Shri Mahatma Basweshwar Education Society's

# Mahatma Basweshwar Mahavidyalaya, Latur

## (NAAC Re-Accredited with 'A' Grade)

### One-Day National Conference
### On
### RESEARCH FRONTIERS IN GEOGRAPHY

### 8th February, 2019

**Organized by**
**Department of Geography**
**(U.G., P.G. & Research Centre) and**
**Internal Quality Assurance Cell**

• In Collaboration With •

*Marathwada Association of Geographers, Latur*
*and*
*Swami Ramanand Teerth Marathwada University, Nanded*

SPECIAL ISSUE OF
AAYUSHI INTERNATIONAL
INTERDISCIPLINARY
RESEARCH JOURNAL

PEER REVIEW & INDEXED JOURNAL

www.aiirjournal.com

EDITORS
Dr. N. G. Mali
Capt. Dr. B. M. Godbole
Dr. S. R. Dharashive
Dr. S. P. Dharne
Dr. S. M. Ijare

Shri Mahatma Basweshwar Education Society's

# Mahatma Basweshwar Mahavidyalaya, Latur

(NAAC RE-ACCREDITED 'A' GRADE)

*One-Day National Conference*

*On*

## RESEARCH FRONTIERS IN GEOGRAPHY

**8th February, 2019**

*Organized by*

**Department of Geography
(U.G., P.G. and Research Center) and
Internal Quality Assurance Cell**

*In Collaboration With*

**Marathwada Association of Geographers, Latur**

*and*

**Swami Ramanand Teerth Marathwada University, Nanded**

*Chief Organizer*

**Dr. U. V. Biradar** (I/C Principal)

Convener             Co-Convener

**Dr. N. G. Mali**        **Capt. Dr. B. M. Godbole**

### Local Organizing Committee

**Dr. S. R. Dharashive**     **Dr. S. P. Dharne**     **Dr. S. M. Ijare**

**Mr. B. P. Pawar**     **Mr. R. A. Salunke**

# Editorial.........

We are very happy to present the proceedings of national conference on "Research Frontiers in Geography" on 8th February 2019 organized by Department of Geography, Internal Quality Assurance Cell (IQAC), Mahatma Basweshwar Mahavidyalaya, Latur in collaboration with Swami Ramanand Teerth Marathwada University, Nanded and Marathwada Association of Geographers (MAG). We sincerely hope that the purpose of the conference has been served through a discussion of a number of issues presented by the resource persons and participants of this conference.

The Department of Geography of Mahatama Basweshwar Mahavidyalaya, Latur has always been activity organizing different academic and co-curricular activities that would help to enhance the knowledge of students and researchers. This conference aimed at providing a platform to academicians, researchers, students and stake holders to discuss varied issues regarding research so as to arrive at some positive results. We, as inhabitants of this earth, are well aware of the significance of research methods, e-sources and new trends in geography. Research papers included in this proceedings are varied in their nature and cover a wide range of topics. No attempt has been made to place these papers in any defined order. In general, the research papers, which are included in this proceedings, have current concern covering branches of Geography.

The publication of this proceedings has become possible in time due to the support of contributors and valuable time spelt by referees. I take this opportunity to extend our sincere thanks to the authors of the research papers, to BoS members of geography, MAG members, S.R.T.M. University, Nanded and also to the principal, teaching and non-teaching staff of the college.

We thank all the eminent persons who have been instrumental in making this conference a success. We express our gratitude for the co-operation and help received from all colleagues, organizing committee members and all those who have contributed research articles. I am immensely pleased to place this special online issue with ISSN and the impact factor 5.707 entitled Aayushi International Interdisciplinary Research Journal. I am thankful all the delegates, research fellow and students who support us by sending 127 research papers.

In this proceedings we have included various articles on a number of relevant issues. We would like to declare that the final responsibility of the facts, figures and opinions expressed in the research papers and articles lies with the concerned authors. We have taken utmost care to avoid printing mistakes in this proceeding. However, we apologize for any mistakes that may have occurred unknowingly.

<div style="text-align: right;">

Dr. Narendra G. Mali

Convener

</div>

08th February, 2019.
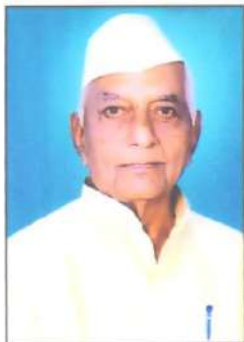
दिनांक :

## Message

Honourable dignitaries and dear delegates, with immense pleasure and pride, we, on behalf of the Governing Council of Shri Mahatma Basweshwar Education, Latur, heartily welcome you all to the One-Day National Conference on **Research Frontiers of Geography** organized by the Department of Geography (U.G., P.G. & Research Centre) of Mahatma Basweshwar College, Latur in collaboration with Swami Ramanand Teerth Marathwada University, Nanded and Marathwada Association of Geographers held on 8th February 2019, we have made all the possible efforts to make this Conference rewarding, enlightening and unforgettable one.

Mahatma Basweshwar College, Latur, right from its inception, has shown academic excellence and the students have won the meritorious awards and have maintained top-ranks in the university examination as well as extra-curricular activities. We have been enhancing, enlightening and creating the doctors, engineers, medical practitioners, teachers, officers as well as social engineers. Last year, our college has been reaccredited with 'A' grade by NAAC.

Researchers have been studying natural hazards for more than a century and Geoinformatics for a few decades. The research on Natural hazards, problems and calamities has been widely increasing in Geography.

This Conference aims to bring together Scientists, Geographers, Teachers, Research Scholars to exchange their views and ideas for a better understanding in the subject. On behalf of this occasion, we welcome all the delegates and express our sincere gratitude to all the well-wishers and members of the organizing committee for their moral support, cooperation and painstaking efforts to organize this National Conference.

We wish a grand success for this proposed National Conference.

**Shri Manmathappa Lokhande**
Secretary
S. M. B. Education Society, Latur

**Shri Shivshankarappa Bidve**
President
S. M. B. Education Society, Latur

Respected Sir,

It gives me great pleasure to know that you organised NATIONAL CONFERENCE on RESEARCH FRONTIERS IN GEOGRAPHY recently.

I sincerely feel that this opportunity will helpful in all activities organised by the College time to time.

I hope that your continuous support, encourgament and blessings will be helpful in the future too.

This noble work of spreading GEOGRAPHY, message among the students and Colleagues, will benefit all to build up their knowledge.

Wish you Happy and Prosperous new year 2019.

Thanking You.

Dr. Baliram Lahane
Joint Director (Higher Education)
Nanded

|| सा विद्या या विमुक्तये ||

## स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड
"ज्ञानतीर्थ" परिसर, विष्णुपुरी, नांदेड - ४३१६०६ (महाराष्ट्र)

### SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED
"Dnyanteerth", Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)
Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade

Phone : (02462) 229246

Fax : (02462) 229572

## OFFICE OF THE REGISTRAR

Website: srtmun.ac.in

E-mail: srtmunregistrar@gmail.com

## MESSAGE

I am very happy to note that Department of Geography, Mahatma Basweshwar Mahavidyalaya, Latur is organising a one day National Conference on "Research Frontier in Geography" in collaboration with Swami Ramanand Teerth Marathwada University, Nanded and Marathwada Association of Geographers, Latur on 8th February, 2019.

The important research areas will be discussed in the conference mainly Physical Geography, Human Geography, New Trends in Environmental Management, Regional Issues about Development and Planning, Post Doctoral Research and Modern Techniques in Geographical Research.

This is good opportunity for young researchers that new methodologies and new trends in geographical research will be discussed with Eminent Scientists and Researchers in the conference.

I hereby congratulate the management of the institution, Principal, organiser and their team. I express my best wishes for the grand success of this academic event.

With regards,

(Prof. Dr. Ramjan M. Mulani)
Registrar,
Swami Ramanand Teerth Marathwada University,
Nanded.

Date 03rd February, 2019

जवाहरलाल नेहरू विश्वविद्यालय   **J**AWAHARLAL **N**EHRU **U**NIVERSITY

Centre for International Politics, Organization and Disarmament (CIPOD)
School of International Studies, New Mehrauli Road, New Delhi-110067

**Dr. B. C. Vaidya**

Professor in Geography

Mobile No. 09422512246 Email ID: vaidya2255@gmail.com

To,
    **Department of Geography,**
    **M. B. College, Latur**

It is a great honour and pleasure for me that our College is organizing One Day National Conference ofMarathwadaGeographers Association, Laturin association with Swami RamanandTirth University, Nanded. The theme of the conference is 'Research Frontiers in Geography'. This theme is relevant for the present day situation as there is a gap in present researchon various topic and sub-topics. The dimension of research ofsubject has increased with flourishing newer branches in geography like tourism geography, soil geography, geomorphology, environmental geography and huge application of RS, GIS and GPS techniques enlarging the horizons of the research. In this context, researchers should rethink the subject matter and go for innovative themes to be undertaken for search in geography. This event would be a great opportunity to meet and exchange the ideas searching new research frontiers in geography. I congratulate the organizers of holding one day Conference. I hope that this one day deliberations and outcome will go a long way in creating awareness and provide new inside.

I wish a great success for this conference.

**Professor in Geography**
**CIPOD/SIS,**
**Jawaharlal Nehru University, New Delhi &**
**Editor-in-Chief,**

KARNATAK UNIVERSITY, DHARWAD

*University with Potential for Excellence*

**DR. ARAVIND MULIMANI**
PROFESSOR& CHAIRMAN
 DEPARTMENT OF GEOGRAPHY
**CHIEF**
UNIVERSITY EMPLOYMENT INFORMATION AND GUIDENCE BUREAU

Bhoosir 79/B KIADB Layout
Tapovan Haliyal Road,Dharwad-580 003
Tele / Fax [O]: 91+836+2215225
e-mail: aravindmulimani@gmail.com
Cell : +919480750844

**Date: 25-1-2019**

## MESSAGE

It gives me an immense pleasure and proud privilege to write a message in the auspicious occasion that the Mahatma Basweshwar Mahavidyalaya, Latur is organizing the National Conference on **Research Frontiers in Geography** with the joint venture has been made by the Marathawada Association of Geographers and S.R.T.M. University Nanded on 8$^{th}$ February, 2019. I wish the Conference with lot of imputes and extend the horizon of the knowledge in the discipline through the deliberations and maintain the academic excellence and enhancement of the research in the discipline cater to the need of the society and future generation. I am assured that the thought provoking innovative ideas by the expertise scholars may float in the National Conference. Hope, the academic discussions are to be fruitful and deliberations are effective.

**I WISH THE CONFERENCE WITH GRAND SUCCESS**

**DR. ARAVIND MULIMANI**
CHAIRMAN

**DEPARTMENT OF LIBRARY & INFORMATION SCIENCE**
**SANT GADGE BABA AMRAVATI UNIVERSITY**

Dr. Mrs. V. P. Gudadhe
Professor & Head

Phone : (O) 0721-2662358  Ext. 245
Mobile : 09403740095
Fax : 0721-2662135, 2660949
E-mail : vaishalichoukhande@sgbau.ac.in
vpgudadhe@gmail.com
Amravati-444602 (M.S.), India

Ref. No.

21-01-2019

## MESSAGE

It's matter of pride that Shri Mahatma Basweshwar Education Society's Mahatma Basweshwar Mahavidyalaya, Latur is organising one day National Conference on "Research Frontiers in Geography" on 8th February, 2019.

The subject Geography itself is the vast research area and there are many thrust areas including natural sciences and social sciences i.e. Physical geography and Human geography. One has to learn and understand how the world's basic physical systems work and affect our everyday life. Also we have to learn more about the geography of a different era and the role it played in people's lives, environments and ideas. Geography plays a major role in our history and has helped mold the world we live in today. Urbanisation has changed the world and its societies.

The topic of present conference is a splendid effort in that direction since the debate and discussion will be a kind of retrospection in the area of research for the researchers. I hope all the faculty members and research scholars will seek this occasion of required brainstorming for their future prospects for research.

I must appreciate the sincere efforts of the organisers to have this national conference as related issues will be discussed and issue of plagiarism in research is very much important to maintain the academic integrity and honesty in the institutions as per UGC guidelines. I regard this to be one of the important steps to identify and strengthen research in thrust areas. I extend my sincere wishes for the grand success of this national conference.

(Dr. Viashali P. Gudadhe)

# MESSAGE

It gives me great pleasure that the Department of Geography, S. M. B. Education Society's Mahatma Basweshwar Mahavidyalaya, Latur is orgnizing one day National conference, on "Research Frontiers in Geography" scheduled to be held on 8th February 2019. The college is located in urban area and has played a very important role in education field in Latur and surrounding regions. I congratulate the organizer that they selected such innovative theme for the conference. It is one of the needs of discussion on research frontiers for more and more improvement in geographical research. I think that there number of new dimensions of geographical research and number of new techniques and tools of geographical research introduced by various scientist in recent years. As like education, research is a continue process. In my opinion, in true sense, research is a basic way of any development. This is an opportunity for geographers to interact with resource persons and eminent personalities.

I congratulate the management, Principal, and faculty members for organizing the National conference and express my best wishes for its success.

Dr. Arjun H. Nanaware
Dept. of Geography & Research Center,
Shri Shivaji Mahavidyalaya, Barshi.
Academic council member
Solapur University, Solapur.

*Conveners Desk.........*

With immense pleasure I heartly welcome all the dignitaries, delegates, research fellows and students to the One Day National Conference on "**Research Frontiers in Geography**", organized by Department of Geography, Internal Quality Assurance Cell (IQAC), Mahatma Basweshwar Mahavidyalaya, Latur in collaboration with Swami Ramanand Teerth Marathwada University, Nanded and Marathwada Association of Geographers (MAG). We have taken all the possible efforts to make this conference successful and enlightening. It is our great privilege to have studious geographers as the chief guests, resource persons of the conference.

Now-a-days research is increasing in all the disciplines of knowledge. Geogrphy is such a subject which concerns physical as well as humen aspects. Therefore, research in geography is very vast. The new technologies and theoretical perspectives that emerged in the last decades of 20th century helped to redefine the objects of geographers' inquiry and extend the methods in use for collecting and analysing data and evaluating research. They also concerns about the criteria, norms and values for human action and conduct. In physical geography data availability increased dramatically after earth observataion satellites were launched in the 1970s. At the same time some human geographers began to seek alternatives to using spatial analytical methods i.e. quantitative, objective and scientific to explain, represent and understand human actions and landscapes.

Learning about research should be a rewarding experience that allows students to pursue their own interest, lern more about a chosen topic and examine a subject from defferent perspectives. The best reason for researching a topic in depth is that one finds it stimulating and important. But students should also be encouraged to approach the eclecticism of their chosen discipline with a broad mind and an ecumenical spirit. Many prominent geographers have been attracted to the field precisely because of its wide remit and some topic that are now considered mainstream were not considered to be patrt of the discipline so we encourage students to let their imagination run free as they select objects of analysis and ways to study them.

I am confident that your interactions, your discussions, your observations, your experiments and conclusions will be surely fraithful for the research methods in geography.

With best wishes

Dr. N.G. Mali
*Convener*

# Marathwada Association of Geographers, Latur

# Key Note Address
## on
# RESEARCH FRONTIRES IN GEOGRAPHY

**Dr. Aravind A. Mulimani**
Professor & Chairman
Department of Studies in Geography
Karnatak University, Dharwad.
Karnataka State, India

I deemed it, it is a proud privilege for me and is an opportunity to deliver keynote address in this august gathering to highlight some of the important thoughts related to the main focal theme of the National conference on **RESEARCH FRONTIRES IN GEOGRAPHY**organized by the Department of Geography of Mahatma Basaveshwar Mahavidyalya Latur with collaboration of Marathawada Association of Geographers, Latur and Swami RamanandTeerthMarathawad University, Nanded.

Research is gaining much significance in the modern world in any geographical space. It is not only confined to the specified discipline but also has scope in the other discipline. Research is a continuous process not only added knowledge in the specified filed but also enhance the horizon of the discipline. The innovative research is definitely developed in the well fertile land of intellectual mind. The intellectuality is the main force for an effective research through the vast knowledge in the discipline and also the broader way of understanding the society. Therefore, the research has much significance in the any discipline in the world where, geography is also not an acceptation.

It is not only for the academic way of thinking but also to look into the needs of the society for their welfare. The research outcome could be the planning tool and also could be the good guidelines to design the planning strategy for further development.

As far as research frontier in geography is concerned, it has a long history with the confrontation of methodology. In the ancient period it was popularly known as descriptive in nature. As and when the centuries have passes through, the methodology was also changes and accordingly the descriptive to systematic, comparative, empirical methods where adopted. Later on, the Analytical Inductive and Correlative method has long way to employed by the academician and developed the discipline. After the quantitative revolution, the scenario of the geography discipline has changed drastically. As a result, the synthesing the matter with quantification method has gained much significance. The development of science and scientific method, the mathematical models, statistical tools and quantitative techniques have helped the researchers to take a kind of innovative research in the discipline. Surprisingly, the methodologies related to the physical geography will not suites to the human geography and viva-versa. The similar manner, the methodology in agricultural geographic research is not applicable to tourism geography. The research methodology in Population geography may not suite in the branch of geomorphology. The climatological approach will not be useful for cultural geography. Therefore, the methodology in social sciences is definitely differ and not applicable to science and technology. The methodological approach has its own status in a particular related discipline and has a limitation and cannot be extending its horizon. As far as multi-branch or multidiscipline research is concerned, the combinations of the methodical approach has to play a vital role and employed that kind of methodological oriented approach in the research in a specified discipline.

The numerical data delt by using the statistical methods in any branch of the geographical research without the spatial information is incomplete and hence, the spatial and non-spatial data is to be integrated through the Geographical Information System and Remote Sensing is totally broken the barriers of the methodological confrontation. Therefore, the frontier has minimized in the geographical research through the spatial technology. The Geographical Information System, Remote Sensing and Global PositingSystem are the recent research methodological tools in geography.

The geo-informatics is the best technological oriented tool available in the academic environment. The minute of the micro level analysis could possible from this and to cater the need of the society. The effective planning strategy could be the outcome the geo-informatics. It has capability to integrate the spatial and non-spatial data together and convert the geographical data is permissible for spatial analysis. GPS is really useful tool to the travel operators for specific locations not only the tourist destinies but also other required locations. There are many planners, academicians, private personalities are utilizing this. The academic endower in the wider manner has enhanced due to its applicability. The governance is always looking forwards the applications of geo-informatics in the administration. Therefore, there will be a lot of avenues to the geographers to play a role not only in the academic point of view but also to the society need.

In view of the above issues, which I have  focused on the focal theme of the today's conference could be  the  good  guidelines  and  is   an  opportunity  to  explore  the  best  possible  manner  for  interaction  with  an academicians, planners and policy makers  in the deliberation.

It is the need of the hour for every one look into the further extension of the horizon of the knowledge in the field of geography in particular and rest of the discipline in general.

# Types or Techniques of Sampling

**Dr. Arjun H. Nanawarwe**
Department of Geography & Research center
Shri. Shivaji Mahavidyalaya, Barshi.

**Meaning of Research:**

A careful investigation or inquiryspecially through search for new facts in any branch knowledge. (Oxford dictionary, 1952)

Redman & Mory defined research as a "Systematic effort to gain new knowledge".

Robert Burns (2003) describes research is a systematic investigation to find solutions to a problem.

Scientific research method depend on the collection of empirical facts and for meaningful understanding facts must be ordered in some fashion, analyzed, generalized and related to other facts.

The scientific method could be either be an inductive method or the deductive method. Inductive method involves establishing generalization. While deductive method involves testing gereralisations, i.e. it is a process of reasoning from general principal to particular instances.

**Steps in Scientific Research:**

Define the problem
Review of literature
Formulate the hypothesis
Plan the research design
Collection of data
Analysis the data
Draw conclusions
Replicate the study
I want share my thought about the sampling techniques for primary data collection

While planning the data collection for any research, investigator has to make several decisions. Most important of these decisions is to choose between census enquiry and sample enquiry.

**Census Method:**

If in our investigation, we study each and every unit of the population or universe, the method of investigation so called the census method.

**What is sampling?**

"A sample is a part of the population which is studied in order to make inferences about the whole population". – Manheim

"A Sample as the name implies is a small representative of a large whole". -Goode and Hatt.

A Sample is a portion of people drawn from a large population. It will be representative of the population only if it has basic characteristics of the population from which it is drawn.

**Key Terms in Sampling:**

**1. Universe or population**

**2. Target population:**

3. **Sample size:**

$$\text{Sample Size } = N \div 1+N \text{ (e)}^2$$

Where N is total population and 'e' is error or confidence level.

**4. Sampling elements:**

**5. Sampling unit:**

**6. Sampling Frame:**

**7. Sampling trait:**

**8. Sampling Fraction:** Formula is - Size of sample ÷ Total population

**8. Sample estimate:**

**9. Biased sample:**

**10. Parameters:**

**11. Sampling error:**

The sampling error generally decreases with increase in sample size.

**The following factors should be considered while deciding the sample size**

1. Population size:
2. The resource available:
3. The degree of accuracy desired:
4. Nature of population:

.**Techniques of Sampling or Types of a Sampling:**

Accuracy of the judgment in this case depends upon how scientifically sample has been taken from the population. Different methods of drawing a sample out of a given population have been developed by the statisticians. Famous sampling techniques are discussed below:

**Types of Sampling:**

**A) Probability sampling:**

Probability Sampling is one in which every unit of population has an equal probability of being selected for sample. It offers a high degree of representativeness.

1. Simple randomsampling2. Stratified randomsampling3. Systematic sampling, 4. Clustersamplingor Multistage sampling 6. Multi phase sampling

**B) Non probability Sampling:**

Non probability sampling makes no claim for representativeness, as every unit does not get the chance of being selected, researcher decides which sample units should be chosen.

1. Convenience sampling, 2. Purposive sampling, 3.Quota sampling, 4.snowball sampling, 5. Volunteer sampling

**1. Random Sampling:**

This is a sampling technique in which all the individuals or units in the population have same chance to be included in a sample. In other words, when in a choice of sampling, no bias is present, technique of sampling is called as random sampling. Suppose in a class there are 70 students and we are to take a sample of 10 students. If these students are drawn without any discrimination regarding their sex, intelligence, caste, religion etc., technique of sampling will be called random sampling and sample drawn will be called as random sample.

Different statisticians define random sampling as below –

"A random sample is one in which every member of the parent population has had an equal chance of being included". – F. Yates

"Random Sampling is the form applied when the method of selection assures each individual or element in the universe an equal chance of being chosen". – Patron

**Lottery Method:**

In this methods the various units of the universe are represented by small chits of paper. These chits of paper are folded and mixed together. From these well mixed chits, the required numbers of chits are picked out blindfolded. The population units corresponding to these chits are taken in a sample.

**Random Number Tables:**

Lottery method is inconvenient when size of population is large. In such case we use random number tables. In such case we use random number tables. These tables have been constructed in such a way that various digits from 0 to n appear with approximately the same frequency and independently of each other. This method is very easy. The steps involved are:

(a) Each unit of the universe must be identified and given a serial number.
(b) Any page from random number tables can be used. They can be used either in rows or in columns.
(c) The units of the population which correspond to the number in the table will constitute the sample.

**2. Stratified Random sampling:**

Though random sampling method is a scientific method and is free from personal bias, yet it may give a sample which is not a true representative of the population especially when population is heterogeneous in nature. Purposive sampling has a severe limitation of presence of human bias. Stratified random sampling technique is a mixture of random sampling and purposive sampling and overcomes these limitations of the two methods.

This method is generally used when population is heterogeneous in nature, i.e. when large variations are present in the population. In this method, firstly, entire heterogeneous population is divided into more or less homogeneous sub-populations called as strata (singular is stratum). The division of the population into strata or groups is done according to some relevant characteristic. After making this division a random selection of sample is made from each stratum. Generally (not compulsory), the number of units selected from each stratum is proportional to the numbers of units of that sample in the total population.

**3. Systematic Sampling:**

Method of purposive sampling suffers from human bias. Random sampling method and stratified random sampling method are difficult one. Systematic sampling is a very simple technique of taking a sample out of given population and this technique is free from human bias.

In this technique a complete list of population units is formed. List may be formed in alphabetical, geographical, numerical or some other order. The units of population are serially numbered After this sampling interval or sampling ratio is calculated using the following relation.

$$K = \frac{\text{Size of population}}{\text{Size of sample}} \text{ or } K = \frac{N}{n}$$

Using this K value, Population is divided into n parts. A number is selected randomly from first part. This number is denoted by 'I' and is called as random start. After this every number at difference k is selected from each of the 'n' parts.

$$I, I + K, I + 2K, I + 3K \text{ ------- } I + (n - 1)K.$$

## 4. Cluster Sampling or Multi – Stage Sampling:

Cluster sampling refers to the procedure of dividing the population into groups called clusters and drawing a sample of clusters to represent the population.

In cluster sampling, the population is distributed into a number of first stage sampling units and a sample is taken of these first stage units by random sample method. This is the first stage of sampling process. Each of these selected first sample units is further sub – divided into the second stage units. From these again a sample is taken by random sample method. Further, stages may be added if required. Accordingly, cluster sampling may be single stage sampling, two stage sampling or multi – stage sampling.

## 5. Multi-phase Sampling:

The process in this type is same as in multi-stage sampling. i.e. primary selection, secondary selection, and so on. However, in a multi-phase sampling procedure, each sample is adequately studied before another sample is drawn from it. Consequently, while in multi-stage sampling, only the final sample is studied, in multi-phase sampling, all samples are researched. This offers advantages over other methods because the information gathered at each phase helps researcher to choose a more relevant and more representative sample.

## 6. Purposive Sampling:

This technique of drawing a sample is also called as 'judgment sampling' investigator selects sample according to his judgment. For drawing a good sample, the investigator must have knowledge of the nature of population and purpose of statistical enquiry. This method is a subjective method and each investigator will draw a sample according to his own judgment.

## 7. Quota Sampling :

Quota sampling is common in making surveys of public opinion. Interviewers are given definite quotas of persons in different social classes, different age groups, different regions etc. interviewers are told to interview these persons. Within the quotas, the selection of sample items depends upon personal judgment of the interviewers. The quotas ensure that the total sample includes approximately the right proportion of persons of various categories.

## 8. Convenience Sampling:

When a sample is neither selected by judgment nor by chance but by convenience, method is called as convenience sampling. Part of a population taken in a sample is called as a chunk. Therefore, this method is also called the chunk method.

9. **Snow ball sampling:**

In this technique, the researcher begins the research with the few respondents who are known and available to him, subsequently, these respondents give other names who meet the criteria of research, who in turn give more new names. This process is continued until 'adequate' number of persons are interviewed or until no more respondents are discovered.

## Choice Among Different Sampling Techniques:

Selection of a suitable method for any investigation depends upon several factors. These factors are.

Availability of time, Availability of finance, Availability of labour, Degree of accuracy desired, Position of the investigator, Nature of population.

# Index

# Index

# Spatial Distribution of Health Care Facilities in Latur City

**Capt. Dr. B. M. Godbole**
Department of Geography
Mahatma Basweshwar Mahavidyalaya, Latur.

**Abstract:**

*Urban Geography attempts to analyse the geographical conditions which are significant in the building of urban centres. It shows how a particular site attracts the people to settle and develops thereafter, with the increase in its functional activities and civic organization. Present investigation was carried out to study the spatial distribution of medical and educational facilities distributed in Latur city. For this study data used for the present research work was collected from both the sources i.e. primary and secondary. From the present investigation it is concluded that the distribution of dispensaries are uneven in Latur city. Study region has 236 dispensaries, 221 hospitals. The distribution of hospitals, dispensaries and doctors are not uniform in Latur city. Mobile health care facilities should be increased in the city as well as in rural areas. The number of govt. hospital centers should be increased.*

**Keywords:** Urban Geography, Dispensaries, Hospital, Spatial Distribution.

**Introduction:**

Medical Geography is the application of geographical concept and techniques to health related problems. It includes the study of the spatial analysis of various aspects of human health problems. Medical Geography in India is underdeveloped branch of geography. Hesterlow (1929) was the first researcher who threw light on the possible relationship of environmental factors and disease in southern India. Later, Arther Geddens (1942) made a very important contribution when he tried to find the relationship between the general conditions of health and population growth in India. Learmonth (1957) provided a scientific base to the researchers of Medical Geography in India.

Many research scholars have done research work on disease ecology. Some have done research work on Geography of nutrition and disease ecology. Very few research work is carried out on socio-cultural aspects of health behavior and traditional medicine, health care Geography and family planning programme. Akhatar and Nilofar Izar (1985) have studied the inequalities in the distribution of health care facilities in India. They have highlighted the imbalances in availability of health facilities in different regions at state level. The present study includes the spatial distribution of health care facilities such as dispensaries, hospitals and doctors etc. The study is based mainly on primary source of data.

**Choice of the Region and Topic:**

The choice of the study area and the topic has been influenced by several considerations. Latur city is one of the fast growing cities in Aurangabad division as well as in Maharashtra. As yet no systematic study has been done in geographical point of view of Latur. It is situated on 633.85 meter from mean sea level and developed on the plateau of Balaghat. The climate of the city is generally dry. The area of Latur city is 32.55 square kms. According to 2001 census population of the city was 297635, which increased to 382754 as per the census of 2011.

Latur is one of the important cities in the region which perform many functions. It performs different functions like educational, industrial, commercial, administrative etc. Food grain trading is main function of Latur city. There is irregular growth in the city due to natural increase in population and immigration which affect the morphology of the city. Population composition of Latur city is heterogeneous with complex land-use pattern. Land, roads, lanes, railway lines, buildings, industrial units and population form part of city structure. The author is born and brought up at Latur city and knows various functions and service activities of this centre. All these considerations motivated the author to carry out research work to study medical and educational facilities distributed in Latur city.

**Methodology:**

Present work is based on primary and secondary sources of data. Primary data is collected to analyze health facilities. The secondary data for the present investigation has been collected from following sources.

1. The Reports of Municipality Office of Latur.
2. District Census Hand Book of Latur District 1991-2011.
3. Socio-Economic Review and District Statistical Abstracts of Latur city.
4. The Gazetteer of Latur District.
5. Reports of Town Planning.
6. Different department plans of Zilla Parishad, Latur

Data used for the present research work is collected from both the sources i.e. primary and secondary. The primary data have been collected at the time of field work.

Secondary data collected from different sources, basically from Gazetteers of Osmanabad and Latur district, District Census Handbooks of 1981, 1991 and 2001, Annual Reports published by Latur Municipal Council, Silver Jubilee Report of Latur district and Town Planning Office of Latur.

The data collected from different primary and secondary sources is analysed and tabulated. Information collected in the research work is presented through graphs, diagrams and maps.

**Results and Discussion:**

**Sectorwise Distribution of Dispensaries and Hospitals in Latur City:**

The dispensary is the point of first contact for most of the patients. It is a place where medicines are dispensed. Dispensary consist of the family practitioner services and community health services. Here, an attempt is made to study the distribution of dispensaries in Latur city. It is observed that the distribution of dispensaries are uneven in Latur city. It is observed from Table, No. 7.1 that there are 236 dispensaries in 11 sectors of Latur city.

**Table, No. 1: Sectorwise Distribution of Dispensaries and Hospitals in Latur City**

| Sector No. | Dispensaries | | Hospitals | |
|---|---|---|---|---|
| | In Nos. | In % | In Nos. | In % |
| I | 29 | 12.29 | 3 | 1.36 |
| II | 17 | 7.20 | 6 | 2.71 |
| III | 22 | 9.32 | 18 | 8.14 |
| IV | 33 | 13.98 | 65 | 29.41 |
| V | 09 | 3.81 | 17 | 7.69 |
| VI | 13 | 5.51 | 18 | 8.14 |
| VII | 10 | 4.24 | 14 | 6.33 |
| VIII | 17 | 7.20 | 5 | 2.26 |
| IX | 24 | 10.17 | 13 | 5.88 |
| X | 29 | 12.29 | 19 | 8.60 |
| XI | 33 | 13.98 | 43 | 19.457 |
| **Total** | **236** | 100 | **221** | 100 |

*Source: Based on field work.*

The Sector No. XI and Sector No. IV have highest number of dispensaries i.e. 13.98 percent. Sector No. I and X are slum area with largest population those sectors have the second highest number of dispensaries in this area i.e. 12.29 percent. There are few number of hospitals therefore, number of dispensaries are found more. Sector No. V has lowest number of dispensaries i.e. 3.81%, followed by Sector No. VII with 4.24% dispensaries.

**Spatial Distribution of Hospitals in Latur City:**

Hospital management requires an analysis of utilization of hospitals. In India number of researchers have done research work on location of hosplitals, travel costs and patient behavior pattern. Shannon, Dever (1974) and Whitelegg (1982) have studied spatial patterning of hospital facilities. Stimson (1980) has studied spatial pattern of use of hospital in Australian situation. Geographical inequalities in hospital bed, population ratios are not limited to capitalist societies (Cole and Harrison, 1978).
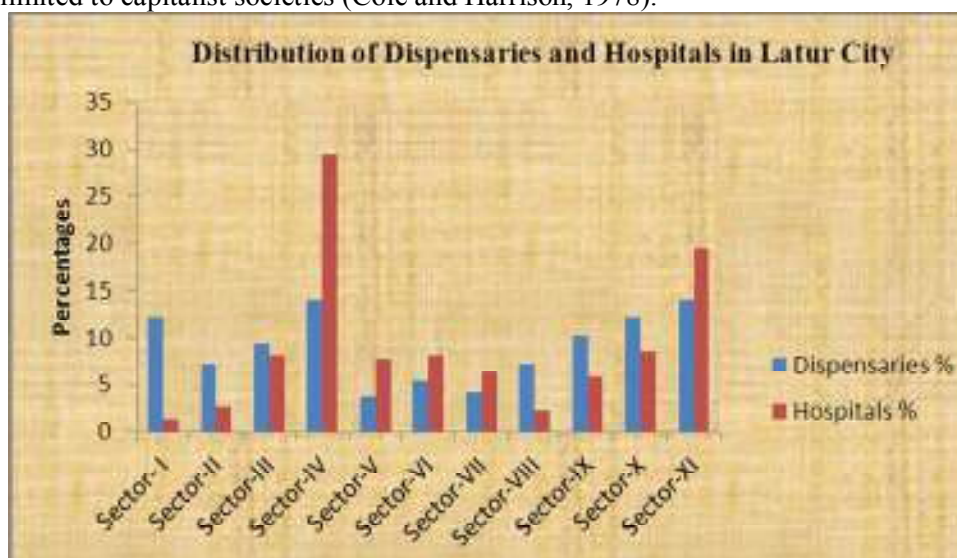


**Fig. No. 1**

Here an attempt has been made to analyze the distribution of hospitals in Latur city. There are 221 hospitals located in 11 sectors of city but the distribution is uneven. The Sector No. IV has highest number of hospitals i.e. 29.41 percent. In this sector, there are 65 hospitals located from Rama theatre to Ganjgolai. This is central part of the city where accessibility is more. The area from Gandhi chowk to Rma theatre is known as hospital line where concentration of hospitals are very high. Sector No. 11 ranks second in number of hospitals. It has 43 hospitals i.e. 19.45% hospitals of the city.

Sector No. I has only 3 hospitals that is 1.36 percent hospitals of the region.. Sector No. III, V, VI, VII, IX and X have 18, 17, 18, 14, 13 and 19 hospitals. Accessibility is very significant factor affecting on location of hospitals in Latur city. The spatial distribution pattern of dispensaries and hospitals is shown in Table, No. 1 and in Fig. No. 1.

**Spatial Distribution of Doctors, Health Care Centres and Hospital Beds in Latur City:**

Social, cultural and professional climate of the area affect on the distribution of doctors in the city. The distribution of doctors in Latur city is very uneven.

There are 709 doctors in the study area. Out of 11 sectors 3 sectors particularly Sector No. IV, X and XI have nearly fifty percent of doctors to the total number of doctors. The Sector No. IV is concentrated with number of hospitals therefore, it is also popularly known as Hospital line. Sector No. IV is concentrated with highest (193) number of doctors. The Sector No. XI ranks second for number of doctors with 14.39 percent doctors. This area starts from New Renapur Naka to Shivaji Chowk where S.T. Stand is located. It is most accessible part of the city by road with all types of automobile facilities. The Sector No. X has 72 doctors which accounts 10.16% to the total number of doctors (Table No. 2). The Sector No. I has a few number of doctors i.e. 3.10%. This area is occupied by automobile repairing workshops, Masjit and some residents. Limited number of medical facilities are found in this sector. This area is occupied by mainly low class working groups.

**Table No. 2: Sectorwise Distribution of Doctors, Health Care Centres and Hospital Beds in Latur City**

| Sector No. | Doctors | | Heath care centres | | Hospital beds | |
|---|---|---|---|---|---|---|
| | In Nos. | In % | In Nos. | In % | In Nos. | In % |
| I | 22 | 3.10 | 32 | 7.00 | 78 | 1.99 |
| II | 39 | 5.50 | 23 | 5.03 | 88 | 2.24 |
| III | 52 | 7.33 | 40 | 5.75 | 414 | 10.54 |
| IV | 193 | 27.22 | 98 | 21.44 | 1125 | 28.65 |
| V | 56 | 7.90 | 26 | 5.69 | 281 | 7.16 |
| VI | 42 | 5.92 | 31 | 6.78 | 319 | 8.12 |
| VII | 59 | 8.32 | 24 | 5.25 | 229 | 5.83 |
| VIII | 31 | 4.37 | 22 | 4.81 | 91 | 2.32 |
| IX | 41 | 5.78 | 37 | 8.10 | 236 | 6.01 |
| X | 72 | 10.16 | 48 | 10.50 | 342 | 8.71 |
| XI | 102 | 14.39 | 76 | 16.63 | 724 | 18.44 |
| **Total** | **709** | **100** | **457** | **100** | **3927** | **100** |

*Source: Based on field work.*

In the present investigation it is observed that there is a close relationship between number of health care centers and number of hospital and dispensaries. Health care centre include both the dispensaries and hospitals located in a particular area. There are many dispensaries where single doctor practice is found whereas in hospital more than two doctors are found in practice. In some hospitals they are mainly the members of one family or a couple. There are number of specialized doctors visiting various hospitals on specific days. There are some centers of consulting doctors. Some nursing and maternity hospitals have more number of doctors. Sector No. VIII has lowest number of health care centers that is 22 which includes 17 dispensaries and 5 hospitals. This is followed by Sector No.II including 23 health care centers. Heath care centers of this sector include 17 dispensaries and six hospitals.

Maximum numbers of health care centers are found in Sector No. IV that is 98. About 21.44 percent health care centers are concentrated in these sectors. This includes 33 dispensaries and 65 hospitals. This sector has highest health care facilities with highest number of doctors and highest beds. This sector is followed by Sector No. XI and X with maximum number of health care centers, doctors and hospital beds.

More than one fourth hospital beds that is 1125 are found in Sector No. IV. Multi-specialist hospitals are located in Sector No. IV and in Sector No. XI, therefore, hospital beds are observed highest in those sectors. Sector No. I have only 3 hospitals but dispensaries are 29. This sector has only 78 beds that is 1.99 percent of the total beds of the study region. Sector wise distribution of doctors, health care centers and hospital beds are shown in Table No. 2 and Fig. No. 2
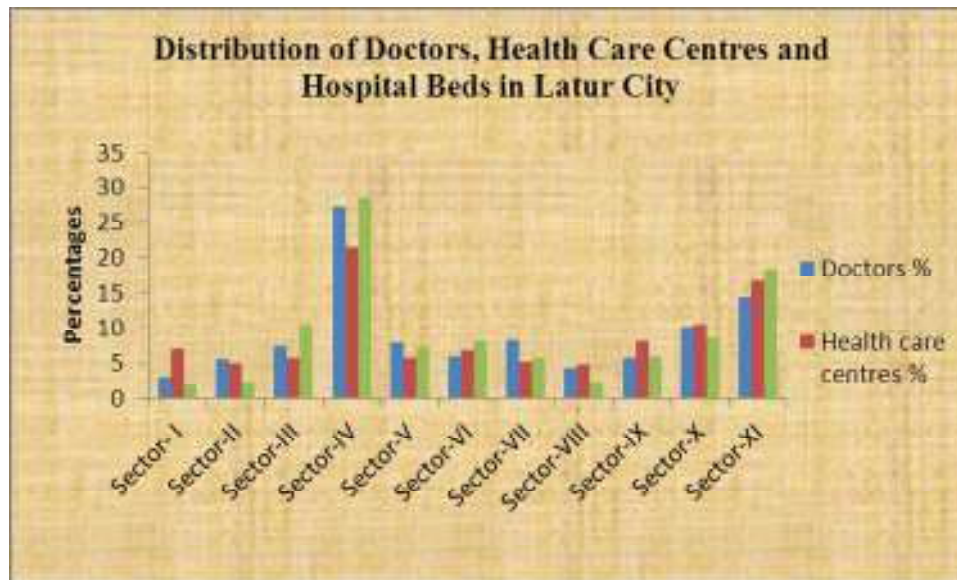
**Fig. No. 2**

**Conclusion:**

From the present investigation it is concluded that the distribution of dispensaries are uneven in Latur city. study region has 236 dispensaries, 221 hospitals which are distributed in 11 Sectors of the study region. They are concentrated mostly in Sector No. IV and Sector No. XI. There are 709 doctors in Latur city. Doctors are concentrated mostly in Sector No. IV that is 27.22% followed by Sector No. XI. Maximum number of hospital beds is also found in Sector No. IV followed by Sector No. XI. The distribution of hospitals, dispensaries and doctors are not uniform in Latur city. These are found more in Sector No. IV and XI. In government hospital the pressure of patients is very high than the private hospitals. Patients coming from rural areas are more in government hospitals.

**References:**

1. *Akhtar R. and Nilofar (1985): 'Inequalities in the Distribution of Health Care in India.' Concept publishing Co. New Delhi.*
2. *Gedden, A. (1942): 'The population of India: variability of changes as regional demographic India,' published in Geographical Review.*
3. *Hesterlow, A.M.V. (1929): 'The Geographical Distribution of diseased with some remarks regarding some common disease in South India'. Published in Journal of Madras Geographical Association.*
4. *Highsmith R.M. (1968) : World Economic Activities, A Geographic Analysis, New York: Harcourt, Brace and World.*
5. *Learmonth, A.T.A. (1957): 'Some contrasts in the regional Geography of malaria in India and Pakistan' published in Transaction of the Institute of British Geographers.*
6. *Reilly, W.J. (1931) :The law of Retail Gravitation, New York, The Knickerbockers Press.*
7. *Shannon and Dever (1974): 'Health Care Delivery' Spatial Perspectives, McGraw Hill, New Delhi.*
8. *Siddharth K. and Mukherjee S. (1996) : Cities Urbanization and Urban systems, Transworld Media and Communication, New Delhi.*
9. *Stimson R.J. (1980): 'Spatial Aspects of epidemiological phenomena and Provision and utilization of health care services in Australia': A review of methodological problems and empirical analysis.*
10. *Zipff, G.K. (1949) : 'Human Behavior and Principle of least effort, Cambridge.*

# Environmental Impact Assessment and Application of GIS to Illustrate Geographical Distribution of Waterborn Diseases

**Dr. V. S. Anigunte**
Principal,
Kala Mahavidyalaya, Nandurghat, Tq. Kaij, Dist. Beed.

*Abstract:*

*Geographic information system "GIS" have been defined in different ways, based on their functions, basic components and uses. Antenucci et al defined GIS as a computer system that stores and links non-graphic attributes or geographically referenced data with graphic map features to allow a wide range of information processing and display operations, as well as map production, analysis, and modeling. Parr defined a GIS according to its basic components, which include: 1) data input and editing, 2) data management, 3) data query and retrieval, 4) analysis, modeling, and synthesis, and 5) data display and output functions. Cowen viewed GIS as the integration of spatial data for decision-support systems. In the most restrictive usage, GIS refers only to hardware and software. In common usage, it includes hardware, software, and data. In some organizations GIS also implies the people and procedures involved in GIS operation.*

**Key Words:** GIS, EIA, Distribution of water Diseases.

## Introduction:

Computers were first applied to geography as analytical and display tools during the 1960s. GIS emerged as a multidisciplinary field during the 1970s due to several factors combined to reinforce GIS development. First, computers became more accessible and less costly. Second, mainframe computers gave way to minicomputers and then workstations, which gave great power to the user and included the access to networks that has led to its own revolution in technology. Third, the types of user interface required to operate technical software changed from batch, command-line, and remote access to windowing systems and "point and click" graphic interaction. The current GIS list hundreds of system suppliers and sources of information and catalogs system capabilities. GIS has now developed to the extent that the contributions of a growing number of parallel disciplines have both influenced and been influenced by GIS. Disciplines now affecting GIS include forestry, transportation planning, emergency services delivery, natural hazards planning, marketing, archeology, surveying, and criminal justice. The power of GIS lies in its ability to 1) integrate and display the spatial and other kind of information within a single system-offering a consistent frame work, 2) allows for manipulating and displaying geographical knowledge in new and exciting ways by putting maps and other spatial information into digital form, 3) makes connections between activities based on geographic proximity, 4) allows for access to administrative records.

## Data and files required of a GIS in their sources:

There are essentially two types of data used in a geographical information system: cartographic data and descriptive or attribute data. Cartographic data provide a spatial or geographical reference for an object, whereas descriptive or attribute information indicates the characteristics of the object. In general, a GIS contains four types of information and computer files: geographic, map, attribute, and data-point files. Geographic files are the heart of a GIS; they contain the data, including the coordinates defining each unit that are going to be mapped. The map files contain information on the names of geographical files and other related files forming the GIS; e.g., names or labels, coverage, colors, map scale, and lines. Attribute files are rectangular data files whose columns list variables and whose rows correspond to individual cases or geographical points. Finally, data-point files are those produced by linking interfacing attribute files and geographic files through a process called geocoding, using an identifier.

## GIS in Health:

The idea that place and location can influence health is a very old and familiar concept in Medicine. As far back as the time of Hippocrates, (460-370 BC), the father of Modern Medicine, when he observed that certain diseases seem to occur in some places and not in others. In 1854, John Snow demonstrated the utility of mapping disease outbreaks to gain insights as to their cause. Snow, an anesthesiologist, mapped the highest density of cases that occurred in households, which used the public pump on Broad Street as their water source. Since the 1990s, GIS have been increasingly used in public health settings. The WHO and UNICEF created the Public Health Mapping Programme in 1993, to establish a GIS to support management and monitoring of the Guinea worm Eradication programme. This has been expanded to a much wider range of public health applications and now includes the promotion and use of GIS for other disease control programmes and in public health departments of a number of countries.

The ability of GIS to combine different entities based on their common geographic occurrence makes it a very valuable tool in epidemiological research, disease surveillance and monitoring. Some recent applications of GIS include vector borne diseases, water borne diseases, environmental health and modeling

exposure to electromagnetic fields. Also GIS is highly relevant to meet the demands of outbreak investigation and response, where prompt location of cases, rapid communication of information, and quick mapping of the epidemic's dynamics are vital. GIS is being used by public health administrators and professionals, including policy makers, statisticians, epidemiologist, medical and district medical officers. Some of its applications in public health are to: find out geographical distribution and variation of diseases, analyse spatial and temporal trends, identify gaps in immunization, map populations at risk and stratify risk factors, document health care needs of community and assess resource allocations, forecast epidemics, plan and target interventions, monitor diseases and interventions over time, monitor the utilization of health centers, route health workers and equipments supplies to service locations, publish health information using maps on the internet and locate the nearest health facility.

**Spatial and Temporal Analysis in epidemiology:**

Public health practice needs timely information on the course of disease and other health events to implement appropriate actions. Most epidemiological data have a location and time reference. Knowledge of the new information offered by spatial and temporal analysis will increase the potential for public health action. GIS are an innovative technology ideal for generating this type of information.

**Spatial Analytic Techniques:**

Spatial variation in health related data is well known, and its study is a fundamental aspect of epidemiology. Representation and identification of spatial patterns play an important role in the formulation of public health policies. Some of the graphic and exploratory spatial data analytic techniques are:

**Point Patterns**: also known as dot maps, attempt to display the distribution of health events as data locations. The ability to overlay data locations with other relevant spatial information is a general tool of considerable power. It is useful for delimiting areas of case occurrences, identification of contaminated environmental sources, visual inspection of spatial clusters, and analyzing health care resources distribution. A classical example of point pattern analysis in epidemiology is the identification of the source of cholera spread in London.

**Line Patterns**: Vectors or lines are graphic resources that aid in the analysis of disease diffusion and patient-to-health care facilities flow. In their simplest form, lines indicate the presence of flow or contagion between two sub regions, which may or may not be contiguous. Arrows with widths proportional to the volume of flow between areas are important tools to evaluate the health care needs of different locations. Use of line pattern analysis is quite common in epidemiology to describe the diffusion of several epidemics, such as the international spread of Acquired immunodeficiency syndrome (AIDS).

**Area Patterns**: The first stage of data analysis is to describe the available data sets through tables or one-dimensional graphics, such as the histogram. For spatial analysis, the obvious option is to present data on maps, with the variable of interest divided into classes or categories, and plotted using colors or hachure within each geographic unit, know as a choropleth map.

**Surface and Contour Patterns**: Surface and contour analysis assumes that a health event is a continuous process observed at a set of geographic points, known as sampling points. Using the $x$ and $y$ coordinates of these sampling points, with an associate $z$ value corresponding to the health event, the estimated spatial relative risk is depicted as a three-dimensional map or surface. The contour map, known as an isoline or isopleth, is the projection of the surface in a plane, and corresponds to constant $z$ values of the defined surface.

**Temporal Analytic Techniques:**

Surveillance of diseases requires continuous systematic collection and analysis of a series of quantitative measurements. The detection and interpretation of changes in the pattern of the constructed time series is very important and therefore this presents a major challenge to the public health systems, as late detection of the 'disease' may result in missed opportunities for intervention.

**Quality Control Charts**: Industrial quality control has developed a series of methods for monitoring. Among them, three major methods appeared in the public health surveillance literature — the Shewhart test, the simple cumulative sum test, and V-mask. These methods are based on a comparison of incoming values from the time series with constant values, usually defined empirically from historical data. The advantages of these methods are that they can provide graphic information, and as such can be incorporated into an information system, helping public health professionals in the surveillance process.

**Statistical Monitoring**: A common measure used by epidemiologists to identify increases in case occurrence of diseases, is the ratio of case numbers at a particular time to past case occurrence using the mean or median. Based on this concept, a monitoring technique has been developed and is currently in use at CDC (Centers for Disease Control and Prevention, USA). Expected values for the current month are computed as the average of data from the corresponding, previous, and subsequent months for the last 5 years.

**Time Series Analysis**: To account for the evolving nature of surveillance data, time series analysis is an alternative for monitoring case occurrence of health events. The common analytical framework uses time

series models to forecast expected numbers of cases, followed by comparison with the actual observation. Detection of changes from historical patterns through forecast error uses the difference between the actual and estimated values at each point in time. In contrast to other monitoring schemes, time series methods use the correlation structure of the data at different time intervals in making estimates.

**Temporal Cluster Analysis**: This method consists of counting the number of cases in each possible time interval of fixed length. The largest number of cases in any such intervals is tested under the null hypothesis that this value is likely to occur in a case of no epidemic. Application of this method involves the assumption of a constant population at risk and a constant detection rate of cases. A modification of the method has been suggested to avoid the restrictive assumptions involved in the scan statistic. Studies of temporal clusters based on the time interval between events have also been described in the literature. These methods assume that the random time intervals of successive cases form an independent and identically distributed sequence of exponential random variables.

**Spatio-Temporal Analytic Techniques:**

Space-time interaction among health events or between health events and environmental variables is as an important component for epidemiological studies and public health surveillance. The bulk of the development in spatio-temporal patterns of health problems has been based on modeling and simulation because of the paucity of available data sets. Similarly with time series analysis, the basis of spatio-temporal analytical techniques is the assumption that observed spatial patterns arise from an underlying process. Modeling this underlying spatial processes allows for the study of disease diffusion process, and the estimation of linear spatial transfer functions which best transform a map at time $t$ into that at time $t + 1$.

**Objectives of the Study:**

This study was conducted to investigate application of the geographic information system "GIS" and Environment Impact Assessment to illustrate the geographical distribution of some of the notifiable water diseases in Latur during the period from 2005-2015.

**Materials and Methods :**
**Source of data:**

A spatially referenced database: Non locational or descriptive data refer to the features or attributes (surveillance data) of 14 notifiable water diseases in Latur in the period from 2005-2015, which are Gastroentritis, Dysentery and Diarrhoea, T.B., Malaria, Typhoid, Cholera, Malaria (Dengu), Scabies, Anemia, Rickets, Heart Diseases, Marasmus, Sugar and Swine Flu.

The epidemiological geographic information system (EPI-GIS) was established using the health mapper GIS software. Linking the descriptive database (on access xp) to the GIS software required the conversion data tables into Access 97, a DBF format. By using the database manager it was possible to join the DBF descriptive data tables to the features attribute tables using the command JOIN. We have used a suitable indicator of the disease which in this study was total number of reported cases yearly for health regions, or created a new indicator if it is not available. The pattern of spatial analysis used was point and area pattern. Digitized data from existing maps provided base layers (topography, land use, roads, rivers, surface water) on which other data can be overlaid. The distribution of cases was displayed as data locations through Health Mapper using the command overlay indicator. Each layer was related to one year or sum of years according to what was requested.

**Notifiable Diseases in Latur:**

Twenty diseases were reported from 290 health centres in the annual health report of Latur district. Ten of these diseases have been reportable since 2000. They were from 68 health centres. Those diseases are Whooping cough, tetanus neonatorum, and other forms of tetanus, measles, mumps, chickenpox, hepatitis A, hepatitis B, unspecified hepatitis, amoebic dysentery, typhoid, rabies, syphilis and other venereal diseases. While studying the distribution of diseases in the rural areas of Latur, it is observed that the prevalence of respiratory diseases is more in the southern parts of the district which are directly connected with major urban centres like Hyderabad and others. The villages which are in the vicinity of these urban centres show more prevalence of respiratory disorders. Rural urban migration is the chief factor for the occurrence of the diseases of atmospheric disorder in these villages. The heart diseases, Tuberculosis and currently leading Swine flu are the notable diseases of these rural and urban areas.

**Results:**

A sequence of maps was produced comparing density of reported cases in all health regions in the Latur during 2015s. Dots in each health centres on the maps mean presence of this number of cases in this health region but do not specify the real location of the cases in each health centres.

**Discussion:**

This computer-based technology has been available for a number of years but it is only recently that it has been widely appreciated as a powerful new tool that supports health situation analysis, operations research, and surveillance for the prevention and control of health problems. Health Geographic Information System (HGIS) has proven to be a potent tool for risk assessment, decision-making, intervention evaluation and health planning. The use of this technology can be tailored to suit a wide range of application; some recent applications include vector-borne diseases, water-borne diseases and environmental health. One of the best examples is application of GIS in malaria control programs which worthy in many countries. In the Latur effort has been made to implement GIS in malaria control mainly in malarious areas like Udgir and Ausa.

GIS was also very efficient when it was used for planning of Latur health care facilities, applied GIS to analyze accessibility to hospitals in Latur. That application identified the parts of the city which require more attention regarding their health care supply. Identifying health care needs is one of the important tasks which health authorities frequently do. Information technology in general and GIS in particular can help the health authorities to make their decision. GIS and remote sensing have been also used to study the transmission and outbreak of Rift valley fever (RVF) in Manjra region. Geographical databases and disease epidemiology have been integrated into decision support system.

The present study demonstrates use of GIS and spatial analysis to 14notifiable diseases. It compares the density of reported cases from all health centers over time every year or every two years which provide quick and reliable information for discussion, planning, assessment, analysis and decision making. Mapping of the incidence/ prevalence of notifiable diseases over geographic areas is the basic application but this information was not available. We therefore used reported cases of notifiable diseases from the annual health report, ministry of health. GIS could generate hundreds of maps and charts of the reported diseases and this study illustrates examples of them. Each layer represent data of one year, moving from one layer to another by activate layer or more reveal where was the density of the reported cases came from and what has changed during that period. Comparing maps of different years can provide excellent means of visualizing trends.

Quick response by activation of one layer or more was very informative when data have been displayed. Comparing maps and charts by using GIS technology has provided immediate visualization of the density difference of reported cases between the health centres during 2015s and was extremely effective in understanding the data.

**Conclusions:**

GIS technology has the potential to revolutionize health surveillance. It gives health professionals quick and easy access to large volumes of data. GIS is valuable in strengthening the whole process of epidemiological surveillance information management and analyses.

Moreover, these systems provide analytical support for the planning, programming, and evaluation of activities and interventions in the health sector. Thus, GIS can be considered part of the decision-support systems for people who formulate and follow health policy.

**Limitations:**

• Skills how to use GIS software which need training and imaginative use of the researchers.
• Lack of population size for each health region to calculate the incidence rates.

**Recommendations**:

• Use of GIS in collecting, updating, managing public health data.
• Completion of reporting data is a very important issue for GIS setup.
• Address many characteristics of notifiable disease into the reporting system e.g. risk factors, incidence and prevalence rate.
• GIS is a new technology that staffs with GIS training and skills are in high demand.

**References:**

1. *Anenucci J.K., Brown P.L., Croswell M.J., Kevany M.J., Archer H. Geographic information systems: A guide to the technology. New York: Van Nostrand Reinhold. 1991.*
2. *Parr D.M. Introduction to geographic information systems workshop. The Urban& Regional Information Systems Association.1991.*
3. *Cowen D.J. GIS versus CAD versus DBMS: what are the differences? In introductory readings in geographic information systems. ed. D J Peuquet and D F Marble.1990; 52-61. London: Taylor & Francis.*
4. *Richards T, Croner C, Rushton G, Brown C, Fowler L. Geographic Information Systems and Public Health: Mapping the Future. Public Health Reports.1999; 114:359-373.*
5. *Clarke K, McLafferty S, Tempalski B. On Epidemiology and Geographic Information Systems: A Review and Discussion of future directions. Emerging infectious diseases.1996; 2(2)*
6. *Elisha Bhakre GIS- Intro lecture. Geography Department of Mahatma Basweshwar College, Latur, 2011.*

# Correlation between Density and Rainfall of Frontier Regions of Nanded District: A Geographical Study

**Dr. Sangmeshwar Dharashive**
Department of Geography,
Mahatma Basweshwar College, Latur.

**Abstract:**

*The density of population is expressed in various ways to understand the relationship between population and resources. These ratios have been designated as arithmetic density, physiological density, agricultural density, geographical density and caloric density. Arithmetic density is a ratio between total area and total population. However, it cannot be used as a measure of population pressure on land because it merely gives a simple quantitative relationship between man and land.*

*According to 2011, census arithmetic density of the Nanded district was 319 persons per sq.km. This is significantly lower than that of Maharashtra in the same year which was 365 persons per sq.km or less than that of India, which was 382 persons per sq.km. The density of population for the study region has been lower than that for Maharashtra as well as for India since 1951. In the decade of 1951 density of the study area increases, it is mainly due to low mortality rates caused by plague epidemic.*

**Key words:** Density, Distribution, Population, Rainfall, Regression, Correlation.

## Introduction:

Distributions of population in an area constitute an important segment of population studies. While distribution, the concepts are quite interrelated and used simultaneously. Distribution of population refers to the way people are spaced over the land; it emphasizes the pattern of actual place location of a population. Distribution of population measures the degree of population concentration or dispersion. On the other hand density of population is most revealing and is useful tool in the analysis of diversity of man's distribution in space. It is a simple concept of relating population size to the land area with a view to assessing the pressure of population upon the resource of area. It is generally expressed in terms of person per sq.km or per sq. mile of land area rather than of gross area. Density of population per unit of area represents the ratio of population to land (Desai, 1985).

## Study Region:

Nanded district is located in the eastern part of Marathawada. It lies in Godawari river basin. It extends from 18º 16' north latitude to 19º 55' north latitude and 76º 56′ east longitude to 78º 19' East longitude (Map No. 2.1). The study region is bounded to the east by Adilabad district of Andhra Pradesh and to the west by Parbhani, Hingoli and Latur districts to the north by Yeotmal district and to the south by Latur and Bidar district of Karnataka state. It covers an area of 10527.87 sq.km. and has a population of 3361292 as per the 2011.

Adilabad district is situated with the geographical coordination of $18^{0}40'$ and $19^{0}56'$ North latitudes and $77^{0}46'$ and $80^{0}01'$ East longitudes. Nizamabad district is bounded on the North by Adilabad district and on the East by Karimnagar district, on the South by Medak district on the West by Nanded district of Maharashtra State and Bidar district of Karnataka State. The geographical area of this district is 9,80,595 acres or 7,956 Sq. Kms. The district lies between $18^{0} 5'$ to $19^{0} 0'$ North latitudes and $77^{0} 4'$ to $78^{0} 37'$ East longitudes. Bidar district is located at the tri-junction of Karnataka, Maharashtra and Andhra Pradesh states. It lies between $17^{0}35'$ to $18^{0}25'$ North latitudes and $76^{0}42'$ to $77^{0}39'$ East longitudes.

## Objectives:

1. To correlate density of population
2. To correlate density and rainfall
3. To conclude with relationship of density and rainfall

## Database and Methodology:

The attempts have been made by the researcher to examine population structure during the 30 years spreading between 1991 to 2011, for which uniform data at circle level is available. The main body of data used in this study was collected from two sources viz. primary and secondary.

The present paper includes distribution, density of population in the study region. It has been carried out over thirty years from 1991 to 2011. The processed data was presented in the form of maps, diagrams and tables.

Scattered diagram is prepared for X and Y. Regression equation for the line of Y on X is obtained. Regression of any straight line is in the form of -

$$YP = a + bx$$

Where as : a = intercept

b = slope

Once 'a' and 'b' is worked out a straight line could be drawn.

The regression equation is YP = a + bx . The 'a' and 'b' would be obtained with the following formula-

$$b = \frac{N \in xy - (\in x \in y)}{N \in x^2 - (\in x)^2} \qquad a = \frac{\in y - b \in y}{N}$$

**Spatial Variations in Density of Population:**

Map No. 1.1 and 1.2 is showing the spatial variations in the density of population of the study area since 1991-2011. Density of the study area is categorized into three sections. 1. Density below 200 persons per sq.km. this is a lower density region. 2. Density between 200-250 persons per sq.km. this is moderate density area and 3. Above 250 people per sq.km.thisis high density area of the study area.

According to 1991 census, Ranjal and Kotgir tahsils has noticed above 250 persons per sq.km. whereas Mukhed, Degloor, Biloli, Dharmabad, Navipet and Bodhan tahsils was found medium density. While Bhokar, Himayatnagar, Umri, Kinwat, Tamsi, Talamadugu, Bazarhatnoor, Boath, Sarangpur, Kuntala, Kubeer, Tanoor, Mudhole, Madnoor, Jukkal and Aurad tahsils was recorded low density regions of the study area. According to 2001 census, Degloor, Biloli, Dharmabad, Navipet, Ranjal, Bodhan and Kotgir tahsils was observed above 250 persons per sq.km. density of the region, whereas 200 to 250 persons per sq.km. density which was medium density are noticed in Mukhed, Umari, Madnoor and Aurad tahsils. Bhokar, Himayatnagar, Kinwat, Tamsi, Talamadugu, Bazarhatnoor, Boath, Sarangpur, Kuntala, Kubeer, Tanoor, Mudhole and Aurad tahsils was found in low density region of the study area. Density of Bodhan tahsil is increased very fast, it may be largely due to changing economic paradigm i.e. industrial activities and consequent urbanization. Bodhan (454), Ranjal (299) and Kotgir (294) tahsils may be included in high density group. Other remained tahsils are reprising medium type of density.

**Table No. 1.1 Spatial Pattern of Arithmetic Density (1991-2011)**

| Sr. No. | Tahsils | Years | | | Sr. No. | Tahsils | Years | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1991 | 2001 | 2011 | | | 1991 | 2001 | 2011 |
| 1 | Mukhed | 215 | 228 | 276 | 13 | Sarangpur | 131 | 154 | 180 |
| 2 | Degloor | 246 | 292 | 332 | 14 | Kuntala | 115 | 131 | 156 |
| 3 | Biloli | 226 | 280 | 308 | 15 | Kubeer | 116 | 138 | 172 |
| 4 | Dharmabad | 226 | 282 | 317 | 16 | Tanoor | 132 | 161 | 184 |
| 5 | Bhokar | 161 | 173 | 201 | 17 | Mudhole | 150 | 171 | 192 |
| 6 | Himayatnagar | 171 | 146 | 180 | 18 | Navipet | 237 | 254 | 271 |
| 7 | Umari | 161 | 204 | 234 | 19 | Ranjal | 286 | 299 | 342 |
| 8 | Kinwat | 122 | 135 | 158 | 20 | Bodhan | 216 | 454 | 494 |
| 9 | Tamsi | 110 | 130 | 143 | 21 | Kotgir | 275 | 294 | 308 |
| 10 | Talamadugu | 92 | 111 | 123 | 22 | Madnoor | 189 | 217 | 253 |
| 11 | Bazarhatnoor | 98 | 109 | 134 | 23 | Jukkal | 156 | 189 | 226 |
| 12 | Boath | 138 | 137 | 155 | 24 | Aurad | 172 | 200 | 227 |

*Source: Census of India, 1991-2011.*

As per 2011, census highest density of population was registered in Bodhan (494) after that Ranjal, Degloor, Dharmabad, Kotgir, Biloli, Mukhed, Navipet and Madnoor tahsils. Lowest density of population was find out in Himayatnagar, Kinwat, Tamsi, Talamadugu, Bazarhatnoor, Boath, Sarangpur, Kuntala, Kubeer, Tanoor and Mudhole tahsils of below 200 persons per sq.km.

**Correlation Regression between Density and Rainfall :**

Scattered diagram is prepared for X and Y. Regression equation for the line of Y on X is obtained. Therefore the equation of present regression of district is Y on X (i.e. rainfall and density) is YP 636.99+(-0.32)X.



Graph No. 1.1: Correlation Between Density and Rainfall (2011)

**FRONTIER REGIONS**

**Tahsilwise Density of Population (2001)**

**FRONTIER REGIONS**

**Tahsilwise Density of Population (2011)**

Map No. 3.2

Map No. 3.3

*Source: Compiled by the Researcher.*
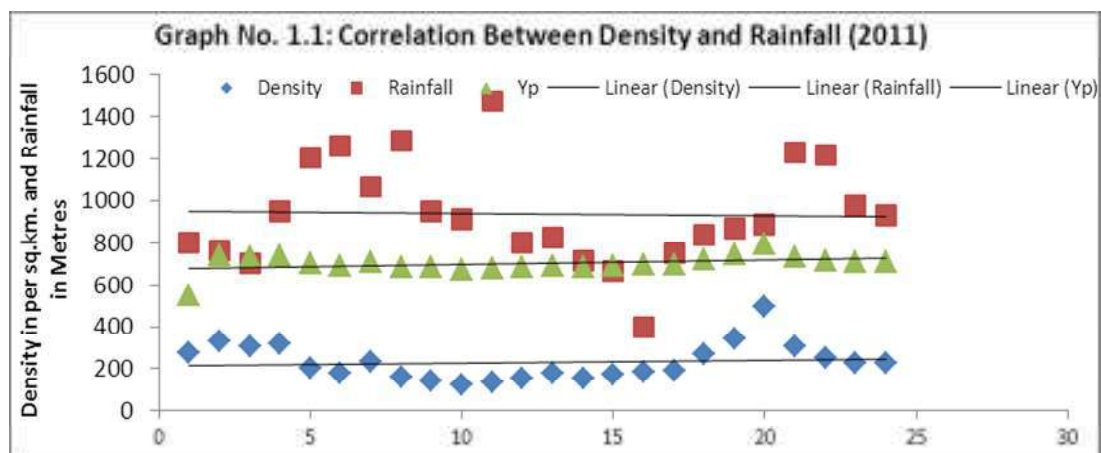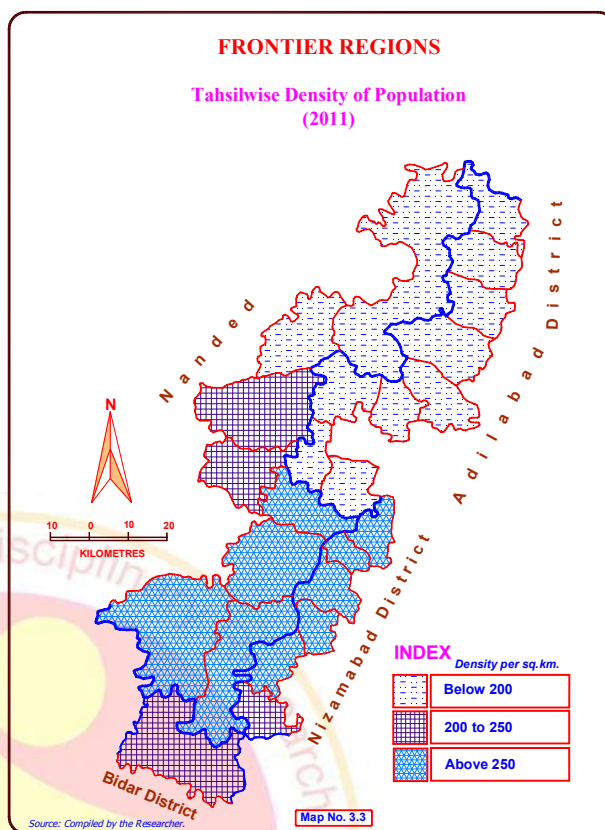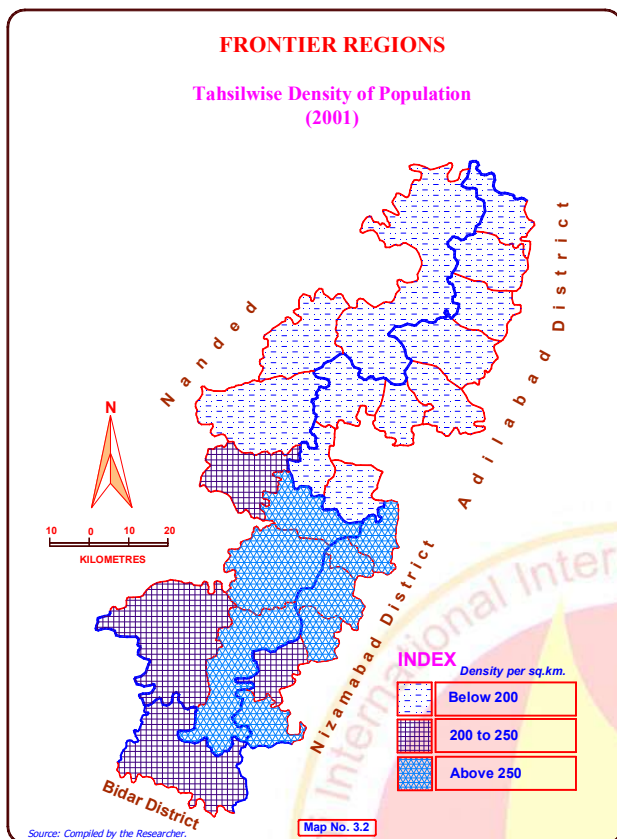
With reference this equation for any value of X the YP could be identified. Then by taking any three more points X and these corresponding YP values three more points are plotted on the scatter diagram and straight line is drawn to pass through the three points. This resultant straight line is regression line it shows that there is a positive relationship between these two variables more specifically it shows that with increasing rainfall there is increase in density of population.

**Table No. 1.2: Rank Correlation between Density and Rainfall(2011)**

| Sr. No. | Tahsils | Density | Rainfall | X2 | XY | Yp |
|---|---|---|---|---|---|---|
| 1 | Mukhed | 276 | 800 | 76176 | 220800 | 548.67 |
| 2 | Degloor | 332 | 767 | 110224 | 254644 | 743.23 |
| 3 | Biloli | 308 | 703 | 94864 | 216524 | 735.55 |
| 4 | Dharmabad | 317 | 951 | 100489 | 301467 | 738.43 |
| 5 | Bhokar | 201 | 1205 | 40401 | 242205 | 701.31 |
| 6 | Himayatnager | 180 | 1259 | 32400 | 226620 | 694.59 |
| 7 | Umari | 234 | 1064 | 54756 | 248976 | 711.87 |
| 8 | Kinwat | 158 | 1283 | 24964 | 202714 | 687.55 |
| 9 | Tamsi | 143 | 948.6 | 20449 | 135649.8 | 682.75 |
| 10 | Talamadugu | 123 | 913.8 | 15129 | 112397.4 | 676.35 |
| 11 | Bazarhatnoor | 134 | 1474.2 | 17956 | 197542.8 | 679.87 |
| 12 | Boath | 155 | 804.6 | 24025 | 124713 | 686.59 |
| 13 | Sarangpur | 180 | 823.4 | 32400 | 148212 | 694.59 |
| 14 | Kuntala | 156 | 718.8 | 24336 | 112132.8 | 686.91 |
| 15 | Kubeer | 172 | 665.2 | 29584 | 114414.4 | 692.03 |
| 16 | Tanoor | 184 | 400.2 | 33856 | 73636.8 | 695.87 |
| 17 | Mudhole | 192 | 752 | 36864 | 144384 | 698.43 |
| 18 | Navipet | 271 | 841 | 73441 | 227911 | 723.71 |
| 19 | Ranjal | 342 | 867 | 116964 | 296514 | 746.43 |
| 20 | Bodhan | 494 | 886.8 | 244036 | 438079.2 | 795.07 |
| 21 | Kotgir | 308 | 1230 | 94864 | 378840 | 735.55 |
| 22 | Madnoor | 253 | 1216.4 | 64009 | 307749.2 | 717.95 |
| 23 | Jukkal | 226 | 977.2 | 51076 | 220847.2 | 709.31 |
| 24 | Aurad | 227 | 931.1 | 51529 | 211359.7 | 709.63 |
| | | ∑X= | ∑Y= | ∑X²= | ∑XY= | |
| | | 5566 | 22482.3 | 1464792 | 5158333.3 | |

*Source : Compiled by the Researcher.*

The points lie above the regression line indicates that rainfall in those places are more than what is expected the level of density. The places lie below the expected it indicates that the presence of density is not only dependent only the rainfalls but there are some other factors which affect the density distribution.

However, in the case of all tahsils since most of the points are away from the regression line. One may conclude that density is not so related with rainfall.

### Results:

The points lie above the regression line indicates that rainfall in those places are more than what is expected the level of density. The places lie below the expected it indicates that the presence of density is not only dependent only the rainfalls but there are some other factors which affect the density distribution.

However, in the case of these district since most of the points are away from the regression line. One may conclude that density is not so related with rainfall.

Density is not so related with rainfall. In 2011, Highest urban density was observed in Degloor tahsil with 7364 persons per sq.km it is due to increased industrialization, and consequent urbanization whereas rural density was high in Ranjal tahsil with 342 persons per sq.km. and lowest rural density was noticed in Talamadugu tahsil. Rural density of the study area is closely related with soil types, potential irrigation, and accessibility of transportation means and distance of towns, market centers. Another think, 1991 to 2011 these tahsils was same position in this year.

### References:

1. *Baghew, Anusuiya& Gupta Gauri (2001): Rural infant mortality in Rajnandgaon district. A Geographical Analysis, Utter Pradesh Geographical Journal, Vol.6. Pp. 28-33.*
2. *Chen, C. (1973): Population growth and Urbanization in China, Geographical Review, 63 Pp.55.*
3. *David, Kingsley (1951): Population of India and Pakistan, Princeton University press, Princeto.*
4. *Demko, G.T. (1970): Population Geography – A Reader, McGraw Hill, New York.*
5. *Das, N.P. and Bhavsar, Suraj (1991): Population Graowht Rate in India; Emerging Trends in the light of 1991 census Result, demography India, vol. 20 no. 2 Pp. 227-41.*
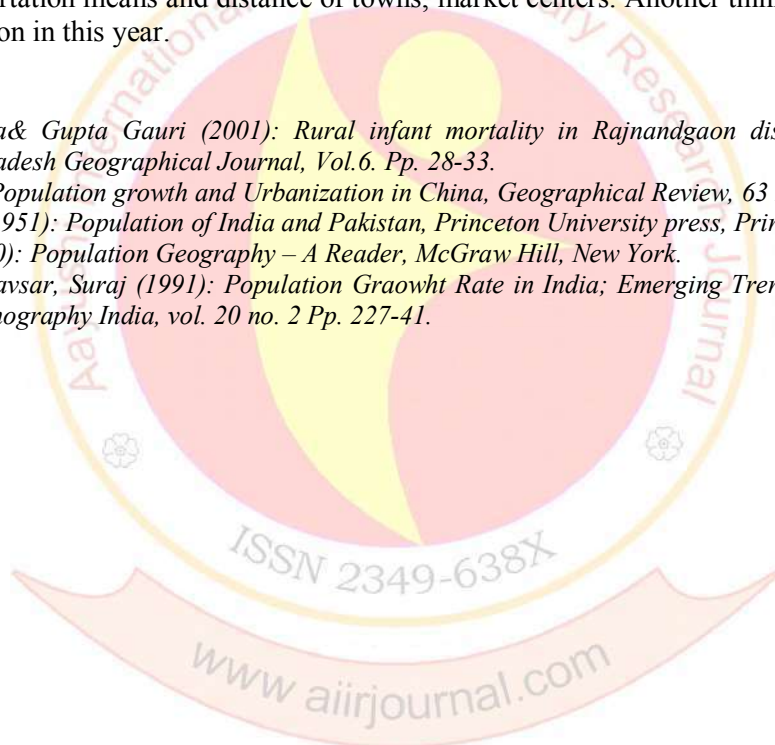
# Crop Combination in Beed District: Study in Agricultural Geography

**Assit. Prof. Namdev Rathod**
Head, Department of Geography,
Panditguru Pardikar Mahavidyalaya, Shirsala.

**Abstract:**

Water is the greatest resource of humanity. It is one of the most important substances on earth. All plants and animals need water to survive. If there was no water there would be no life on earth. Apart from drinking it for survival, human beings need it for many purposes such as cooking, washing, for plants and so on. Besides various other uses of water, it is essential for healthy grown of farm crops and farm stocks. It is also used in manufacture of many products. The largest use of water is made for irrigating lands. The impact of irrigation is all pervading as it leads to changes in cropping pattern. Due to the impact of irrigation agricultural landuse changes in the course of time and place. Yield rates and labour utilization increases due to its impact. It brings properly due to which socio-economic change takes place. Therefore, this research is selected for the present research work.

**Keywords:** Spatio-Temporal Changes, Crop Combination.

**Introduction:**

The fact that the provisions of irrigation facilities can enhance our crops yield by large extent, at the global scale, 2,788,000 km² of agricultural land was equipped with irrigation infrastructure around the year 2000. About 68% of the area equipped for irrigation is located in Asia, 17% in the Americas, 9% in Europe, 5% in Africa and 1% in Oceania. The largest contiguous areas of high irrigation density are found in North India and Pakistan along the rivers Ganges and Indus, in the Hai He, Huang He and Yangtze basins in China, along the Nile River in Egypt and Sudan, in the Mississippi-Missouri river basin and in parts of California. Smaller irrigation areas are spread across almost all populated parts of the world. Only 8 years later in 2008, the scale of irrigated land increased to an estimated total of 3,245,566 km², what is nearly the size of India. It does not rain equally in all parts of the country. India is an agricultural and populous country. About 70 per cent of people depend on agriculture. In order to grow food-crops and agricultural products in large quantities to feed the growing millions, intensive farming and rotation of crops are essential. Extensive irrigation is, therefore, necessary for more production.

**Choice of the Region:**

Beed district is situated on the central part of the Maharashtra and lies between 18°27' and 19°27' north latitudes and 74°49' and 76°44' east longitudes. The east west extension of Beed district is 268 kms. The shape of the Beed district is broadly that of a trapeze, the northern and southern sides of which are nearly parallel.

The total geographical area of Beed district is 10615.3 sq.kms and its proportion as compared with Maharashtra state it is about 3.5 percent. The proportion of area of the Beed district in Marathwada division is 19.20 percent.

**Aims and Objectives:**

1. To analyze method of Crop Combination.
2. To analyze spatio-temporal changes of cropping pattern.

**Data Base and Methodology:**

For the present research data was collected from both the sources – Primary and Secondary. Primary data are collected through questionnaires, interviews and other data collection techniques from different sources. Secondary data are collected from Socio-economic abstracts, District Census Handbooks, Gazetteers, Agricultural Epitomes, Periodicals and offices like department of Agriculture, Irrigation Departments, Zilla Parishad etc. The data thus collected through primary and secondary sources are processed and represented by statistical and cartographic techniques. Different chorographic and choro-logic methodologies are adopted.

**Crop Combination Regions and Changes Theirin:**

The study of crop combination regions is an important aspect of agricultural geography as it provides a good basis for agricultural regionalization. The crops are generally grown in combinations and it is really that a particular crop occupies a position of total isolation in a given area unit at a given point of
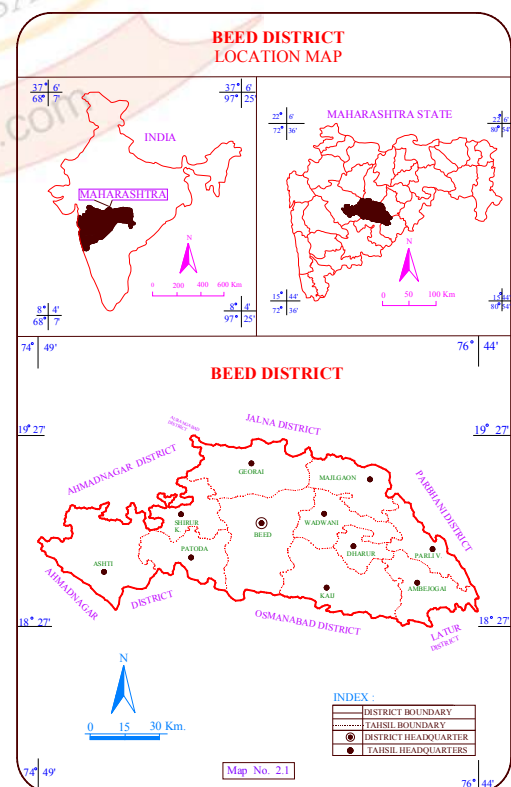


BEED DISTRICT LOCATION MAP

time. The distribution maps of individual crops are interesting and useful for planners but it is even more important to view the integrated assemblage of the various crops grown in an areal unit.

Geographers have always been closely related with spatio-temporal analysis of the regional and ecological landscape of the earth. The significance of regional analysis is really core of all geographic investigation. Agricultural landuse planners have paid considerable attention on such studies. Thus the crop combination regions delineated would emphasis the regional framework of agricultural activities and specialization of crops in the area. The pattern of crop combination regions that will emerge from the delineation might also serve the meaningful purpose in a balanced regional agricultural planning. Different approaches have been applied for the delineation of crop combination. The combination analysis was originally introduced in geographical research by Weaver in his outstanding study of crop combination in Mid-Western United States.[7] For the present study an attempt is made to delineate the crop combination regions by applying crop combination methods i.e. Minimum Standard Deviation Method as introduced by Weaver (1954).

### Table No. 1.1 Changes in Number of Crops in the Combination in Beed District

| Tahsils | Weaver's Method No. of Crop Combination | |
|---|---|---|
| | 1991-2001 | 2001-11 |
| Beed | 15 | 14 |
| Georai | 12 | 09 |
| Majalgaon | 13 | 13 |
| Ambajogai | 12 | 13 |
| Keij | 14 | 14 |
| Patoda and Shirur K. | 14 | 14 |
| Ashti | 16 | 16 |
| Dharur and Wadwani | 11 | 13 |
| Patli (V.) | 13 | 14 |
| **Beed District** | **16** | **14** |

*Source: Computed by the Researcher.*



BEED DISTRICT

CROP COMBINATION OF WEAVER'S METHOD

(1991 to 2001)

**INDEX**

| | | |
|---|---|---|
| Ashti | : | Jowar, Bajara, Gram, Frouts and Vegitables, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Rice, Other Oilseeds, Groundnut, Other Pulses, Mung. |
| Shirur | : | Jowar, Bajara, Gram, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Other Oilseeds, Groundnut, Rice, Gram, Mung. |
| Georai | : | Jowar, Bajara, Cotton, Safflower, Tur, Sunflower, Wheat, Other Oilseeds, Sugarcane, Mung, Gram, Groundnut. |
| Majalgaon | : | Jowar, Cotton, Bajara, Tur, Safflower, Other Oilseeds, Sunflower, Sugarcane, Groundnut, Wheat, Mung, Frouts and Vegetables, Gram, Rice. |
| Wadwani | : | Jowar, Bajara, Cotton, Tur, Sunflower, Groundnut, Sugarcane, Gram, Mung, Wheat, Frouts and Vegetables. |
| Beed | : | Jowar, Bajara, Gram, Frouts and Vegitables, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Other Oilseeds, Groundnut, Other Pulses, Mung. |
| Kaij | : | Jowar, Bajara, Gram, Frouts and Vegitables, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Other Oilseeds, Groundnut, Other Pulses, Mung. |
| Dharur | : | Jowar, Bajara, Cotton, Tur, Sunflower, Groundnut, Sugarcane, Gram, Mung, Wheat, Frouts and Vegetables. |
| Patoda | : | Jowar, Bajara, Gram, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Other Oilseeds, Groundnut, Rice, Gram, Mung. |
| Parli | : | Jowar, Bajara, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Udid, Other Oilseeds, Groundnut, Other Pulses, Gram. |
| Ambajogai | : | Jowar, Bajara, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Udid, Other Oilseeds, Groundnut, Other Pulses. |

Map No.5.21

BEED DISTRICT

CROP COMBINATION OF WEAVER'S METHOD

(2001 to 2011)

**INDEX**

| | | |
|---|---|---|
| Ashti | : | Jowar, Bajara, Gram, Frouts and Vegitables, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Other Oilseeds, Groundnut, Other Pulses, Mung, Udid, Rice. |
| Shirur | : | Jowar, Bajara, Gram, Frouts and Vegitables, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Other Oilseeds, Groundnut, Other Pulses, Mung. |
| Georai | : | Jowar, Bajara, Cotton, Safflower, Tur, Sunflower, Wheat, Sugarcane, Mung. |
| Majalgaon | : | Jowar, Bajara, Gram, Frouts and Vegitables, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Groundnut, Other Pulses, Mung. |
| Wadwani | : | Jowar, Bajara, Gram, Frouts and Vegitables, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Groundnut, Other Pulses, Mung. |
| Beed | : | Jowar, Bajara, Gram, Frouts and Vegitables, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Groundnut, Other Pulses, Mung, other Oilseeds. |
| Kaij | : | Jowar, Bajara, Gram, Frouts and Vegitables, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Groundnut, Other Pulses, Mung, other Oilseeds. |
| Dharur | : | Jowar, Bajara, Gram, Frouts and Vegitables, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Groundnut, Other Pulses, Mung. |
| Patoda | : | Jowar, Bajara, Gram, Frouts and Vegitables, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Other Oilseeds, Groundnut, Other Pulses, Mung. |
| Parli | : | Jowar, Bajara, Gram, Frouts and Vegitables, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Other Oilseeds, Groundnut, Other Pulses, Mung. |
| Ambajogai | : | Jowar, Bajara, Gram, Frouts and Vegitables, Wheat, Tur, Cotton, Safflower, Sunflower, Sugarcane, Other Oilseeds, Groundnut, Other Pulses. |

Map No.5.21

Table No.1.1 reveals that Beed district has nine crop combination regions based on Weaver's Minimum Standard Deviation Method. In the year 1991-2001 eleven crops combination was present in Dharur and Wadwani tahsils. Twelve crop combinations in Ambajogai, Georai, thirteen-crop combination was noticed in Majalgaon and Parli tahslils. Fourteen-crop combination was found in Keij, Shirur and Patoda tahsils. Fifteen crop combinations were found in Beed tahsil and sixteen crop combinations was found in Ashti tahsil. Table No. 1.1 reveals that the change was occurred in crop combination in the five tahsils during the period of investigation (Map No. 5.21 A).

Change in crop combination regions were occurred from fifteen to fourteen in Beed, twelve to nine in Georai, thirteen to thirteen in Majalgaon, twelve to thirteen in Ambajogai, fourteen to fourteen in Keij, Shirur K. and Patoda sixteen to sixteen in Ashti eleven to thirteen in Dharur and Wadwani, thirteen to fourteen in Parli tahsil during the period of investigation (Map No. 5.21 B).

**Results:**

The region has a medium reservoir of surface and underground waters, fertile soils and good climatic condition which has fevoured irrigation and agricultural development. It is clearly observed by the impact of irrigation on the extension of cultivated area (net, total, double), the scope for bringing new lands under plowing is limited. The extension of irrigation facilities had led to the expansion of double and gross cropped area. The role of irrigation in altering crop pattern is noteworthy. A declining trend has been seen in kharif cultivated area.

Farmers yet prefer to the cultivation of food grains. It also shows that the impact of extension in irrigation facilities in area under fine cereals like wheat and rice.

**References:**

1. Ahmed A. and Siddiqui M.F. (1967), 'Crop Combination Patterns in Luni Basins' Geographer (M.U.A.) Vol. XIV., Pp. 69-80.
2. Weaver John C. (1954), 'Crop Combination Regions in the Middle West', The Geographical Review 44(1954), Pp. 175-2000.
3. Jasbir Singh & Dhillon S.S. (1997), ' Agricultural Geography', Tata McGraw Hill Publishing Co. Ltd., Delhi, P. 216.
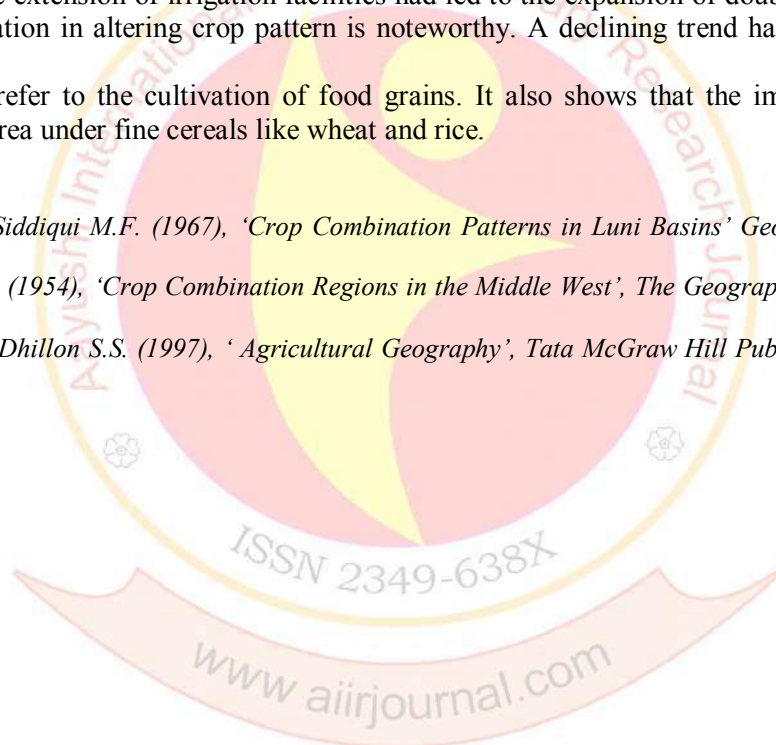
# Centrality of Settlement: A Case Study of Beed District

**Dr. Sanjay Sawate**
Head, Department of Geography,
Kalikadevi Mahavidyalaya, Shirur Kasar, Beed.

**Abstract:**

*Centrality is the measure of importance of a place in terms of its functional capacity to serve the needs of the people in the surrounding area. Centrality can be expressed qualitatively, such as low, moderate and high centrality as well as obtained by converting the functional base of place into scores on the basis of frequency and importance of the function. There has also been a concern among geographers to establish a precise relationship between the size of settlement in terms of population and the range of services which it offers (Johnson, 1967).*

*The researcher has calculated centrality of settlement of Beed District by two methods. These two methods are already used by the geographers. The results for all settlements have been calculated by using 'Surplus Service Capacity Index' method of Shete S.T. (2002). The results obtained by this method have been compared with the method of Davies (1967) in terms of surplus population served.*

**Key Word:** Centrality, Surplus Service Capacity Index, Method.

**Introduction:**

Settlement Geography is a recent most sprout from the venerable tank of human geography. Its considerations have however run like a thread through almost the whole fabric of geographic thought. Settlement geography deals with the facilities built in the process of human occupancy of the land and their grouping the nature and distribution of these facilities are related to the art and made of living and on physical factors.

Centrality however depends upon the central functions. Which have a certain range beyond the limit of place and cater to the needs of the surrounding region. According to Christaller (1933), "the centrality of a place is that component of its functional magnitude which is required for the population of its hinterland." The above statement clearly indicates that mere agglomeration of population and functions cannot give any place central importance, unless it has surplus functions to provide the services to its umland.

**Study Area:**

Beed has been a Marathi speaking District in the former Hyderabad State. In 1956, this district had been a part of the Marathwada at the time of formation of Bi-lingual State. This district was included in the State of Maharashtra, the Marathi-speaking state in 1960. In August 1982, the region as well as the district was divided and 43 villages along with 11 wadys from the Renapur Mandal in Ambajogai Tehsil were included in Latur District.

Beed District is situated at the Central West of the Aurangabad. It is lies between $18^0 28'$ North latitudes $19^0 28'$ North latitudes and between $74^0 54'$ East and $76^0 57'$ East longitudes. It is surrounded by Aurangabad and Jalna in the North, Parbhani and Latur in the East, Ahmednagar and Osmanabad in the South and Ahmednagar in the West. Godavari is the most significant river that flows on the borderline of Georai and Majalgaon Tehsils.

**Objectives:**

The specific objectives of the present study are:
1.     To study centrality and central places of settlement of Beed district.

**Methodology:**

The non-availability of data imposes serious constraints on the choice of method to be adopted. Considering the developing nature of the study region, care has been taken in the selection of central functions. In all twenty three functions have been selected for calculating centrality by two methods (Table No. 1.1).

While selecting functions, functions of different order have been selected to avoid the problem of equivalence. The lower order functions like post office, Bus stand, High School etc. The medium order functions like Higher Secondary School, Degree College etc. and higher order functions like Market yard, District headquarters, Professional Colleges etc. are selected.

Using the data for the above mentioned central functions and centrality of settlements is calculated by surplus service capacity index method of Shete, S.T. For comparison and justification for the choice of method, centrality has been also calculated by using Location Quotient Method of Davies.

### Table No. 1.1: Selected Central Functions

| Sr. No. | Central Functions |
|---|---|
| 1 | High school |
| 2 | Higher Secondary School |
| 3 | Senior College (ASC) |
| 4 | Professional College |
| 5 | Civil Hospital |
| 6 | Private Hospital |
| 7 | Radio center |
| 8 | Medical Store |
| 9 | Bank |
| 10 | Telephone Exchange |
| 11 | Post Office |
| 12 | News paper |
| 13 | Railway Station |
| 14 | Agro Service Centre |
| 15 | Vegetable Broker |
| 16 | Agricultural Produce Broker |
| 17 | Cloth Centre |
| 18 | S.T. Bus Depot |
| 19 | Kirana Shop |
| 20 | Auto Repairing Work Shop |
| 21 | Printing Press |
| 22 | Cinema House |
| 23 | District Headquarter |

*Source: Census of India, 2001.*

**Measurement of Centrality by 'Surplus Service Capacity Index Method:**

The following equation gives the 'Surplus Service Capacity Index'.

$$Sx = \frac{P}{Nxr} \qquad (I)$$

Whereas,

Sx = Mean service value of function 'x' in terms of population.

P = Total population of the study region.

Nxr = Total number of functional units of function 'x' in the study region.

$$Sp = Nxc \times Sx \qquad (II)$$

Sp = Total service value of function 'x' at central place in terms of Population.

Nxc = The number of units of function 'x' at the central place.

$$SSc = Sp - Cp \qquad (III)$$

SSc = Surplus service capacity of the central place for any function 'x' In terms of population.

Cp = Population of the central place.

$$SSci = SSc1 + SSc2 + SSc3 + ..SScn \qquad (IV)$$

SSci = Surplus Service Capacity Index (Total Centrality Value) of a central place (measured in term of population).

**Measurement of Centrality by Davies Method :**

Davies (1967) has used this method for South Wales. In this method a score for any single unit of function is calculated by the following formula.

$$C = \frac{t}{T} \, 100$$

Whereas,

C = Score for any function.

t = One unit of function t.

T = The total number of functional units of function 't' in the area.

With this method centrality scores for all functions have been calculated and sum of individual centrality scores for all functions at any central place gives composite locational index.

The calculated centrality scores for all urban places in the study region are given in Table No. 1.2 and shown in Map. No. 6.1 and 6.2 with Surplus Service Capacity Index Method as well as Location Quotient Method.

**Regional Analysis of Centrality :**

The spatial distribution of centrality scores for individual tahsils by Surplus Service Capacity Index Method and Location Quotient Method are shown in Map. No. 6.1 and 6.2. The Surplus Service Capacity Index method indicates that, in the northern and southern part of the region with a sparse population has small settlements and the centrality score of most of the settlement is very low. The higher centrality score of settlement is found in the middle part of the region where prosperity is more than northern and southern part of the study area.

The comparative analysis of the two methods shows that the ranks obtained by settlements by Surplus Service Capacity Index Method and Location Quotient Method are same for the eleven tahsils but different for two tahsils. The two tahsils are Patoda and Ambajogai. Both Surplus Service Capacity Index Method and Location Quotient Method give appropriate functional importance of the tahsils.

**Table No. 1.2: Centrality Scores of Settlements Calculated by Surplus Service Capacity Index and Location Quotient Method, with Population Size and their Ranks**

| Sr. No. | Name of the Tahsil | Centrality Value by Surplus Service Capacity Index | Rank | Centrality Value by Location Quotient method | Rank | Rank By Population Size |
|---|---|---|---|---|---|---|
| 1 | Ashti | 1944.98 | 2 | 266.27 | 2 | 3 |
| 2 | Patoda | 1289.75 | 7 | 125.08 | 6 | 9 |
| 3 | Shirur K. | 942.32 | 10 | 89.15 | 10 | 8 |
| 4 | Georai | 1872.55 | 3 | 243.9 | 3 | 2 |
| 5 | Manjlegaon | 1420.97 | 5 | 141.24 | 5 | 5 |
| 6 | Wadwani | 1054.21 | 9 | 98.42 | 9 | 11 |
| 7 | Beed | 4314.73 | 1 | 1290.79 | 1 | 1 |
| 8 | Kaij | 1709.39 | 4 | 211.19 | 4 | 4 |
| 9 | Dharur | 745.65 | 11 | 75.85 | 11 | 10 |
| 10 | Parli | 1172.57 | 8 | 101.7 | 8 | 7 |
| 11 | Ambajogai | 1307.34 | 6 | 112.42 | 7 | 6 |

*Source: Compiled by the Researcher.*



BEED DISTRICT
Centrality of Settlements
(Based on Surplus Service Capacity Index Method)

Centrality Scores
3000
2000
1000

N

0    15    30 Km.

Source: Compiled by the Researcher

Map No. 6.1

BEED DISTRICT
Centrality of Settlements
(Based on Surplus Location Quotint Method)

Centrality Scores
1000
300
100

N

0    15    30 Km.

Source: Compiled by the Researcher

Map No. 6.2
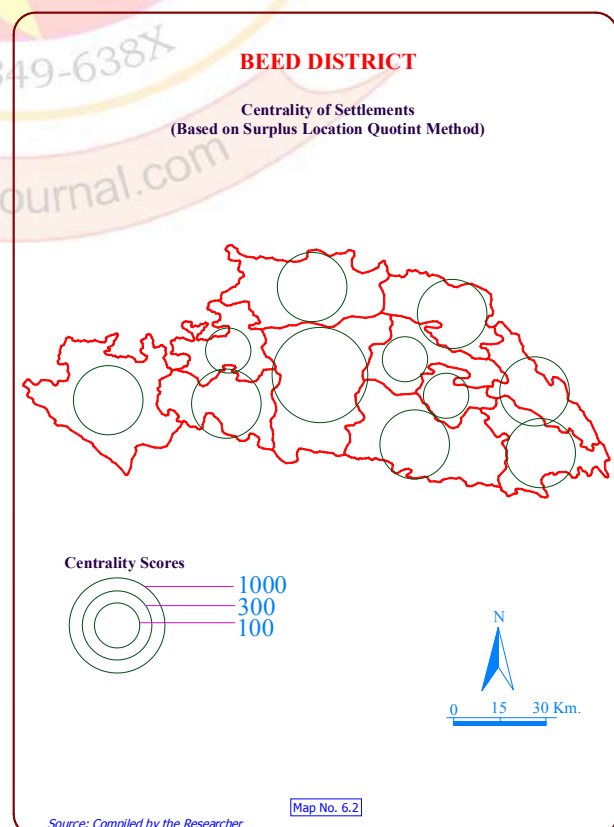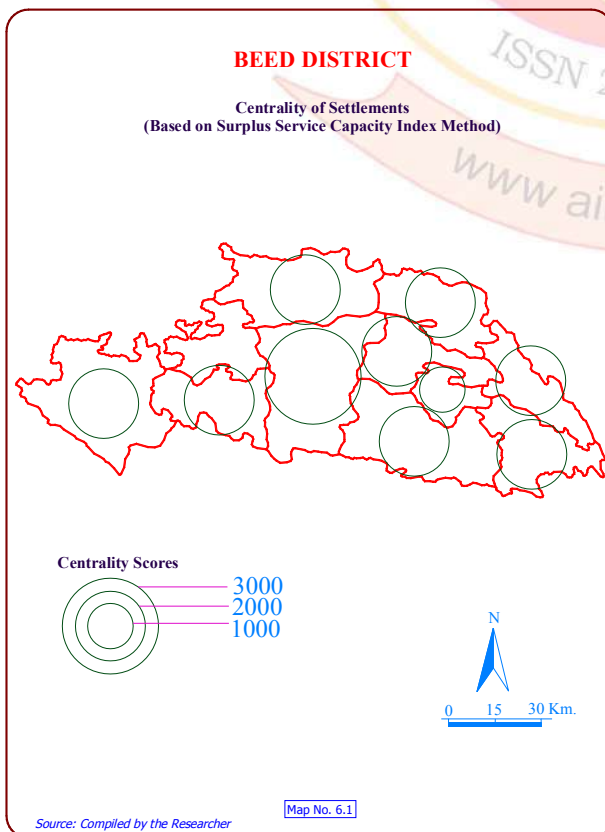
**Results:**

The centrality of settlements in the study area has been calculated by selecting important functions. Centrality ranks calculated by using 'Surplus Service Capacity Index' and 'Location Quotient Method' are nearer to match each other. The Surplus Service Capacity Index method indicates that, in the northern and southern part of the region with a sparse population has small settlements and the centrality score of most of the settlement is very low. The higher centrality score of settlement is found in the middle part of the region where prosperity is more than northern and southern part of the study area.

According to 'Surplus Service Capacity Index' Beed ranks first, Ashti ranks second, Georai ranks third, Kaij ranks fourth, Manjlegaon fifth, Ambajogai ranks sixth, Patoda ranks seventh, Parli ranks eighth, Wadwani ninth, Shirur Kasar tenth and Dharur ranks eleventh in centrality order.

**References:**
1. Christaller, W. (1933) : "The Central Places of Southern Germany",  by C. Baskin, Prentice Hall.
2. Dande, V. C. (2012) : "Morphological and Functional Analysis of Urban Centres in Latur District." (Unpublished Ph.D. Thesis), S.R.T.M.U. Nanded.
3. Davies, R. L. (1969) : "A Note on Centrality and Population Size", Professional Geographer, 21, PP. 112.
4. Davies, W. K. D. (1967) : "Centrality and Central Place Hierarchy," Urban Studies, 4, pp.61-79.
5. Johnson, J. H. (1967) : 'Urban Geography : An Introductory Analysis'. Pergamon Press, Oxford, p.92.
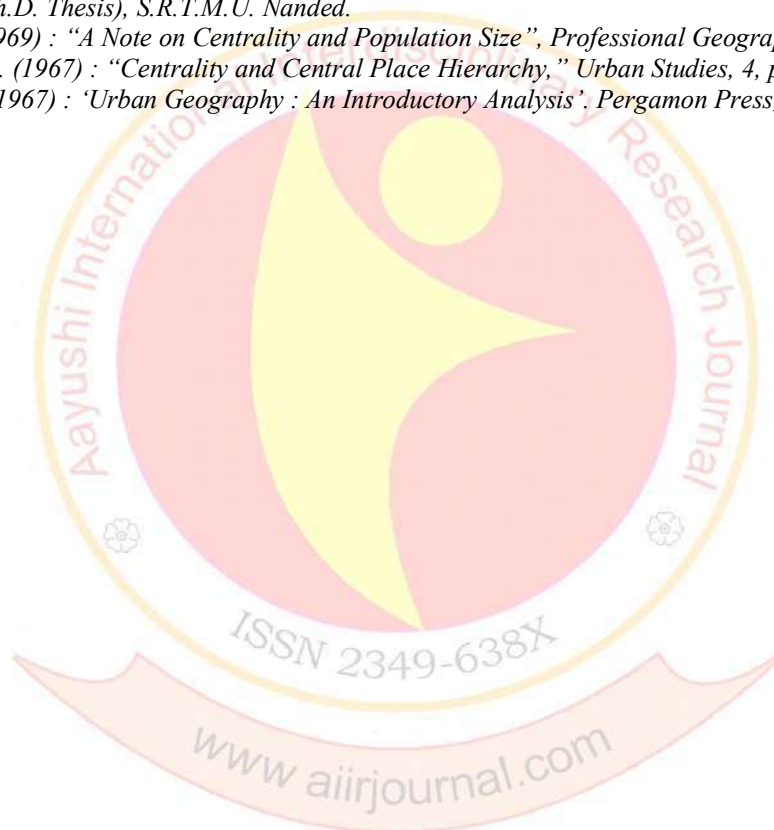
# Geographical Study of Population in Marathwada Region

**Dr. V. V. Khadke**
Coordinator, Dept. of Environmental Studies,
Shri.Madhavrao Patil College, Murum, Dist. Osmanabad.

**Abstract**:

*In the present study an attempt has been made to analyze the characteristics of Population in Marathwada region. The growth of population in Marathwada was not satisfactory as it was a little bit slow. The unfavorable circumstances hit hard the growth of population in Marathwada. "The general condition of health is far from satisfactory remarked the Director of Public Health". This speaks of the paucity of medical facilities in Marathwada which resulted in slow growth of population. In other words there was a high growth rate of mortality. Decline in the growth of population can be attributed to the non-availability of adequate quantity and quality of food in Marathwada, coupled by the shortage of the medical facilities. In this paper we focused on socio-economic characteristics of population in Marathwada.*

**Keywords**: Population growth, literacy, age structure and sex composition.

## Introduction:

Socio-economic conditions of the population in any region are governed by certain basic characteristics of the population like sex, composition, age structure, marital status, educational status. However, these characteristics are mainly depending upon the physical and cultural environment of the region.

## Study area:

Marathwada region comprises of eight districts. Geographically it is located on $74^0$ 20' east longitudes and $17^0$ 50' to $20^0$ 40' latitude form the part of vast Deccan Platue all of India and one of the sixth divisions of the state. The study area is bounded by Vidharbha region on the north by Andhra Pradesh on the east andsouthwest by Karnataka. The highest temperature during the summer days is about $43^0.3$ C while the lowest during winter nights is about $6.0^0$. On the basis of climatic data that the study area falls 600 to 1100 mm is the annual rainfall.

## Aim and objectives:

The specific objectives of the study area as follows:

1) To find out the changing characteristics of Population.
2) To understand the structure of Population.

## Database and Methodology:

The present study is based on district level data of 2001 to 2011 Census of India. Secondary data has been collected and completed by new statistical techniques. The results have been brought through table and maps.

## Result and Discussion:

The structure of population in an area, the resource availability and utilization pattern are closely associated with socio-cultural and economic development.

## Growth of Population:

The growth of population in an area is the index of its economic development, social awakening, cultural background, historical events and political ideology. The distribution of population refers to the wax in which the people are spaced over the earth's surface.

**Table No. 1.1: Population of Marathwada (2001 – 2011)**

| Sr. No. | Districts | Population | | Volume of change in | |
|---|---|---|---|---|---|
| | | **2001** | **2011** | **Total** | **Percentage** |
| 1 | Aurangabad | 2897013 | 3695928 | 798915 | 25.78 |
| 2 | Jalna | 1612980 | 1958483 | 345503 | 11.16 |
| 3 | Beed | 2161250 | 2585962 | 424712 | 13.70 |
| 4 | Osmanabad | 1486568 | 1660311 | 173743 | 5.60 |
| 5 | Latur | 2080285 | 2455543 | 375258 | 12.11 |
| 6 | Nanded | 2876269 | 3356566 | 480297 | 15.50 |
| 7 | Parbhani | 1527715 | 1835982 | 308267 | 9.95 |
| 8 | Hingoli | 987160 | 1178973 | 191813 | 6.20 |
| | Total | 15629240 | 18727748 | 3098508 | 100 |
| | State | 94029964 | 112372972 | 82792667 | |
| | % to state | 16.62 | 16.66 | 3.74 | |

*Source: Census of India, 2001, 2011, Part II, B, Page No. 4*

Total Population of Marathwada Region



Age Group of Population in Marathwada Region
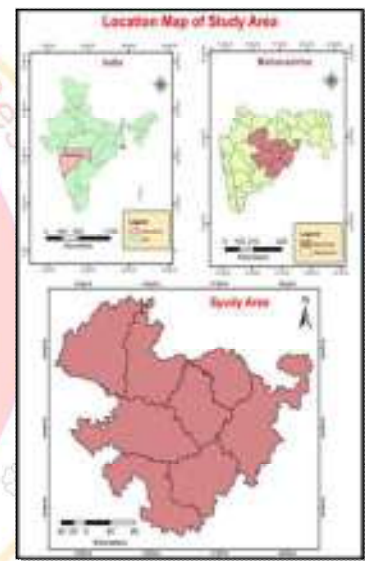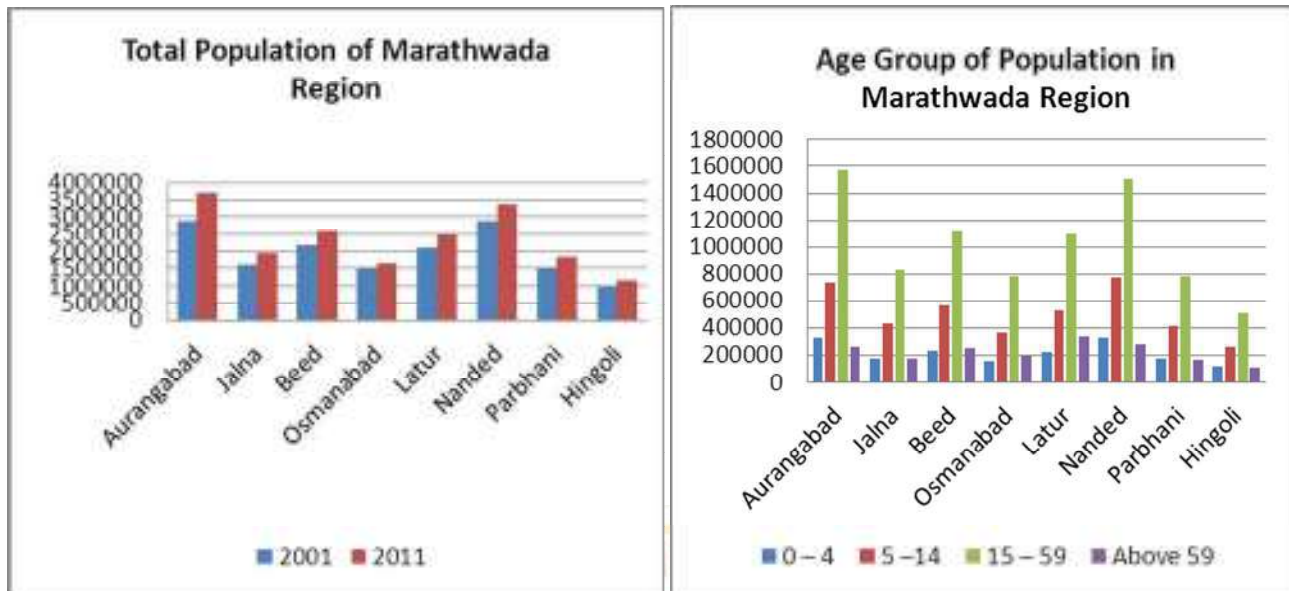
The population of Marathwada region has increased from 15629240 personals in 2001 to 18727748 in 2011 Census. It is observed that, in Aurangabad district, there has been a tremendous Variation in the population, whereas it was minimum in Osmanabad districts (5.60 %), Hingoli (6.20 %) and Parbhani (9.95 %)

**Table No. 1.2: Sex wise Literacy rate in Marathwada**

| Sr. No. | Districts | 2001 | | | 2011 | | | Vol. of Change in Total | | |
|---------|-----------|-------|------|--------|-------|------|--------|-------|------|--------|
| | | Total | Male | Female | Total | Male | Female | Total | Male | Female |
| 1 | Aurangabad | 72.47 | 84.88 | 60.06 | 80.06 | 89.31 | 70.81 | 7.59 | 4.43 | 10.75 |
| 2 | Jalna | 41.61 | 79.15 | 49.07 | 73.26 | 85.25 | 61.28 | 31.65 | 6.1 | 12.21 |
| 3 | Beed | 67.61 | 80.70 | 54.52 | 73.14 | 83.99 | 62.29 | 5.53 | 3.29 | 7.77 |
| 4 | Osmanabad | 68.65 | 80.42 | 56.89 | 75.99 | 85.31 | 66.67 | 7.34 | 4.89 | 9.78 |
| 5 | Latur | 71.17 | 82.94 | 59.40 | 78.72 | 87.42 | 70.02 | 7.55 | 4.48 | 10.62 |
| 6 | Nanded | 31.19 | 80.44 | 54.35 | 76.65 | 86.62 | 66.68 | 45.26 | 6.18 | 12.33 |
| 7 | Parbhani | 65.82 | 79.63 | 52.02 | 47.96 | 85.66 | 64.27 | 9.17 | 6.03 | 12.25 |
| 8 | Hingoli | 65.94 | 80.71 | 51.02 | 75.73 | 86.73 | 64.73 | 20.79 | 6.02 | 13.56 |
| | Total | 62.10 | 72.10 | 54.68 | 76.06 | 86.28 | 65.84 | 16.85 | 14.18 | 11.16 |

*Source: Census of India, 2011.*

**Literacy:**

Literacy is an important characteristic of population. As per 2001 Census male literacy was 80 to 81 % and 51 to 56 % female literacy, whereas 86.28 % male and 65.84 % female are literate in the year 2011. Aurangabad has relatively higher literacy rate than other districts in Marathwada. (Male 89.31 % and female 70.81)

**Age Structure:**

Age structure is one of the most vital characteristics of population. It is an index of persons having capability to perform socio-economic activities in a region. More than % of the people are in the age group of 15 – 59 years, which is real working force at a particular period.

**Table No. 1.3: Age GroupWise population in Marathwada**

| Sr. No. | Districts | 0 – 4 | 5 –14 | 15 – 59 | Above 59 | Total |
|---------|-----------|-------|-------|---------|----------|-------|
| 1 | Aurangabad | 326108 | 738430 | 1569313 | 263162 | 2897013 |
| 2 | Jalna | 178918 | 427445 | 832728 | 173889 | 1612980 |
| 3 | Beed | 230310 | 561900 | 1118331 | 250709 | 2161250 |
| 4 | Osmanabad | 154917 | 362971 | 779086 | 189612 | 1486586 |
| 5 | Latur | 225429 | 527753 | 1094509 | 332594 | 2180285 |
| 6 | Nanded | 322834 | 775152 | 1503051 | 275222 | 2876259 |
| 7 | Parbhani | 171802 | 408566 | 786399 | 160948 | 1527715 |
| 8 | Hingoli | 114337 | 260863 | 507637 | 104323 | 987160 |
| | Total | 1724655 | 4063080 | 8191054 | 1750459 | 15729248 |
| | % to state | 10.97 | 25.82 | 52.08 | 11.13 | 100 |

*Source: Census of India, provisional table.*
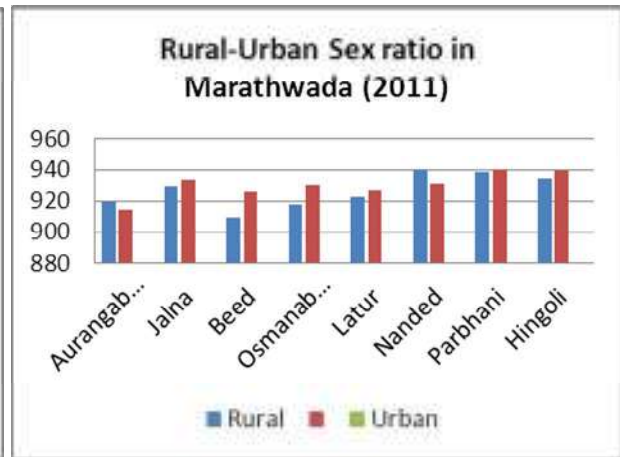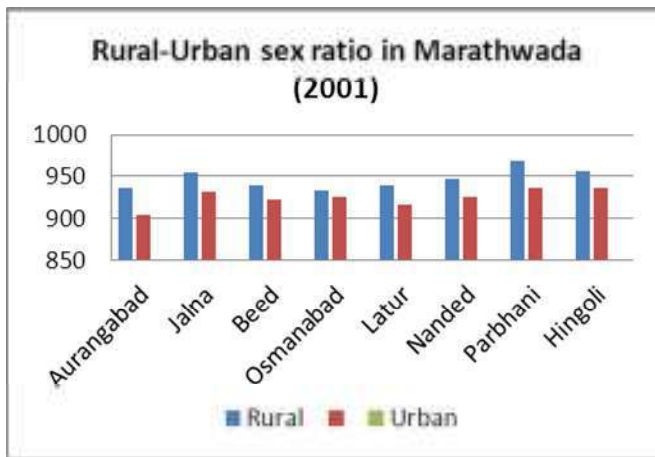
**Sex Composition:**

Sex composition commonly referred as sex ratio. It is an index of socio-economic conditions prevailing in an area and is a useful tool for regional analysis .Generally it affects the growth of population, marriage rates, occupational structure and helps in understanding the employment and consumption pattern. Sex composition of a region is usually expressed as number of female per thousand male. The sex ratio in the region of above 950 female per 1000 males was observed in Parbhani, Hingoli and Jalna districts, as per Census 2001. Whereas it is declined in tremendous level I Census 2011. As well as in Beed district it is declined to higher percentage in rural area. On the other hand urban sex ratio has been increased in all districts of Marathwada in 2001 to 2011 years. This table reveals that Latur, Aurangabad and Nanded districts have positive change in urban sex ration in 2001 year. The table No. 4reveals that age group wise population in the study area is 52.08 percent 15 – 59 age group of population observed to state, whereas 10.97 percent and 11.13 percent is observed in the age group of 0 – 4 and above 59 populations respectively. On the other hand Aurangabad and Nanded districts have found higher population in group of 0 – 4 and 5 – 14 age, but above 59 group of population has been observed in Latur district. Out of total population 17, 50,459 populations are above 59 age group.

**Table No. 1.4: Sex ratio by residence in Marathwada**

| Sr. No. | Districts | Number of females per thousand males | | | | | | Vol. of Change in Total | | |
| | | 2001 | | | 2011 | | | | | |
| | | Total | Rural | Urban | Total | Rural | Urban | Total | Rural | Urban |
| 1 | Aurangabad | 925 | 936 | 905 | 917 | 919 | 914 | – 8 | –17 | + 9 |
| 2 | Jalna | 951 | 955 | 931 | 929 | 929 | 933 | – 22 | –26 | + 2 |
| 3 | Beed | 936 | 939 | 923 | 912 | 909 | 926 | –24 | –30 | + 3 |
| 4 | Osmanabad | 932 | 933 | 926 | 920 | 918 | 930 | –12 | –15 | + 4 |
| 5 | Latur | 935 | 940 | 916 | 924 | 923 | 927 | –11 | –17 | + 11 |
| 6 | Nanded | 942 | 947 | 925 | 937 | 940 | 931 | –5 | –7 | + 6 |
| 7 | Parbhani | 958 | 968 | 937 | 940 | 938 | 940 | –18 | –30 | + 3 |
| 8 | Hingoli | 953 | 956 | 937 | 935 | 934 | 939 | –18 | –22 | + 2 |
| | Total | 941.50 | 946.75 | 925 | 926.75 | 926.25 | 930.75 | 14.75 | –20 | + 5.75 |

*Source: Census of India, 2011, Page No. 16, 8.*

**Conclusion:**

The conclusions of this regional study are as follows:
1) There is an impact of population on socio-economic condition.
2) There is a change in the population structure in the entire study region.
3) Higher concentration of population growth has been observed in Aurangabad district.
4) The literacy of sex has been increased in the year 2011.
5) Sex ratio has been decreased in the rural areas whereas it is increased in urban areas.
6) Higher percentage population is observed in 15 – 59 group.

**References:**
1. *Census of India, (2001), final population table series I, India, Registrar, General and Census Commissioner, India.*
2. *http:www.cencusindia.ov.in.*
3. *Provisional Population Tables, Census of India.*
4. *Chandna and Sindhu (1980), Introduction of Population Geography, Kalyani Publisher, New Delhi, Page No. 7.*
5. *Porwal M. C. (1997), RS Analysis of Environmental Resources for Planning and Development, APH Publication corporation, New Delhi, Page No. 191.*

# Impact of Agricultural Landuse Pattern on Growth of Population in Latur District of Maharashtra

**Dr. Pradip P. Laggad**
Department of Geography,
M. S. S. Arts College, Tirthpuri,
Tq. Ghansawangi, Dist. Jalna.

**Abstract:**

*The growth of population, whatever its rate may be, gradually raises the man-land ratio and causes increase in the demand for food and other products. Consequently the same unit of land requires to accommodate more people and to meet the increased demand. In an agricultural area where there has been high growth of population but limited scope for further expansion of cropland, intensification of cropping is one of the possible ways for increasing output. Intensification of cropping is, in fact, a process by which the annual yield capacity of an unit-area can be enhanced. Normally the yield capacity of land is increased by raising more than one crop from the same land and thus, the intensity of cropping often refers to the number of crops raised in an area during an agricultural year. Cropping intensity and population density both are near about stable in the Latur district from 2001 to 2011.*

**Keywords**: Population growth, growth rate of population, Population density, cropping intensity

## Introduction:

Population growth and its increasing density exert pressure on cropping pattern. There are only two ways to satisfy the increasing food and other agricultural demands of the District rising population: either expanding the net area under cultivation or intensifying cropping over the existing area. Cropping intensity plays an important role in the agricultural development of any region. Higher cropping intensity shows intensive use of land for agricultural purpose. Its significance is further increased in view of the rising pressure of population on land. It may be seemed that areas of high population pressure have higher productive intensity and higher frequency of cropping. This lead to the conclusion that increases in population pressure may cause increase cropping intensity in the agricultural system.

## Study Area:

Latur district is located on the map to the South-East of Maharashtra on the border of Maharashtra and Karnataka. The district of Latur lies between $17^0$ 52' north latitudes to $18^0$ 50' north latitudes and 76 $^0$ 18' east longitudes to $79^0$ 12' east longitudes. The maximum east-west length of Latur District is 106 km and north-south length is 109 km. It has a total area of 7157 sq.kms and proportion as compared with Maharashtra state is about 2.33 %. The proportion of area of the Latur district in Marathwada division is about 11.34 %.

## Objectives:

The following objectives has been taken for achieve result of this research paper.
- To know the changes in cropping intensity.
- To examine the growth of population.

## Data base and Methodology:

The present study is entirely based on secondary data and study period for the year 2001 and 2011. The secondary data is collected from socio – economic review and District census hand book. For calculating cropping density formulae is used.

$$Index\ of\ Cropping\ Intensity = \frac{Gross\ Cropped\ Area}{Net\ Sown\ Area} \times 100$$

## Tahsilwise Population Growth and Density:

There is decline in growth rate of population during the decade of 2001 to 2011 in Latur district. The total population growth of Latur district was increased by 17.97% during the decade of 2001-2011. Latur tahsil recorded highest growth rate of total population that is 26.04% whereas in other tahsil of the study region the growth rate of total population is observed between 10.45 to 26.02 % during the decade of 2001-2011.

**Table No. 1.1: Tahsilwise Density of Population in Latur District: 2001 to 2011**

| Sr. No. | Tahsil | Density of Population ( Per Km²) | | Change in Persons Per km2 (2001 to 2011) | Growth Rate in % |
|---|---|---|---|---|---|
| | | 2001 | 2011 | | 2001 to 2011 |
| 1 | Latur | 543 | 684 | 141 | 26.04 |
| 2 | Renapur | 221 | 258 | 36 | 16.36 |
| 3 | Ahmadpur | 254 | 302 | 47 | 18.65 |
| 4 | Chakur | 235 | 266 | 31 | 13.25 |
| 5 | Jalkot | 199 | 251 | 52 | 26.02 |
| 6 | ShirurA. | 224 | 253 | 29 | 12.75 |
| 7 | Ausa | 222 | 245 | 23 | 10.47 |
| 8 | Nilanga | 272 | 310 | 37 | 13.69 |
| 9 | Deoni | 223 | 246 | 23 | 10.45 |
| 10 | Udgir | 340 | 405 | 64 | 18.94 |
| Total District | | 291 | 343 | 52 | 17.97 |

*Source*: *District Census Hand Book of Latur District, 1991.*
(*The figures of 2001 census are taken from the CD distributed by statistical Dept., Latur district*).

The total density of population in Latur district according to the population census of 2001 was 291 persons per sq.km. It was increased up to the 343 persons per sq.km. in 2011. It means growth of 52 persons per sq.km. in density of 2001.

The density of population varies from tahsil to tahsil. The highest total density of population found in Latur tahsil is 684 persons per km² while the lowest total density of population recorded in Ausa tahsil is 245 persons per km² in 2011. Positive change in density of population was observed in all tahsils from 2001 to 2011.

**Analysis of Cropping Intensity:**

Cropping intensity refers to rising of a number of crops from the same field during one agriculture year. Thus, higher cropping intensity means that a higher portion of the net area is being cropped more than once during one agricultural year. This also implies higher productivity per unit of arable land during one agricultural year.For instance, suppose a farmer owns five hectares of land, and gets the crop from these five hectares during the kharif season and, again, during the rabi season he raises a crop from three hectares. He, thus, gets the effective produce from eight hectares, although he owns only five hectares physically. Had he raised crop from five hectares totally, his cropping intensity would have been 100 per cent, while now it is 160 per cent.

**Table No. 1.2: Tahsilwise Agricultural Cropping Intensity in Latur District: 2001 to 2011**

| Sr. No. | Tahsil | Index of Cropping Intensity 2001 | Index of Cropping Intensity 2011 | Vol. of Change 2001-2011 |
|---|---|---|---|---|
| 1 | Latur | 132.30 | 122.44 | -9.86 |
| 2 | Renapur | 141.60 | 136.09 | -5.51 |
| 3 | Ahmadpur | 114.12 | 132.79 | 18.67 |
| 4 | Chakur | 117.44 | 122.49 | 5.05 |
| 5 | Jalkot | 123.10 | 138.03 | 14.93 |
| 6 | ShirurA. | 142.04 | 132.83 | -9.21 |
| 7 | Ausa | 138.84 | 130.70 | -8.14 |
| 8 | Nilanga | 152.37 | 129.00 | -23.37 |
| 9 | Deoni | 121.51 | 133.58 | 12.06 |
| 10 | Udgir | 121.51 | 141.99 | 20.48 |
| Latur District | | 130.62 | 130.22 | -0.40 |

*Source*: *Compiled by Researcher.*

Cropping intensity of Latur district has been slightly decreased from 130.62 to 130.22 from 2001 to 2011. It means cropping intensity is slightly decreased with slightly increasing density of population in Latur district. In other words cropping intensity and population density both are near about stable in the study region.

The highest positive change in cropping intensity has been found in Udgir tahsil (20.48) and the lowest positive change found in Chakur tahsil (5.05) during the period2001 to 2011.The highest negative change in cropping intensity has been found in Nilanga tahsil (-23.37) and the lowest negative change found in Renapur tahsil (-5.51) from 2001 to 2011.

Cropping intensity is depend upon how many times same field has been cultivated in a year. It means, within a year more than twice the same area has been cultivated. Cropping intensity is nothing but it is the ratio between gross cropped area and net sown area. It shows the level of agricultural development.

**Results:**

The study reveals that decline in growth rate of population during the decade of 2001 to 2011 in Latur district. Slightly increasing (52 persons per km$^2$) density of population in the study region from 2001 to 2011. Cropping intensity of Latur district has been slightly decreased from 130.62 to 130.22 from 2001 to 2011. It means cropping intensity is slightly decreased with slightly increasing density of population in Latur district. In other words cropping intensity and population density both are near about stable in the study region.

**References:**

1. *Chandana R.C. and Sidhu M.S. (1980): "Introduction to Population Geography", Kalyani Publisher, New Delhi.*
2. *http://www.censusindia.gov.in/DigitalLibrary/MFTableSeries.aspx*
3. *Majid Husain (2007): "Systematic Agricultural Geography", Rawat Publications, Jawahar Nagar, Jaipur.*
4. *Dr. D.K. Shrivashtava (2006): "Agricultural Geography", published by Intellectual Book Bureau, Bhopal.*

# Spatio-Temporal Study of Crop Combination: A Study in Agriculture Geography (According to Doi's Method)

**Dr. Suryakant S. Pawar**
Department of Geography,
Shivaji Mahavidyalaya, Renapur, Dist. Latur.

*Abstract:*

*Geographers have always been closely related with spatio-temporal analysis of the regional and ecological landscape of the earth. The significance of regional analysis is really core of all geographic investigation. The regional aspects of cultivation, crop concentration and combination etc. are fundamental. Agricultural landuse planners have paid considerable attention to such studies.*

**Keywords:** Crop Combination, Agricultural region, variation.

## Introduction:

An important aspect of agricultural geography as it provides a good basis for agricultural regionalization is the study of crop combination. The crops are generally grown in combinations and it is really that a particular crop occupies a position of total isolation other crops in a given area unit at a given point of time. The distribution maps of individual crops are interesting and useful for planners but it is even more important to view the integrated assemblage of the various crops grown in an Arial unit. For a comprehensive and clear understanding of the agricultural mosaic of an agro climatic region and for the planning and development of its agriculture, a systematic study of crop combinations is of great significance.

## Objectives:

The main objectives of study are:

1) To study the crop combination of the study region.
2) To understand the regional variation in crop combination study region.
3) To suggest the remedies to sustainable development.

## Study Area:

Latur district is located on the map to the South-East of Maharashtra on the border of Maharashtra and Karnataka. The district of Latur lies between $17^0$ 52' north latitudes to $18^0$ 50' north latitudes and $76^0$ 12' east longitudes to $77^0$ 18' east longitudes. It has a total area of 7157 sq.kms and proportion as compared with Maharashtra state is about 2.32 %. It is bounded on the north by the Bid and Parbhani districts, on the north-east by Nanded district, on the south-east by the Karnataka state and on the north-west and west by the Osmanabad district.

Latur district comprising 10 tahsils but only seven old tahsils i.e. Latur, Ausa, Renapur, Ahamadpur, Chakur, Udgir and Nilanga are considered for the study because of the non availability of new tahsils data i.e. Deoni, Jalkot and Shirur-Anantpal. Latur district is well inhabited and total population is 20,80,285 lived in 5 urban centers and 921 villages whereas the density of population is 290.60 person per $km^2$ as per 2011 census.

## Database and Methodology:

Present study mostly relies on the secondary data collected through Agriculture Department and District statistical Department of Latur and District socio-economic abstract of Latur District. For the present investigation, six crops are selected and simple statistical method has been used to present study. For the present study an attempt is made to delineate the crop combination regions by applying crop combination method i.e. Minimum standard deviation method is introduced by Doi's method."The study of crop combination regions constitutes important aspects of agricultural geography as it provides a good basis for agricultural regionalization (Majid Husain, 2007)" out of many methods of crop combination the method used by Doi's have been used for the tahsil wise crop combination of Latur district from 2005 to 2015.

## Crop combination According to Doi's Method:
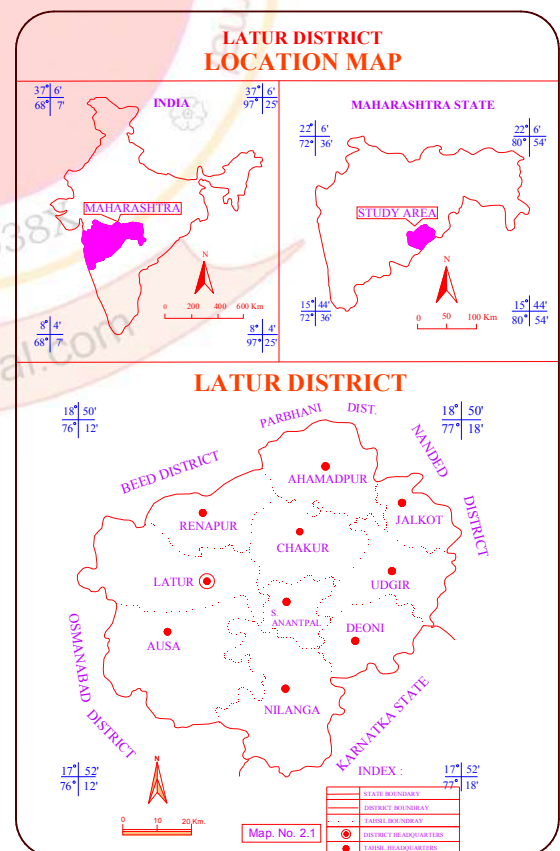
Table No. 1.1 reveals there are six crop combinations in Latur tahsil in 2005 as per Doi's method viz. Jowar, Sunflower, Other Pulses, Tur, Other Oil seeds, Mung and there were six crop combination in 2015 viz. Jowar, Tur, Sugar, Sunflower, Other Oilseed, Mung.

There are five crop combinations in Renapur tahsil in 2005 as per Doi's method viz. Jowar, Tur, Cotton, Other Oilseed, Groundnut and there were six crop combinations in 2015 viz. Jowar, Sunflower, Tur, Other Oilseeds, Mung, Cotton.

### Table No. 1.1 Changes in Crops Combination of Latur District

| Crop Combination in Latur District by Doi's Method | | | | | |
|---|---|---|---|---|---|
| **2005** | | | **2015** | | |
| **Name of the Tahsil** | **Crop Combination ( No. of Crops)** | **Crops** | **Name of the Tahsil** | **Crop Combination ( No. of Crops)** | **Crops** |
| Latur | 6 | Jowar, Sunflower, Other Pulses, Tur, Other Oilseeds, Mung | Latur | 6 | Jowar, Tur, Sugar, Sunflower, Other Oilseed, Mung |
| Renapur | 5 | Jowar, Tur, Cotton, Other Oilseed, Groundnut | Renapur | 6 | Jowar, Sunflower, Tur, Other Oilseeds, Mung, Cotton |
| Ausa | 5 | Jowar, Other oilseeds, Sunflower, Tur, Other Pulses | Ausa | 3 | Jowar, Tur, Sunflower |
| Jalkot | 6 | Jowar, Tur, Other Oilseeds, Cotton, Sunflower, Other Pulses | Jalkot | 6 | Jowar, Tur, Mung, Cotton, sunflower, other Oilseeds |
| Ahmadpur | 5 | Jowar, Tur, Cotton, Other Oilseeds,Groundnut | Ahmadpur | 4 | Jowar, Cotton, Tur, Sunflower |
| Deoni | 6 | Jowar, Tur, Other Oilseeds, Cotton, Sunflower, Other Pulses | Deoni | 5 | Jowar, Tur, Mung, Cotton, sunflower |
| Chakur | 5 | Jowar, Tur, Cotton, Other Oilseeds, Groundnut | Chakur | 6 | Jower, Tur, Sunflower, Rice, Other Oilseeds,Groundnut |
| Nilanga | 7 | Jowar, Other Pulses, Sunflower, Other Oilseeds, Tur, Gram, Groundnut | Nilanga | 4 | Jowar, Tur, Sunflower, Gram |
| Udgir | 6 | Jowar, Tur, Other Oilseeds, Cotton, Sunflower, Other Pulses | Udgir | 6 | Jower, Tur, Sunflower, Mung, Cotton, Other Oilseeds |
| Shirur Anantpal | 7 | Jowar, Other Pulses, Sunflower, Other Oilseeds, Tur, Gram, Groundnut | Shirur Anantpal | 5 | Jowar, Tur, Sunflower, Other Oilseed, Gram |
| Total District | 6 | Jowar, Tur, Other Oilseeds, Other Pulses, Sunflower, Groundnut | Total District | 6 | Jowar, Tur, Sunflower, Other Oilseeds, Mung, Cotton |

*Source : Computed By Researcher.*

There are five crop combinations in Ausa tahsil in 2005 as per Doi's method viz. Jowar, Other oilseeds, Sunflower, Tur, and Other Pulses and there were three crop combinations in 2015 viz. Jowar, Tur, Sunflower.

There are six crop combinations in Jalkot tahsil in 2005 as per Doi's method viz. Jowar, Tur, Other Oilseeds, Cotton, Sunflower, Other Pulses and there were six crop combinations in 2015 viz. Jowar, Tur, Mung, Cotton, sunflower, other Oilseeds.There are five crop combinations in Ahmadpur tahsil in 2005 as per Doi's method viz. Jowar, Tur, Cotton, Other Oilseeds, Groundnut and there were four crop combination in 2015 viz. Jowar, Cotton, Tur, Sunflower.There are six crop combinations in Deoni tahsil in 2005 as per Doi's

method viz. Jowar, Tur, Other Oilseeds, Cotton, Sunflower, Other Pulses and there were five crop combinations in 2015 viz. Jowar, Tur, Mung, Cotton, sunflower.

There are five crop combinations in Chakur tahsil in 2005 as per Doi's method viz. Jowar, Tur, Cotton, Other Oilseeds, Groundnut and there were six crop combination in 2015 viz. Jower, Tur, Sunflower, Rice, Other Oilseeds, Groundnut.There are seven crop combinations in Nilanga tahsil in 2005 as per Doi's method viz. Jowar, Other Pulses, Sunflower, Other Oilseeds, Tur, Gram, Groundnut and there were four crop combination in 2015 viz. Jowar, Tur, Sunflower, Gram. There are six crop combinations in Udgir tahsil in 2005 as per Doi's method viz. Jowar, Tur, Other Oilseeds, Cotton, Sunflower, Other Pulses and there were six crop combinations in 2015 viz. Jower, Tur, Sunflower, Mung, Cotton, Other Oilseeds. There are seven crop combinations in Shirur Anantpal tahsil in 2005 as per Doi's method viz. Jowar, Other Pulses, Sunflower, Other Oilseeds, Tur, Gram, Groundnut and there were five crop combinations in 2015 viz. Jowar, Tur, Sunflower, Other Oilseed, Gram.

There are six crop combinations in Latur district in 2005 as per Doi's method viz. Jowar, Tur, Other Oilseeds, Other Pulses, Sunflower, Groundnut and there were six crop combinations in 2015 viz. Jowar, Tur, Sunflower, Other Oilseeds, Mung, Cotton (Map No. 1.2A, 1.2B).

**Results:**
1. The crop combination of Latur district is largely varying from tahsilwise.
2. The high crop combination is observed in only two tahsils i.e. Nilanga and Shirur Anantpaltahsils of Latur district.
3.  The low crop combination is observed in only Ausa tahsil and expecting whole district the medium crop combination is observed.

**References:**
1. Ahmed A. and Siddiqui M.F. (1967), 'Crop Combination Patterns in Luni Basins' Geographer (M.U.A.) Vol. XIV., Pp. 69-80.
2. Doi K. (1957), 'The Industrial Structure of Japanese Prefecture,' Proceedings I. G. U. Regional Conference in Japan, Pp.310.316.
3. Jasbir Sing and Dhillon S.S. (1997), 'Agricultural Geography', Tata McGraw Hill Publishing Co. Ltd., Delhi. P.210.
4. MajidHussain (1996), 'Systematic Agricultural Geography,' Rawat Publication, Jaipur, Pp. 222-223.
5. Latur District Census 1991, 2001.
6. Socio-Economic abstract of Latur District: 2005 to 2015.
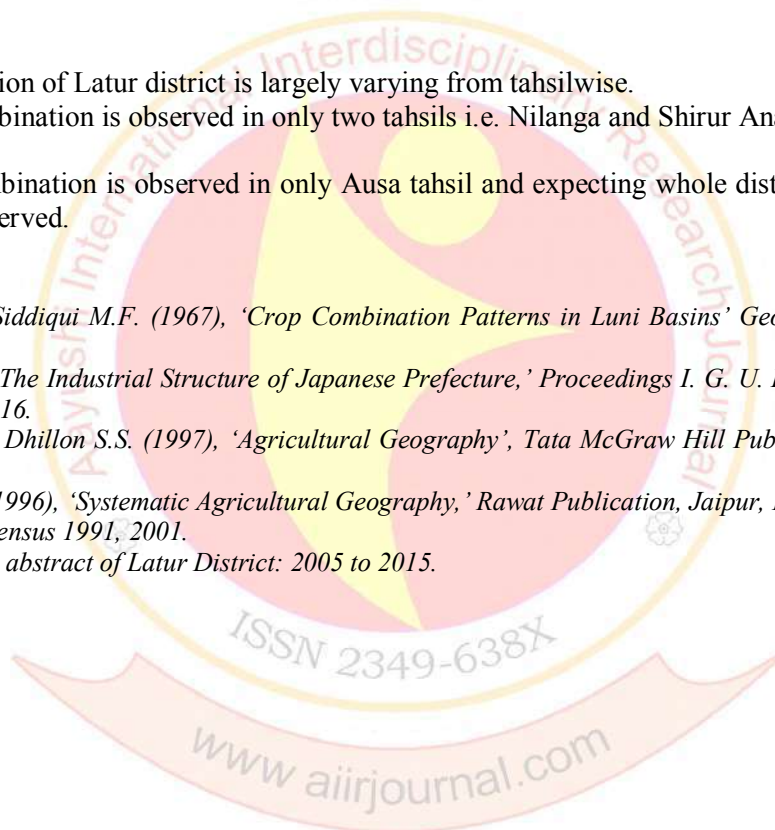
# Spatial Distribution of Population Density in Selected Villages of Adilabad District of Telangna, Bidar District of Karnataka and Nanded District of Maharashtra

**Dr. Amar S. Agale**
Matoshri Kesharbai Kale Adyapak Vidyalaya, Latur.

**Abstract:**

 *Distributions of population in an area constitute an important segment of population studies. While distribution, the concepts are quite interrelated and used simultaneously. Distribution of population refers to the way people are spaced over the land; it emphasizes the pattern of actual place location of a population. Distribution of population measures the degree of population concentration or dispersion. On the other hand density of population is most revealing and is useful tool in the analysis of diversity of man's distribution in space. It is a simple concept of relating population size to the land area with a view to assessing the pressure of population upon the resource of area. It is generally expressed in terms of person per sq.km or per sq. mile of land area rather than of gross area. Density of population per unit of area represents the ratio of population to land (Desai, 1985). As per 1961, Nanded, Nizamabad and Bidar district crossed the figure of one hundred persons per sq.km. and 1981, all district crossed the figure of one hundred persons per sq.km. Fast growth in density of population is noticed during the decade 1991-2011. According to 1991 census, density of the study area was 222, 155, 295 and 276 persons per sq.km. WithNanded, Adilabad, Nizamabad and Bidar district respectively. Arithmetic density of the study area remains lower during the period of seventy years.*

**Keyword:** Spatial Distribution, Growth, Density.

## Introduction:

 The pattern of population distribution is influenced by the physical conditions such as nature and degree of fertility of the soil, the nature of the surface, climatic conditions and spatial relations. Excessively high or low temperature or precipitation influences the degree of soil erosion, vegetative growth and in turn nature of economic activities, particularly agriculture, which influences pattern of population distribution. The region of difficult terrain and high altitude, due to limitations put by these on nature of economic activities, have generally low population densities. Nature of soil affects land use pattern in and area. Availability of certain important economic minerals also exerts a pull on population.

 Socio-economic factors also largely govern the aerial spread and degree of concentration of population. The influence of the physical factors on distribution of population also depends on the ways of life of the people. According to james "the significance to man of the physical features of the land is determined by culture and therefore any change in the attitudes, objectives or technical abilities of the people inhabiting on area requires revaluation of the significance of the land." For obvious reasons the pattern of spatial distribution of an agricultural population is totally different from that of a population engaged in non-agricultural activities. The techniques of productions are intimately related to the types of economic activities, which in turn influence the distribution of population. The steps taken to implement social policies related to the distribution of population also depend, in part, upon the existing farm of social organization.

 According to 2011, arithmetic density of the districts was Nanded (319), Adilabad (170), Nizamabad (321) and Bidar (312 persons per sq.km) respectively. This is significantly lower than that of Maharashtra in the same year which was 365 persons per sq.km or less than that of India, which was 382 persons per sq.km. The density of population for the study region has been lower than that for Maharashtra as well as for India since 1951. In the decade of 1951 density of the study area increases, it is mainly due to low mortality rates caused by plague epidemic.

## Study Region:

 Nanded district lies in the Godavari basin and the eastern most district of Maharashtra. It has a population 33,61,292 as per 2011 census. It is situated on the northern bank of the godavari and has grown in importance as a commercial center. Nanded district covers an area of 10528.00 km$^2$. In terms of area and population it forms 3.42 Percent and 2.55 percent of the state respectively.

## Objectives:

4. To study the changes between growth
5. To study the changes between density

## Database and Methodology:

 The attempts have been made by the researcher to examine population structure during the 30 years spreading between 1991 to 2011, for which uniform data at circle level is available. The main body of data used in this study was collected from two sources viz. primary and secondary. The present paper includes distribution, density of population in the study region. It has been carried out over eight years from 2011 to 2018. The processed data was presented in the form of maps, diagrams and tables. Population concentration is calculated in relation to percentage of population and area. The number of persons per sq.km or mile is known

as arithmetic or general density. It is known as general condition for population pressure. It is calculated by the following formula:

$$\text{Aritmetic Density} = \frac{Total\ Population}{Total\ Area}$$

Arithmetic density is closely related to population growth and area of particular location. Whenever population growth is noticed in only area arithmetic density also increases. If area of only location gets changes, it may decline or increase it affects on the values of densities. If area declines densities finds increase or if area increases density gets decline.

**Distribution of Density:**

**Table No. 1.1: Density of Selected Villages in the Study Region**

| Sr.No. | Tahsils | Name of village | 2011 | 2018 |
|--------|---------|-----------------|------|------|
| 1 | Mukhed | Halani | 307 | 369 |
| | | Honwadaj | 339 | 408 |
| 2 | Degloor | Yedur | 197 | 218 |
| | | Khanapur | 274 | 345 |
| 3 | Biloli | Sagaroli | 314 | 398 |
| | | Lohagaon | 265 | 319 |
| 4 | Dharmabad | Bannali | 246 | 295 |
| | | Jarikot | 278 | 334 |
| 5 | Umari | Bothi | 149 | 198 |
| | | Goratha | 159 | 195 |
| 6 | Bhokar | Mahagaon | 133 | 163 |
| | | Borgaon | 258 | 289 |
| 7 | Himayetnager | Washi | 134 | 154 |
| | | Tembhurni | 130 | 142 |
| 8 | Kinwat | Apparaopeth | 143 | 176 |
| | | Daheli | 269 | 323 |
| 9 | Tamsi | Karanji (T) | 661 | 798 |
| | | Pippalkhoti | 217 | 239 |
| 10 | Talamadugu | Kosai | 12 | 15 |
| | | Bharampur | 354 | 426 |
| 11 | Bazarhatnoor | Jatarala | 165 | 205 |
| | | Tembi | 104 | 136 |
| 12 | Boath | Wajar | 39 | 48 |
| | | Anduru | 80 | 98 |
| 13 | Sarangpur | Potia | 176 | 215 |
| | | Gopalpet | 129 | 162 |
| 14 | Kuntala | Downelle | 72 | 98 |
| | | Andkur | 182 | 256 |
| 15 | Kubeer | Dodarna | 155 | 188 |
| | | Sangvi | 135 | 172 |
| 16 | Tanoor | Masalga | 107 | 132 |
| | | Hangirga | 139 | 167 |
| 17 | Mudhole | Ravindapur | 635 | 762 |
| | | Edbid | 204 | 245 |
| 18 | Navipet | Mittapur | 99 | 122 |
| | | Narayanpur | 321 | 384 |
| 19 | Ranjal | Kandakurthi | 249 | 298 |
| | | Kalyapur | 360 | 432 |
| 20 | Bodhan | Siddapur | 122 | 137 |
| | | Amdapur | 417 | 499 |
| 21 | Kotgir | Hangerga | 438 | 523 |
| | | Rampur | 137 | 165 |
| 22 | Madnoor | Sonala | 129 | 155 |
| | | Rusegaon | 150 | 182 |
| 23 | Jukkal | Gundoor | 196 | 237 |
| | | Pocharam | 210 | 248 |
| 24 | Aurad | Ekamba | 209 | 251 |
| | | Santhpur | 686 | 823 |

**Source:** *Compiled by the Researcher.*

Table No. 1.1 reveals that density above 300 persons per sq.km. for the year 2011 was observed in Halni, Honwadaj, Sagaroli, Karanji (T), Bharampur, Ravindapur, Narayanpur, Kalyapur, Amdapur, Hangerga and Santhpur villages whereas medium density of population than 200-300 persons per sq.km, for the year 2011 is observed in Khanapur, Lohagaon, Bannali, Jarikot, Borgaon, Daheli, Pippalkhoti, Edbid, Kandakurti, Pocharam and Ekamba villages. Density of population below than 200 persons per sq.km. for the year 2011 is noticed in Yedur, Bothi, Goratha, Mahagaon, Washi, Tembhurni, Apparaopeth, Kosai, Jatarala, Tembi, Wajar, Anduru, Downelly, Hangirga, Mittapur, Siddapur, Rampur, Sonala, Rusegaon, Potia, Gopalpet, Andkur, Dodara, Sangvi, Masalga and Gundoor villages.

Highest population density is observed in Santhpur village i.e. 686 persons per sq.km, because this village is nearby Aurad city. Lowest in Kosai (12 persons per sq.km.) village of Talamadugu Tahsil located on Bidar highway.

In the year 2018 that density above 300 persons per sq.km. for the year 2018 was found in Halani, Honwadaj, Sagaroli, Khanapur, Lohagaon, Jarikot, Daheli, Karanji, Bharampur, Ravindpur, Narayanpur, Kalyapur, Amdapur, Hangerga and Santhpur villages whereas medium density of population than 200 to 300 persons per sq.km, for the year 2018 was shown in Edbid, Kandakurti, Gundoor, Pocharam, Ekamba, Yedur, Bannali, Borgaon, Pippalkhoti, Jatarala, Potia and Andkur villages. Density of population below than 200 persons per sq.km. for the year 2018 was noticed in Wajar, Anduru, Gopalpet, Siddapur, Rampur, Sonala, Rusegaon, Bothi, Goratha, Mahagaon, Washi, Tembhurni, Apparopeth, Kosai, Tembi, Downelly, Dodarna, Sangvi, Masalga,



Graph No. 1.1: Density of Selected Villages
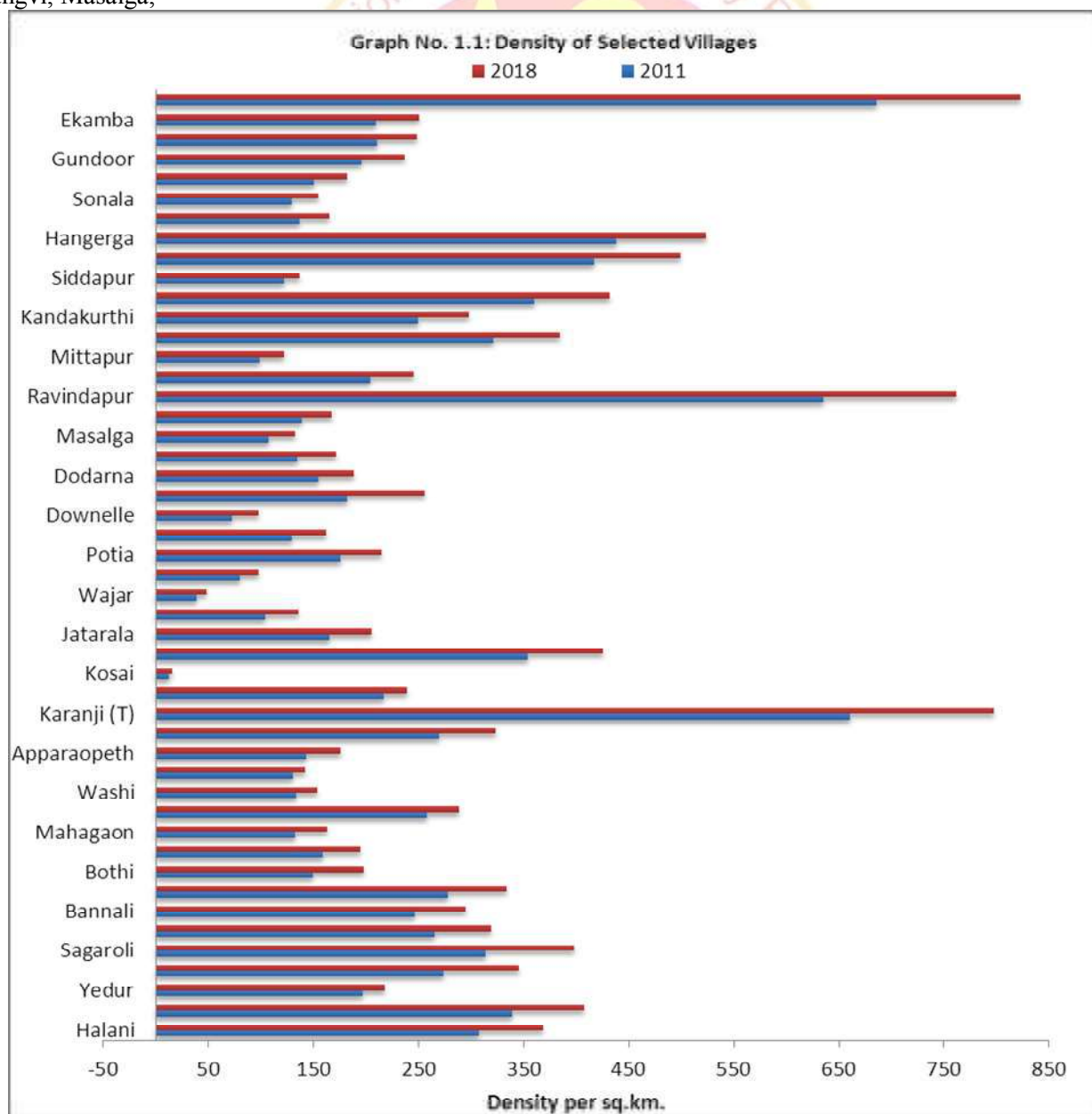
Hangirga and Mittapur villages. Highest population density is located in Santhpur village i.e. 823 persons per sq.km, because this village is nearby Aurad City whereas lowest in Kosai (15 persons per sq.km.) village of Talamadugu Tahsil.

**Conclusions:**

In 1961, frontier area of the study region Nanded, Nizamabad, Bidar, Andhra Pradesh, Karnataka and Maharashtra crossed the figure of three hundred and reached to 365 persons per sq.km. and 1971, there is only one adilabad district nothing crossed the figure of one hundred and reached to 80 persons per sq.km. Fast growth in density of population is noticed during the decade 1991-2011. Density of Bodhan tahsil is increased very fast, it may be largely due to changing economic paradigm i.e. industrial activities and consequent urbanization. Density is not so related with rainfall. In 2011, Highest urban density was observed in Degloor tahsil with 7364 persons per sq.km it is due to increased industrialization, and consequent urbanization whereas rural density was high in Ranjal tahsil with 342 persons per sq.km. and lowest rural density was noticed in Talamadugu tahsil. Rural density of the study area is closely related with soil types, potential irrigation, and accessibility of transportation means and distance of towns, market centers. Another think, 1991 to 2011 these tahsils was same position in this year.

**References:**

1. *David, Kingsley (1951): Population of India and Pakistan, Princeton University press, Princeto.*
2. *Demko, G.T. (1970): Population Geography – A Reader, McGraw Hill, New York.*
3. *Das, N.P. and Bhavsar, Suraj (1991): Population Graowht Rate in India; Emerging Trends in the light of 1991 census Result, demography India, vol. 20 no. 2 Pp. 227-41.*
4. *Gosal, G.S. (1982): Recent population growth in India, Population Geography, vol. 4 Pp. 33-35.*
5. *Hauser, P.M. (1961): Population perspective, New Brunswick, Rutgers University Press.*

# Geography and Technology

**Dr. P.B. Achole**
Head, Dept. of Geography,
Azad College, Ausa, Dist. Latur.

**Abstract:**

    *This paper discusses the importance of technological innovation to Geography, especially since the formation of an approach recognized as Evolutionary Economic Geography. The formation of this approach has roots in economics, which is the object of attention in the first section. Thus, initially discusses technological innovation from the evolution of the theme in economic thought, considering also some contributions from Milton Santos about the technical dimension. The next section is about of National Innovation Systems, a theme dear to geographers and one of the most current approaches on the importance of technological progress for nations. In the last section the Evolutionary Economic Geography is treated in detail from the theoretical foundations of the sub discipline in the consolidation process. Some contributions of the Brazilian Geography are indicated at the end of this paper.*

**Introduction:**

    The concept of innovation was proposed by Schumpeter over one hundred years ago, however, the studies dedicated to the theme have only gained strength in the last decades. This appreciation of technological innovation emerged once a linear approach, in which innovation takes place in a sequential fashion starting with scientific research, had been surmounted in favor of the adoption of a systemic perspective of the phenomenon. In this systemic approach the perspective of the National Innovation Systems stands out, with the contribution of economists who are not only inspired by Schumpeter, but also by other fields of knowledge to construct the subdiscipline known as Evolutionary Economics. This approach inspired geographers to look for a perspective that valued the territorial dimensions of innovative processes from new categories. Evolutionary Economic Geography emerged in this scenario, approaching technological innovation with hitherto unused theoretical contributions. This is the trajectory discussed in this article, which aims to contribute to the debate in Brazilian Geography regarding the importance of carrying out studies focused on the relationship between territory and innovation.

    Accordingly, this article initially highlights the importance of studies of innovation in a national context of the appreciation of the theme by academics, public officials and private agents. This appreciation can be verified, for example, in various economic studies on the subject, especially those published by the Institute of Applied Economic Research (IPEA). Within the ambit of public administration, the federal government's recent industrial plans (PITCE, PDP and Brasil Maior) make clear the government's growing concern to promote the country's autonomous development based on the incorporation of technological progress by the productive sectors. This thesis is reinforced by the incorporation of the term innovation into the title of the Ministry for Science and Technology in 2011. (One possible criticism is that the plans reflect the discursive strategy of the government of the day, more than effective action in the field of scientific, technological and innovation policy.) For the national business community, despite the insufficient innovative advances when comparing Brazil to central countries, there is a consensus that technological progress is a fundamental element to reach higher levels of competitiveness. Thus, there is a broad consensus on the importance of innovation for national development and Brazilian Geography can contribute in this field with better targeted studies on the theme

**Technological Innovation:**

    The theoretical perspective of the phenomenon of innovation has been a debate eminently positioned in the field of economic theory, but it can also be found in other scientific disciplines; in this study the emphasis is on the authors of Evolutionary Economic Geography. The first point to be emphasized about technological innovation is the importance of technical change for development. Above all there is agreement with the view that the difference in labor productivity largely explains the difference in incomes between nations. Technical progress is one of the most relevant factors, perhaps the greatest, for the increase in productivity rates. It should be taken into account that no economic theory is applied in full by governments in their policies; the theory reveals the perception of the practices underway in specific territories and times and also inspires the practice of government and businesspeople..

    According to Hugo Cerqueira (2002) Evolutionary Economics emerged during a crisis in economic thinking. Thus, this approach would be one of the responses to the exhaustion of the mechanistic model would be exceeded by more systemic approaches. The difficulty in analyzing the processes of change by the previously established economic theories motivated researchers in the field to look for new categories to interpret, for example, the technological changes in the behavior of companies and consumers. The criticisms of the limitations of current economic theories are directed not only at the neoclassical approach, but also the Austrian school and Marxist approaches. In the field of economic thinking the main references for the

construction of an approach that incorporates the evolution of processes are: Schumpeter, as outlined above, and Veblen, followed by the American Institutionalists. Essletzbichler and Rigby (2010, p. 43) argue that evolutionary economists have progressed in fields where neoclassical economics was not capable of offering satisfactory answers, namely, economic growth, technological change, industrial evolution, the nature of competition and the role of institutions in directing individual behavior. On the other hand, even if the criticism of the complete information and perfect rationality found in the neoclassical school is a common one among evolutionists, this group is still far from formulating a research paradigm in common, agreeing on basic principles.

**System of Innovation:**

After the end of the Second World War, an understanding of technical change based on the linear model of innovation began to prevail, in which companies were considered to be external to the system. In this model companies were just users of the products and services offered by R&D institutions. In this linear perspective there is a direct relationship between R&D efforts and technological innovation, a relationship composed of successive stages initiated by basic research. After various criticisms of this model a new approach emerged in the 1990s, amid the progress of globalization and the precepts of liberalization. Other models arose to explain the relationship between science, technology and society.

Among the models that succeeded the linear approach, here the emphasis is on the National Innovation System. Fagerberg and Sapprasert (2011) recognize a growing scientific production focusing on the theme of innovation, especially in the 1990s. According to the authors, up to the end of the 1980s and the beginning of the following decade the literature about innovation was mainly concerned with the company or industry level. After this period a new harvest of work emerged guided by a more holistic approach, emphasizing the interdependencies between actors, organizations and institutions that influence innovation and, above all, much more focused on policy.

The interaction between different institutions to promote technological development in the national territory is what characterizes the category of the National Innovation System. The need to address these interactions from a new perspective motivated many authors to propose this new perspective of the innovative process in a context of the increasing importance of innovation for the development of nations. Numerous institutions focused on the theme were already active in the country; the challenge was how to articulate these actors in order to leverage the potential that a coordinated system could offer. Government and businesses adopted strategies to strengthen this system, and the more attentive researchers sought to formulate categories that could contribute to the understanding of the phenomenon.

This section presented the category of the National Innovation System and its regional variation, the Regional System of Innovation. The latter has been the focus used the most in studies that value the relationship between territory and innovation, due to geographers' tradition of debating the theme of regional development. The importance of technological learning to the development of nations was also highlighted, presenting Viotti's argument regarding the need to study countries with tardy development using National Learning Systems. The first two sections have traced a general panorama of studies of innovation, henceforth the focus will be on the perspective specifically adopted by Geography on the theme.

Geospatial technologies are a term used to describe the range of modern tools contributing to the geographic mapping and analysis of the Earth and human societies. These technologies have been evolving in some form since the first maps were drawn in prehistoric times. In the 19th century, the long important schools of cartography and mapmaking were joined by aerial photography as early cameras were sent aloft on balloons and pigeons, and then on airplanes during the 20th century. The science and art of photographic interpretation and map making was accelerated during the Second World War and during the Cold War it took on new dimensions with the advent of satellites and computers. Satellites allowed images of the Earth's surface and human activities therein with certain limitations. Computers allowed storage and transfer of imagery together with the development of associated digital software, maps, and data sets on socioeconomic and environmental phenomena, collectively called geographic information systems (GIS). An important aspect of a GIS is its ability to assemble the range of geospatial data into a layered set of maps which allow complex themes to be analyzed and then communicated to wider audiences. This 'layering' is enabled by the fact that all such data includes information on its precise location on the surface of the Earth, hence the term 'geospatial'.

Especially in the last decade, these technologies have evolved into a network of national security, scientific, and commercially operated satellites complemented by powerful desktop GIS. In addition, aerial remote sensing platforms, including unmanned aerial vehicles (e.g. the Global Hawk reconnaissance drone), are seeing increased non-military use as well. High quality hardware and data is now available to new audiences such as universities, corporations, and non-governmental organizations. The fields and sectors deploying these technologies are currently growing at a rapid pace, informing decision makers on topics such

as industrial engineering, biodiversity conservation, forest fire suppression, agricultural monitoring, humanitarian relief, and much more.

There are now a variety of types of geospatial technologies potentially applicable to human rights, including the following:

Remote Sensing: imagery and data collected from space- or airborne camera and sensor platforms. Some commercial satellite image providers now offer images showing details of one-meter or smaller, making these images appropriate for monitoring humanitarian needs and human rights abuses.

Geographic Information Systems (GIS): a suite of software tools for mapping and analyzing data which is geo-referenced (assigned a specific location on the surface of the Earth, otherwise known as geospatial data). GIS can be used to detect geographic patterns in other data, such as disease clusters resulting from toxins, sub-optimal water access, etc. Global Positioning System (GPS): a network of U.S. Department of Defense satellites which can give precise coordinate locations to civilian and military users with proper receiving equipment (note: a similar European system called Galileo will be operational within the next several years while a Russian system is functioning but restricted).

Internet Mapping Technologies: software programs like Google Earth and web features like Microsoft Virtual Earth are changing the way geospatial data is viewed and shared. The developments in user interface are also making such technologies available to a wider audience whereas traditional GIS have been reserved for specialists and those who invest time in learning complex software programs.

## Conclusions:

This paper has sought to demonstrate that there is an ancient research trajectory on technological innovation: with a stronger tradition in Economics, with classical authors dealing with the theme, and in Geography, especially from Hägerstrand. However, it is only more recently that the theme has been incorporated into the agenda of Economic research in an approach that overcomes the linear model of innovation. Among the perspectives that have overcome this model, special attentions was paid to the National Innovation System, which has been well received by those geographers dedicated to studying innovation. After demonstrating the wider picture of studies on the theme, there was recognition of how Geography has approached technological progress. Next, the main theoretical influences of Evolutionary Economic Geography were debated, taking this thread as representative of the state of the art in studies dedicated to the relationship between territory and innovation. Finally, some contributions from Brazilian Geography on the theme were presented, reaching the conclusion that these studies still are not structured in such a way that could be seen as a thread dedicated to the subject in the country. On the other hand, it would not be appropriate to disregard studies on the importance of technology, as an environment, undertaken by Milton Santos. Neither would it be appropriate do discount the activities of the GRITT, a research group dedicated to the theme discussed herein. However, it is really necessary to show that, with regard to forming a sub-discipline, the reflections of the Brazilian Geography about technological innovation are scarce and poorly structured, and it was exactly this fact that this article has sought to highlight.

## Reference:

1. *CENTRO DE GESTÃO E ESTUDOS ESTRATÉGICOS (CGEE). Estudo envolvendo proposta de ciência e tecnologia para a Amazônia. Documento síntese. Brasília: CGEE, 2004.*
2. *CERQUEIRA, Hugo. A economia evolucionista: um capítulo sistêmico da teoria econômica. Revista Análise Econômica, ano 20, nº 37, pp. 55-79, março, 2002.*
3. *CLAVAL, Paul. Epistemologia da Geografia. Florianópolis: Editora da UFSC, 2011.*
4. *COOKE, P.; URANGA, M.; ETXEBARRIA, G. (1997) Regional Innovation Systems: Institutional and Organizational Dimensions, Research Policy, 26(4-5), p. 475-491, 1997.*
5. *DOSI, Giovanni; NELSON, Richard. An introduction to evolutionary theories in economics. Journal of Evolutionary Economics, (4) p. 153-172, 1994.*
6. *ESSLETZBICHLER, Jürgen; RIGBY, David. Generalized Darwinism and Evolutionary Economic Geography. In: BOSCHMA, Ron; MARTIN, Ron (eds.). The Handbook of Evolutionary Economic Geography. Cheltenham, UK/ Northhampton, USA: Edward Elgar Publishing, 2010, p. 43-61.*
7. *AAAS.SCIENTIFIC RESPONSIBILITY HUMANRIGHTS LAW.*

# Spatio-Temporal Analysis of Sex Ratio in Marathwada Region

**Dr. S. B. Ashture**
Head, Department of Geography,
Shri Kumarswami Mahavidyalaya, Ausa Dist. Latur.

**Abstract:**

*Sex composition is one of the important and dynamic elements of population of any region. Nature of sex ratios is age selective also; it also differs at time and space level. The sex ratio is a function of three basic factors of sex ratio at birth, differential at mortality of the two sexes at different stages of life and sex selectivity among migrants. Sex ratio is gaining an increasing objective significance with the growing emphasis on the regional planning and regional approach to the population policy.*

**Keywords:** Sex composition, Migration, health, social status etc.

**Introduction:**

Sex composition is one of the important and dynamic elements of population of any region. The sex composition influences the marriage and growth rate of population (Khan, 1990). Some other characteristics of population such as vital rates, migration and occupational structure also influences by the ratio between two sexes. Since the role of the two sexes is partly contrasting and partly complementary the study of their ratio is of considerable interest to the population geographers (Chandana, 1973).

Nature of sex ratios is age selective also; it also differs at time and space level. So sex and age structure of the population illustrates the dynamics and pressure of population. Sex ratio is an index of socio-economic conditions prevailing in an area and is useful tool for regional analysis (Franklin, 1956). The pattern of sex ratio explains the employment situation, consumption pattern, social needs of the people and other socio-economic characteristics of a community (Shrivastri & Koshal, 1998).

The sex ratio is a function of three basic factors of sex ratio at birth, differential at mortality of the two sexes at different stages of life and sex selectivity among migrants (Clarke, 1960). Sex ratio is gaining an increasing objective significance with the growing emphasis on the regional planning and regional approach to the population policy. Thus the knowledge of sex ratio is helpful to understand social, communal and psychological nature of an area.

**Objectives:**

This research paper is deals with following specific objectives:
1. To understand the nature and pattern of sex composition of the study region.
2. To find out spatio-temporal changes in sex ratio of the Marathwada region.
3. To observe rural-urban differentials in sex ratio and to explain causes behind the change in the selected region.

**Database and Methodology:**

This research paper deals with secondary data of census. Sex ratio data is taken from individual census handbooks of the district level of 1991, 2001 & 2011.

Data is processed, tabulated, analyzed and shown with the suitable cartographic techniques. Conclusions are based on the analysis of data. To calculate the sex ratio of the study region following formula is applied-

$$Sex\ ratio = \frac{Pm}{Pf} X 1000$$

**Whereas:**

Pm= Number of males in the particular population of the area.
Pf= Number of females in the particular population of the area.

**Temporal variations of Sex Ratio (1961-2011):**

In 2011, sex ratio of the study region is worked out to 926 females per 1000 males which was lower than state of Maharashtra (929) and India (943). This situation is due to high level mortality among females in all age groups. Infant mortality of female childes are higher due to sex selective abortions. There are considerable regional variations in sex ratio at rural and urban level of the study area. Rural sex ratio was 949 whereas urban sex ratio worked out to 882 females per 1000 females. Low sex ratio in urban parts is due to rural urban sex selective migration of males.

Since 1961 to 2011, sex ratio in Marathwada region is continuously declining. Rural- urban sex ratio is fluctuating in nature. Lowest sex ratio is noticed in 2001 with 947 in rural parts as well as in 2011 it was registered in lowest in urban parts with 882 females per 1000 males. (fig. no. 1.1)

**Table no.1.1 Temporal Variations in Sex Ratio 1961-2011**

| Region/Sex Ratio | 1961 | 1971 | 1981 | 1991 | 2001 | 2011 |
|---|---|---|---|---|---|---|
| Marathwada Region T. | 964 | 951 | 960 | 944 | 939 | 926 |
| Rural | 971 | 992 | 970 | 953 | 947 | 949 |
| Urban | 914 | 889 | 914 | 920 | 938 | 882 |
| Maharashtra | 936 | 930 | 937 | 934 | 922 | 929 |
| India | 941 | 930 | 934 | 937 | 933 | 943 |

*Source: Based on Census figures of Maharashtra 2001, 2011.*

**Spatial variations in Sex Ratio:**

Spatial variations in sex composition at district level were observed since 1991 to 2011. According to 1991 census in the study area average sex ratio was 944. Sex ratio above the average was found in Jalna (958), Parbhani (953), Hingoli (952) and Nanded district with 945 females per 1000 males. In 2001, sex ratio of the study region is declined to 939 females per 1000 males. Sex ratio at district level also declined excluding Parbhani (957) and Hingoli district (934). Average sex ratio of the study region declined to 926 females per 1000 males in 2011.

**Fig.no 1.1: Temporal sex ratio in Marathwada 1961-2011**
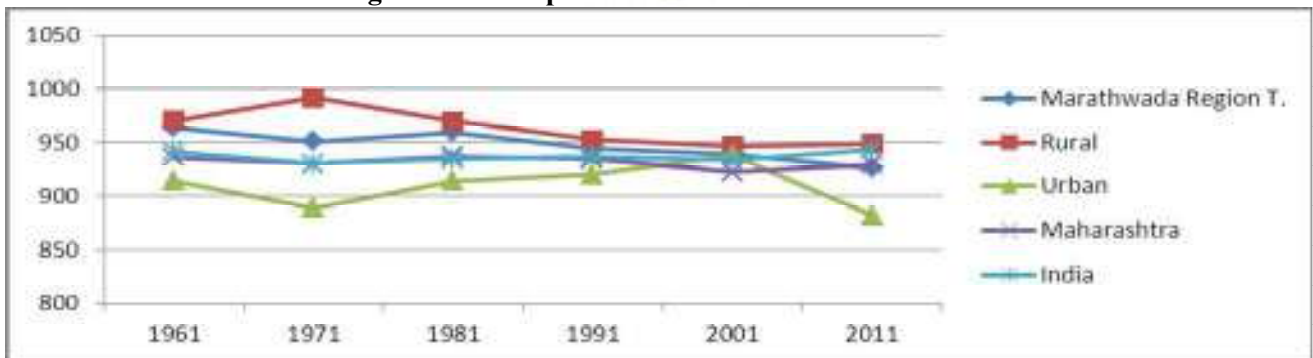


Highest sex ratio was observed in Parbhani district (940) whereas lowest was registered in Osmanabad district with 920 females per 1000 females. Lower social status of females in the society, lack of participitation in decision of family, low literacy levels, economically dependency, carelessness about own health, high mortality rates and high level migration of males from rural to urban parts are the main causes of low sex ratio in the study region.(Fig. no. 1.2)

**Fig. no. 1.2 Sex Ratio of Marathwada Region – 2011 (Per 1000 Males)**
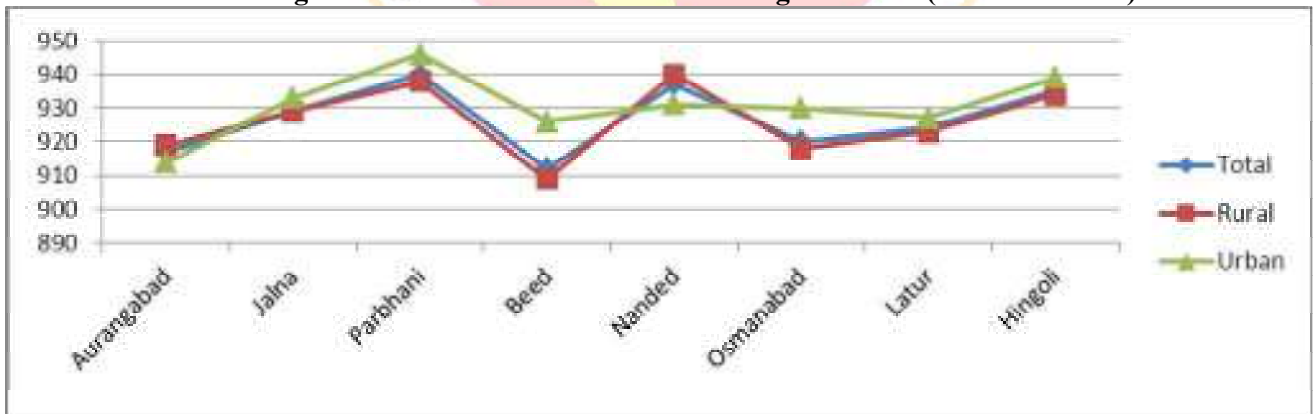


**Fig. No. 1.3 Sex Ratio of Marathwada Region – 1991 (Per 1000 Males)**
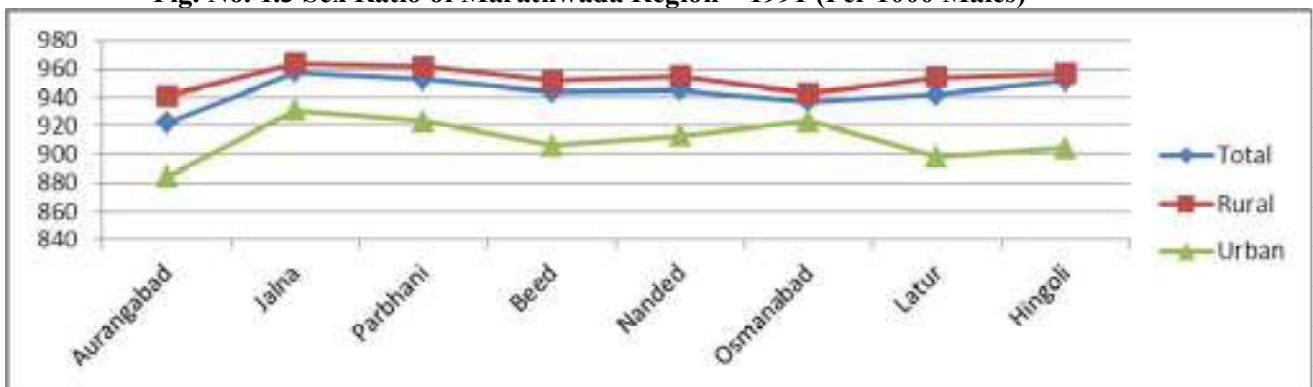
**Rural-Urban Differentials in Sex Ratio:**

**Table No. 1.2: Spatial variations in Sex Ratio in Marathwada Region (1991-2011)**

| Sr. No. | Districts/ Sex Ratio | 1991 | | | 2001 | | | 2011 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | Rural | Urban | Total | Rural | Urban | Total | Rural | Urban |
| 1 | Aurangabad | 922 | 941 | 884 | 919 | 944 | 905 | 917 | 919 | 914 |
| 2 | Jalna | 958 | 964 | 931 | 952 | 957 | 931 | 929 | 929 | 933 |
| 3 | Parbhani | 953 | 962 | 923 | 957 | 967 | 936 | 940 | 938 | 946 |
| 4 | Beed | 944 | 952 | 906 | 927 | 928 | 922 | 912 | 909 | 926 |
| 5 | Nanded | 945 | 955 | 913 | 943 | 949 | 925 | 937 | 940 | 931 |
| 6 | Osmanabad | 937 | 943 | 923 | 930 | 956 | 926 | 920 | 918 | 930 |
| 7 | Latur | 942 | 954 | 898 | 934 | 940 | 916 | 924 | 923 | 927 |
| 8 | Hingoli | 952 | 957 | 904 | 953 | 956 | 937 | 935 | 934 | 939 |
| 9 | Marathwada | 944 | 953 | 920 | 939 | 947 | 938 | 926 | 949 | 882 |

*Source: Based on Census of Maharashtra 2001, 2011.*

Rural-Urban sex ratio of Marathwada reveals that it differs considerable in rural and urban parts. As per 2011 census, sex ratio was 949 females per 1000 males whereas at urban parts it was 882 only. The imbalance in two sex was more in urban areas. This was due to rural-urban migration which was dominated by males. Employment opportunities at urban areas results in large scale migration. Due to high cost of living and scarcity of residential accommodation in urban areas, mostly males migrate to urban areas, leaving their families behind villages. Highest rural sex ratio was registered in Nanded (940) and lowest was in Aurangabad district (919). In urban parts of the Marathwada, Highest urban sex ratio was registered in Hingoli (939) whereas lowest was in Aurangabad with 914 females per 1000 males. (Table no. 1.2)

**Findings:**
- ✓ Overall sex ratio of the study region is continuously declining since last five decades.
- ✓ In 1961, sex ratio of the study area was 964 which was declined to 926 females per 1000 males in 2011. It means that there is decline of -38 females.
- ✓ Sex ratio in Marathwada region was higher than state of Maharashtra and India between the period 1961 to 1991, but it is declined in 2011.
- ✓ There are regional variations at district level in sex ratio of the study area. It is seen that urban sex ratio is increasing since last two decades, but rural sex ratio is declining excluding some districts of the region.

**Suggestions:**
- ➢ Sex ratio of the study region is closely related to social, cultural economic and biological factors.
- ➢ Evil customs such as dowry system, subordinate status of women's in the society, low literacy, economic dependency are the main reasons of high mortality of infant and overall death rates of women's.
- ➢ Equal status to men and women in the society be implemented. Social attitude and behavior towards women must be changed. It is needful to respect women's opinions in family decisions. It is needful to offer opportunities of higher education to girls in rural parts of the study region.
- ➢ Economic dependency of females is necessary to stop. So, reservation of 50 percent in education and employment is needful to offer, government has to make legal provisions.
- ➢ There is no adequate health facilities and maternity homes at rural parts, so it is needful to provide and extend health services in rural parts to stop delivery deaths and infant deaths.
- ➢ Proportion of female baby abortions is still high, it must be prohibited by strict legal ways, role of society and NGO's also important.
- ➢ Migration is sex selective. To stop male migration between rural to urban, employment and earning sectors is necessary to increase in rural parts of the study area.

**References:**
1. Bogue, D.G.(1969) Principles of Demography, New York.
2. Chandana, R.C. & Siddhu, M.S. (1980) Introduction to Population Geography, Kalayani Publishers, New Delhi.
3. Census of India (2001, 2011) Individual District Census Handbooks of Marathwada Region.
4. Farasat, A.S. (1999) Regional pattern of sex composition of population of UP, Geographical Review Of India, Vol. 42 pp 1683-87.
5. Franklin, S.J. (1956) The pattern of Sex ratio in Newzeland, Economic Geography, Vol.32
6. Shrivastri, R.K. & Rajeev Koshal (1988) Change in Sex ratio of Seoni District (MP). The Deccan Geographer, Pune, pp.45-48.
7. Trewartha, G.T. (1953) A Case for Population Geography, Annals of the Association of American Geographers, Vol. 43 pp. 71-97.

# SC Population Sex-Ratio in Jalna District of Maharashtra State: A Geographical Study

**Pramod B. Deshmukh**
Asst. Professor,
Dept. of Geography,
Shri Kumarswami College, Ausa, Dist.-Latur.

**Abstract:**

Jalna district is a part of Aurangabad division and is surrounded on the district falls in the southern plateau. It lies between $19^0 1'$ north to $21^0 03'$ North latitudes and $75^0.04'$ East to $76^0 04'$ East longitudes. According to District Census 2011, it has an area of 7718 sq km. with a population of 1959046, male population is 1011473 and female population is 947573. General Sex-ratio of population is 937 females per 1000 males and Scheduled Caste sex-ratio is 959 female per thousand males. In this research paper analyzes tahsil wise patterns and changes in total, rural and urban SC population sex-ratio in the study area.

**Keywords**: Population, sex ratio, rural and urban.

## Introduction:

The term 'Sex-ratio' is associated to the 'Population Geography' and population geography is the recently developed branch of Human Geography. Sex composition of the human population is one of the basic demographic characteristics, which is extremely dynamic for any meaningful demographic analysis. Sex-ratio is a significant social indicator which defined the number of females per thousand males. Sex-ratio is the ratio of the males to females in a population. Sex-ratio means relative numbers of men and women, can affect marriage Prospects, labor force participation, other social and economic variables. As per Census 2011, Tahsil wise SC population sex-ratio is in Bhokardan (954), Jafrabad (952), Jalna (955), Badnapur (965), Ambad (959), Ghansangvi (980), Partur (961), and Mantha (956). High SC population sex-ratio observed in Ghansangvi tahsil (980) and low in Jafrabad tahsil (952). This research paper analyzes tahsil wise patterns and changes in total, rural and urban Scheduled Caste population sex-ratio in the study area.

## Study Area:

Jalna is one district of Maharashtra State. It was formed on 1st May 1981. Jalna district consists of eight talukas. The range of geographical latitude and longitude of the district is from $19^0 1'$ north to $21^0 03'$ North latitudes and $75^0.04'$ east to $76^0 04'$ East longitudes. The Northern part of the district is occupied by the Ajanta and Satmala hill ranges. The district is a part of Aurangabad division and is surrounded on the district falls in the southern plateau. Jalna is located on Deccan plateau characterized by basalt rock. The north by jalgaon district, on the south by Beed district, on the east Parbhani district and Bhuldhana district, and on the west by Aurangabad district. The geographical area of the district is 7718 sq. km. It is 2.5 percent of Maharashtra's area.

According to the 2011 census total population in district is 1959046. Jalna district having 8 towns and 967 villages. The population density of the district was 209 persons per sq. km in 2001 and in 2011 census that is 254 persons per sq. km.

## Objectives:

1) To examine the spatio-temporal distribution and fluctuations of scheduled Caste population sex-ratio.
2) To study the spatio-temporal distribution of rural-urban scheduled Caste population sex-ratio.

## Database and Methodology:

The present study is based on secondary data. The data have been collected from the published Census reports of Maharashtra government; district Census Handbook of Jalna district (1991-2011), Census abstracts of Maharashtra (2001, 2011) for the understanding of regional variation in SC population sex ratio, tahsil is selected as a basic unit of study.

## Discussion:

### Total SC Population Sex-Ratio of district (1981-2011)

| Sr. No | Year | Sex-Ratio | Fluctuation |
|---|---|---|---|
| 1 | 1981 | 951 | ----- |
| 2 | 1991 | 954 | +3 |
| 3 | 2001 | 962 | +8 |
| 4 | 2011 | 959 | -3 |

*Source: District Census Handbook of Jalna, 1981-2011.*

**Total population sex-ratio and SC population sex-ratio in Jalna district:**

This table shows that, the trend of total SC population sex-ratio in study area from the census 1981 to 2011. As per the Census 1981, the total SC population sex-ratio of study area was 951 females per 1000 males, after that total SC population sex-ratio was increased in next Census 1991, and 2001, it was 954, and 962 respectively. In the decades 1981-1991 and 1991-2001, total SC population sex-ratio was improved with

+3 to +8 points respectively. But in the next census 2011, SC population sex-ratio of study area is 959. In the decade 2001- 2011, total SC population sex-ratio decreased by 3.

**Taluka Wise Sex-Ratio of SC Population (2001-2011)**

| Sr. no | Name of Tahsil | SEX-Ratio of SC Population | | Variation |
|---|---|---|---|---|
| | | **2001** | **2011** | |
| 1 | Bhokardan | 946 | 954 | +8 |
| 2 | Jafrabad | 962 | 952 | -10 |
| 3 | Jalna | 950 | 955 | +5 |
| 4 | Badnapur | 965 | 965 | 00 |
| 5 | Ambad | 952 | 959 | +7 |
| 6 | Ghansangvi | 980 | 980 | 00 |
| 7 | Partur | 1004 | 962 | -42 |
| 8 | Mantha | 977 | 956 | -21 |
| | **Dist.Average** | **962** | **959** | **-3** |
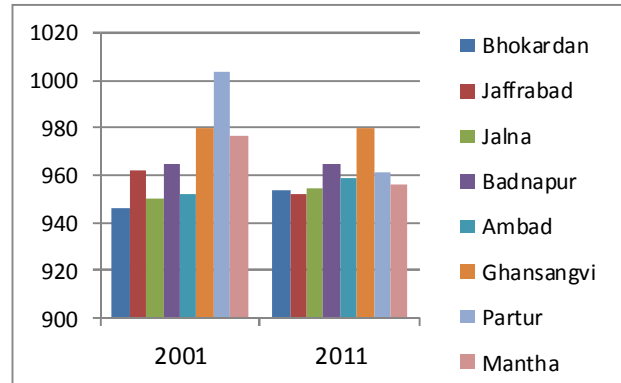
*Source: District Census Handbook of Jalna, 2001-2011.*

As per the Census 2001, high total SC population sex-ratio was detected in Partur tahsil (1004), means in Partur tahsil women's ratio is high. But as per census 2011, SC population sex-ratio of Partur tahsil was 962. It means, 2001 to 2011 decade growth was -42. As per the Census 2001 & 2011, Ghansangvi tahsil (980), and Badnapur tahsil (965) no changes in sex-ratio.

As per the census 2001 and 2011, decadal growth of total SC population sex- ratio Bhokardan tahsil is + 8, but Mantha tahsil is -21 and Partur tahsil is -42. In the district from 2001 to 2011, the decade growth of overall SC population sex-ratio is less than 3.

**Taluka Wise Rural SC Population Sex-Ratio 2001 -2011**

| Sr.no | Name of Tahsil | Sex-Ratio 2001 | Sex-Ratio 2011 |
|---|---|---|---|
| 1 | Bhokardan | 951 | 959 |
| 2 | Jafrabad | 962 | 953 |
| 3 | Jalna | 955 | 935 |
| 4 | Badnapur | 964 | 965 |
| 5 | Ambad | 952 | 946 |
| 6 | Ghansangvi | 980 | 980 |
| 7 | Partur | 1005 | 956 |
| 8 | Mantha | 977 | 957 |
| | **Dist. Average** | **965** | **955** |

*Source: Census Handbook of Jalna District- 2001, 2011.*

**Taluka Wise Urban SC Population Sex-Ratio 2001 -2011**

| Sr. no | Name of Tahsil | Sex-Ratio 2001 | Sex-Ratio 2011 |
|---|---|---|---|
| 1 | Bhokardan | 890 | 899 |
| 2 | Jalna | 946 | 975 |
| 3 | Ambad | 952 | 1069 |
| 4 | Partur | 997 | 989 |
| 5 | **Dist. Average** | **944** | **978** |

*Source: Census Handbook of Jalna District- 2001, 2011.*

As per the Census 2001, rural SC population sex-ratio of study area is low as compare to the census 2011 SC population sex-ratio. As well as the Census 2001, urban SC population sex-ratio is very low as compare to the Census 2011, SC population sex-ratio.

**Average and SC Population Sex-Ratio in 2001**.

| Sr. No | Name of Tahsil | Average Sex-Ratio | SC Population Sex-Ratio |
|---|---|---|---|
| 1 | Bhokardan | 951 | 946 |
| 2 | Jafrabad | 960 | 962 |
| 3 | Jalna | 940 | 950 |
| 4 | Badnapur | 948 | 965 |
| 5 | Ambad | 949 | 952 |
| 6 | Ghansangvi | 955 | 980 |
| 7 | Partur | 963 | 1004 |
| 8 | Mantha | 959 | 977 |
| | **Total Dist.** | **952** | **962** |

*Source: Calculated from Census of India – 2001.*

### Average and SC Population Sex-Ratio in 2011

| Sr. No | Name of Tahsil | Average Sex-Ratio | SC Population Sex-Ratio |
|---|---|---|---|
| 1 | Bhokardan | 928 | 954 |
| 2 | Jafrabad | 932 | 952 |
| 3 | Jalna | 935 | 955 |
| 4 | Badnapur | 934 | 965 |
| 5 | Ambad | 946 | 959 |
| 6 | Ghansangvi | 942 | 980 |
| 7 | Partur | 948 | 962 |
| 8 | Mantha | 933 | 956 |
| | **Total Dist.** | **937** | **959** |

*Source: Calculated from Census of India- 2011.*

Above two tables shows that, the Jalna district average and SC population sex ratio in 2001 and 2011. As per the census 2001 and 2011, Sc population sex-ratio is more than 10 and 22 respectively in comparison to the average sex-ratio of the district.

To observe the table of average and SC Population Sex-Ratio in 2001 & 2011, we found some features of sc sex-ratio.

**Some concerned points regarding sc population sex-ratio:**

As per the Census 2001, high total SC population sex-ratio was detected in Partur tahsil (1004). In the Census 2011, high total SC population sex-ratio is not recorded in any tahsil, all tahsils included in moderate sex-ratio. According to the Census 2001, high rural SC population sex-ratio was observed in Partur tahsil (1005), and other tahsils was included in moderate sc population sex ratio. As per the Census 2001, low rural SC population sex ratio was not recorded in any tahsil of study area. According to the Census 2001, the moderate urban SC population sex-ratio was observed in Ambad (952) and Partur tahsil (997), as well as Bhokardan (890) and Jalna (946) tahsil was included in low urban sc population sex ratio.

As per the census 2011, high rural sc population sex ratio is not recorded in any tahsil, low rural sc population sex ratio is observed in Jalna (935) and Ambad (946), and other tahsils is included in moderate sex ratio. In the Census 2011, high urban SC population sex-ratio is observed in Ambad tahsil (1069), low sex ratio is Bhokardan (899) as well as moderate sex ratio is Jalna (975) and Partur (989).

**Conclusion:**

From the Census 1981 to 2001, the increasing trend of total SC population sex-ratio was noted in study area. But the decade 2001-2011, fluctuations are observed in total SC population sex-ratio. As compare to the decade 1991to 2001, total SC population sex-ratio of study area, it was declined in 2001-2011.

As per census 2001, the Jalna district average sex-ratio is 952, but SC population sex-ratio is 962. In the census 2011, the Jalna district average sex-ratio is 937, but SC population sex-ratio is 959. As per census 2001, the Jalna district rural average sex-ratio is 955, but rural SC population sex-ratio is 965. In the census 2011, the Jalna district rural average sex-ratio is 935, but rural SC population sex-ratio is 955. As per census 2001, the Jalna district urban average sex-ratio is 931, but urban SC population sex-ratio is 944. And as per census 2011, the Jalna district urban average sex-ratio is 944, but urban SC population sex-ratio is 978

**References:**

1. *Clerke, J. I. (1977): Population Geography, Robert Maxwell M. C. Publishing, Asian profile. Vol-2. London.*
2. *Girish Chopra (2006): Population Geography, Ajay Verma for Commonwealth Publishers, New Delhi- 110002.*
3. *District Census Handbook of Jalna, 2001 & 2011.*
4. *District Socio-economic review – 2006, 2009, 2012 & 2013.*
5. *Maharashtra – A. B. Sawadi, Nirali Prakashan Pune.*

# Climatically Study of Osmanabad District

**Dr. N.B. Kadam**
Asso. Professor & Head
Department Of Geography
S.M.P. College, Murum, Dist. Osmanabad.

**Abstract:**
   Among climatic elements rainfall is the most important element which plays a vital role in the distribution as well as development i. e. towards plant succession. It is the factor which is responsible for the overall get up of hydrological cycle, each and every plant with its more or less distribution as vegetation cover specially, the canopy coverage of the trees naturally play a better role in increasing the moisture and decreasing the temperature.(Singh). The intensity of rainfall variability of rainfall, seasonal distribution of rainfall, the erratic nature of rainfall, uneven distribution of rainfall, etc., play an important role in overall distribution of the vegetation.

**Keywords:** Rainfall, intensity of rainfall

## Introduction:

   Rainfall and temperature are the significant as well as dominant components, whereas the relative humidity and wind also play their significant role in the distribution of life form on the planet. There is close relationship between temperature and rainfall for setting climatic conditions. Overall basic climatic element is radiation received from the sun, sky and balance between isolation which is absorbed by earth, reflected and outgoing from earth. In order to study climatic condition three factors need to be considered, viz. temperature, rainfall and atmospheric pressure. It will have effects on all living things.

**Objectives:** The specific objectives of the present study are as follows:

1. To study the geographical background of Osmanabad district
2. To study the Spatio – temporal analysis of climatic condition.
3. To find out imbalance of rainfall.

## Database and Methodology:

   The study is based on extraction of data from various secondary sources which includes municipal corporation statistically office, Ground water survey development agency(GSDA), town planning office, National remote sensing agency Hyderabad and various publications. For the statistical analysis various techniques and methods will be applied. The map was generated using Auto Cad and GIS software. The physical elements like relief, slope, drainage and soil are studied for SOI topographic sheet. For this study statistical data are taken from 1990 – 1991 to 2010 – 2011. The methodology followed in the study can be divided into the following heads.

## Study area:

   Location plays an important role in the origin and development of urban centres in the study region. The study region i.e. Osmanabad district is situated in the south-east part of the Maharashtra and it lies between $17^0 35'$ to $18^0 40'$ north latitudes and $75^0 16'$ to $76^0 40'$ east longitudes. It is surrounded by Beed district in the north, Latur district in the east, Solapur district in the south-west, Ahemadnager district in the north-west and Karnataka State in the south-east.

## Result and Discussion:

   Climate is an important factor affecting directly or indirectly the sitting of settlement, the house types, building materials and the morphology and functions of settlements. It also affects agriculture. Climatic conditions are important in determining distribution and performance of crops.

## Climate:

   Climate is reflected in the habits and requirements of consumer and thus effects on the prospects of various types of industries of consumer goods. The potential of crop productivity capability of a given area is dependent mainly on the existing climate and soil conditions. The success or failure of cropping season is determined by the intensity of the climatic factors. The three most important factors of climate from the stand point of plant response are temperature, water supply and light.

The year may be divided into four season's viz., the cold season, the hot season, the south-west monsoon season and the retreating monsoon season. The cold season is from middle November to about middle of February and is followed by the hot season which lasts up to the end of May or first week of June. The south-west monsoon season is from June to September and October and November constitute the post monsoon or retreating monsoon season.

**Temperature:**

Climate of the study region is dry except south-west monsoon. The cold season commences towards the end of November when temperature begin to fall rapidly. December is the coldest month of the year and the mean minimum temperature is about $15^0$C, occasionally the minimum temperature may fall to about $4^0$C or $5^0$C. The period from the middle of February to the onset of the south-west monsoon is one of continuous rise in temperature. May is generally the hottest month of the year with the mean maximum temperature at about $38^0$C. Sometimes the maximum temperature may rise to about $45^0$C. Thunderstorms which occur in summer bring welcome relief from the intense heat but only temporarily. With the onset of the south-west monsoons there is an appreciable fall in temperature. With the withdrawal of the monsoon there is a slight increase in day temperatures while night temperatures progressively decrease.

**Table No 1: Osmanabad District: Temperature in $^0$C**

| Sr.no. | Season | Meanmaximum | Mean | Average |
|--------|--------|-------------|------|---------|
| 1 | Cold | 31 | 15.42 | 23.21 |
| 2 | Hot | 37.64 | 19.69 | 28.67 |
| 3 | Rainy | 31.34 | 19.61 | 25.47 |

*Source: Regional Meteorological center – Osmanabad.*

During the south-west monsoons season the air is humid and the skies are generally heavily clouded to overcast. During the rest of the year the air is generally dry and the skies are clear or lightly clouded. Winds are light but increase in monsoon season. Thunderstorms occur in the summer and monsoon seasons while dust storms occur in summer.

**Rainfall:**

Beside temperature, rainfall is another important factor of the climate. Water availability is the important factor in the origin of rural and urban settlements. On the basis of water the settlements are classified in to wet and dry point settlements. Availability of water is mainly depending on amount of rainfall and its seasonal distribution. About 84 percent of the annual rainfall is occurred in rainy season i.e. from south-west monsoon period. Table No. 2 shows the average rainy days and average rainfall in the study region. The spatial distribution of rainfall is shown in the Table. On the basis of areaDistribution of average annual rainfall, the study region is divided in tofollowing three zones.

**Table No. 2. : Osmanabad District: Tahsilwise Annual Average Rainfall (2011)**

| Tahsils | Omerga | Lohara | Tuljapur | Os'bad | Kalamb | Washi | Bhoom | Paranda |
|---------|--------|--------|----------|--------|--------|-------|-------|---------|
| Days | 46 | 43 | 51 | 51 | 46 | 47 | 46 | 37 |
| Rainfall(mm) | 799 | 799 | 937 | 751 | 715 | 715 | 905 | 615 |

*Source: Socio-Economic Review and District Statistical Abstract, Osmanabad District. 2010.*
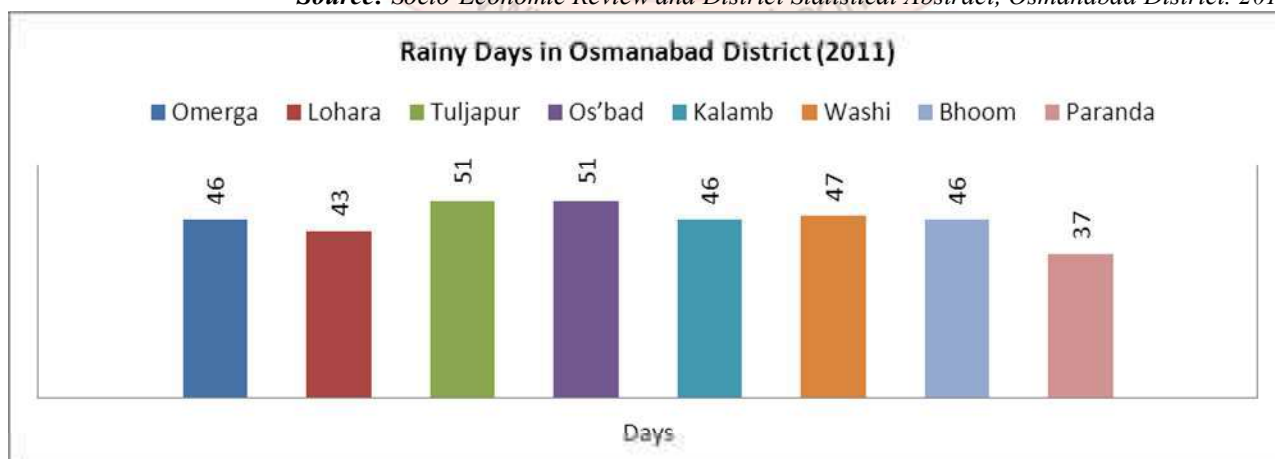


I)    High rainfall zone
II)   Medium rainfall zone
III)  Low rainfall zone

**I)    High rainfall zone: (Above 900 mm.)**

This zone occurs in the Tuljapur and Bhum tahsils where average annual rainfall is above 900 mm.

**II)** **Medium rainfall zone: (700 to 900 mm.)**

The Umarga, Lohara, Osmanabad, Kalamb and Washi tahsils occurs in the medium rainfall zone where annual average rainfall is 700 to 900 mm.

**II)** **Medium rainfall zone: (700 to 900 mm.)**

The Umarga, Lohara, Osmanabad, Kalamb and Washitahsils occurs in the medium rainfall zone where annual average rainfall is 700 to 900 mm.

**III)** **Low rainfall zone: (Below 700 mm.)**

The relatively low rainfall occurs in Paranda tehsil where Average annual rainfall is below 700 mm.The rainfall of the region is erratic in nature and uneven in spatial and temporal distribution.

**Cloudiness:**

In the south-west monsoon season the skies are usually clouded. During the rest of the year the skies are clear of lightly clouded during the afternoon in the summer season.

**Humidity:**

Humidity is one of the consequence elements of weather from the farmer's look and plays a significant role in the changing agro climatic conditions from place to place. Therefore, it is dealt with separately from other elements of climate. The air is very humid during the south-west monsoon season in study region. During the rest of the year the air is mostly dry. Summer season when the afternoon relative humidity is less than 25% in the study region.

**Winds:**

Winds are generally light with some increase in force during the latter half of the summer and monsoon season. Thunderstorms occur in the summer and monsoon seasons, dust raising winds occur during the summer season.

**Conclusion:**

The region is facing problems of resources depletion and environmental degradation. The forests have been cut, wild life is becoming rare, soil erosion is common, water level is very deep, and soil fertility has been reduced in some of the districts in study region. Other problem related to irrigation, communication, education and medical facilities are most vital in this region. The problem of water resource, its distribution, utilization and conservation are the most dominant in the region.Most of the region in every district is dry. High temperature and low rainfall is recorded.

**References:**
1. *Socio-economic Abstract of Osmanabad district,2011*
2. *Gazetteer of Osmanabad district.*
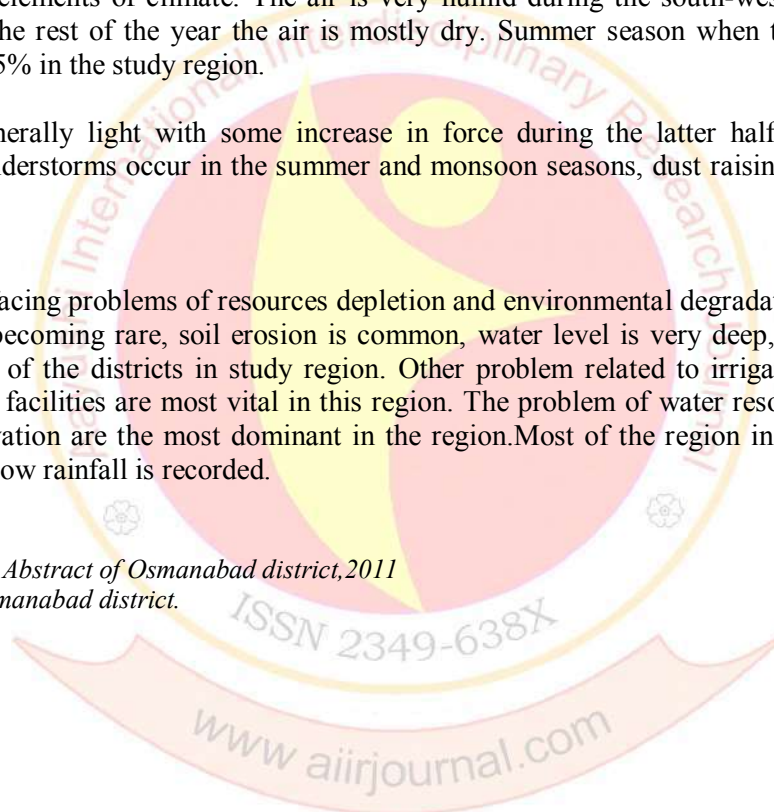
# Geographical Study of Forest Cover in Marathwada

**Dr. P. R. Baravkar**
Department of Geography,
Shri Madhavrao Patil College, Murum, Dist. Osmanabad.

**Abstract:**

Forest are an important sources of India.They supply fuel, timber, wood folder and wide range of non-wood product. They are the natural habitat for biodiversity and resporisitory for genetic wealth. Forest thus play an important role in environmentally and sustainability (Dutt and Sundharam, 2014).At least 33 % land of any region should be under forest to fulfill the forest related requirements of the people or the region and to environmental equilibrium of the region. Generally forest provides us various commercial goods and raw material for various industries and also they maintained ecological balance.

In this paper I try to discuss about the forest cover area in Marathwada region.

**Keywords:** Forests, Sustainable Development, Social forestry

## Introduction:

Forests are the natural gifts that every human being is associated with. In the ancient time Rushi-Munies used to live in the forests. Forests have been the source of inspiration for many poets, writers and artists. The average percentage of forest is 22 %. Mahur, Kinvat and Degloor from Nanded district account the chunk of the forest.

## Aims and objectives:

The specific objectives of the present study are as follows:
1. To study the geographical background of Marathwada Region.
2. To analyze the district wise forest cover.
3. To find out imbalance of forest

## Database and methodology:

The study is based on extraction of data from various secondary sources which includes municipal corporation statistically office, Ground Water Survey Development Agency (GSDA), Town planning office, and various publications. For the statistical analysis various techniques and methods will be applied. The map was generated using Auto Cad and GIS software. The physical elements like relief, slope, drainage and soil are studied for SOI topographic sheet. For this study statistical data are taken from 1990 – 1991 to 2010 – 2011. The methodology followed in the study can be divided into the following heads. The secondary data both published and unpublished was obtained from various departments, block headquarters, district statistical office of all districts in Marathwada region and other relevant places.

## Study Area:

Marathwada region is located in the central part of Maharashtra State. It lies between $17^\circ 35^I$ north to $20^\circ 41^I$ North latitude and $70^\circ 40^I$ to $78^\circ 16^I$ East longitude. The region has an area of 64.302 sq. km. administratively other regions are divided into 8 districts, namely Aurangabad, Jalna, Beed, Osmanabad, Latur, Parbhani, Hingoli and Nanded. According to 2001 census the population of the study area is 1559000. The land of Marathwada Region has general elevation of about 500 meter. Above mean sea level on Godavari Bank near the point where the river crosses over the Parbhani district. The population of the area has increased 12800653 persons in 1991 to 18727748 in 2011. There is an overall growth. There has been tremendous variation in population is Aurangabad (31.93 %), Latur (23.95) and Nanded (23.08) whereas it is minimum (15.31 %) in Parbhani, (15.35 %) in Osmanabad districts respectively.

## Result and Discussion:

Area under forests is continuously decrease in the study from the period of investigation. (1091-2011)

Below table shows the forest area in 1990 – 91 to 2010 – 11 of study area. The highest area under forest is observed in Nanded (915) and Aurangabad (794) districts. Whereas below 100 hectare area of forest cover is seen in Jalna, Osmanabad and Latur districts in 1990 – 91 year.



Location Map of Study Area



DEM Map of Marathwada Region
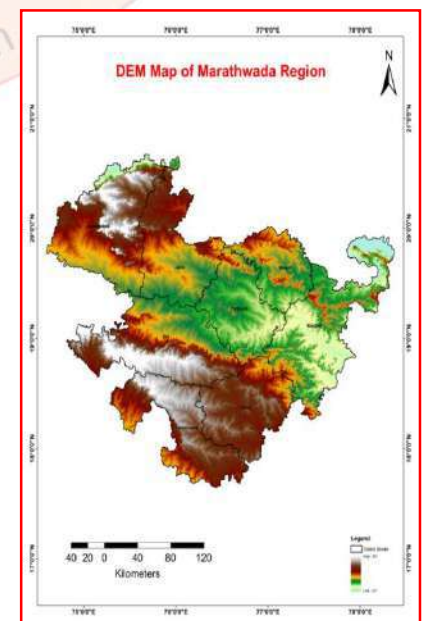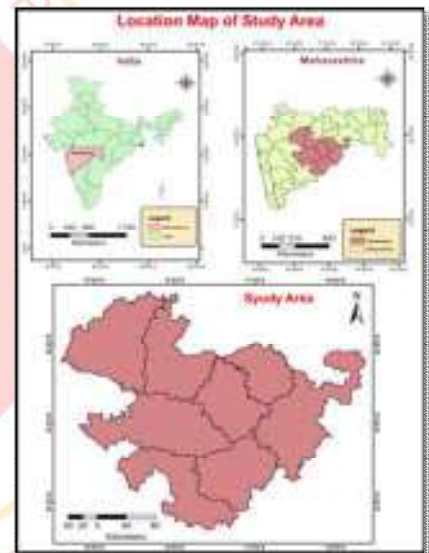
It is decreased in high percent in most of the districts in Marathwada, such as negative changes in Aurangabad, Beed, Latur, Nanded and Parbhani districts. On the other hand positive changes are observed in Jalna, Osmanabad and Hingoli districts. Hence, forest area 2408 hectare in 1990–91. It is decreased by 485 hectare in 2010–11. Hence it is necessary to plant to conserve the forest.

### Table No.1 Forest cover in Marathwada -1991 - 2011(Sq. K. M.)

| Sr. No. | Districts | 1990 – 91 | 2010 – 11 | Vol. of change into total |
|---|---|---|---|---|
| 1 | Aurangabad | 794 | 557 | - 237 |
| 2 | Jalna | 60 | 65 | + 5 |
| 3 | Beed | 216 | 175 | - 41 |
| 4 | Osmanabad | 40 | 43 | - 3 |
| 5 | Latur | 6 | 5 | - 1 |
| 6 | Nanded | 915 | 914 | - 1 |
| 7 | Parbhani | 377 | 50 | - 327 |
| 8 | Hingoli | - | 114 | + 114 |
| | Total | 2408 | 1923 | - 485 |

*Source: Department of Forests, Pune.*

### Table.2 % of area under forests in Marathwada Region

| Districts | 2001 | 2011 | Districts | 2001 | 2011 |
|---|---|---|---|---|---|
| Aurangabad | 4.02 | 5.51 | Latur | 0.15 | 0.7 |
| Jalna | 0.66 | 0.84 | Nanded | 8.32 | 8.68 |
| Beed | 1.09 | 1.64 | Parbhani | 0.94 | 0.79 |
| Osmanabad | 0.92 | 0.57 | Hingoli | 2.62 | 2.43 |

*Source: India State Forest Report-2013.*



Fig. 1 Percentage of Forest cover in Marathwada
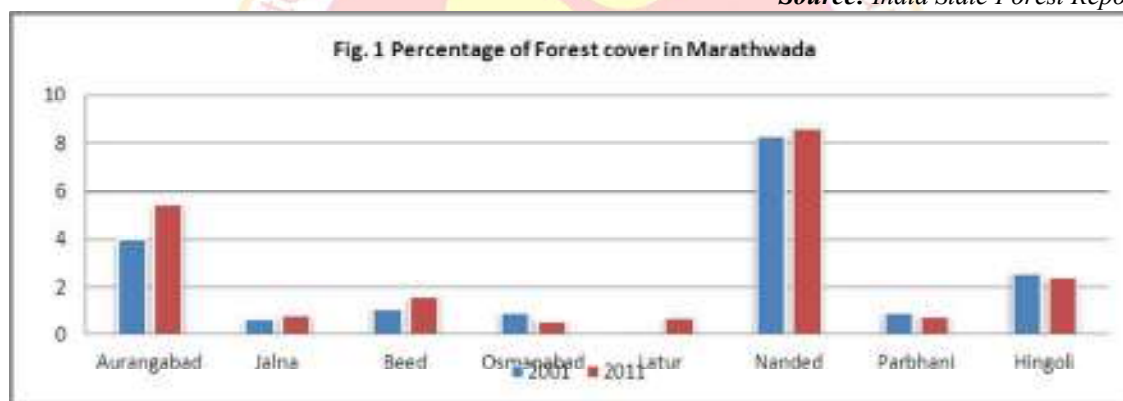
Above table indicate that the area under forest is not uniform in the study region. There is very large variation in compare to other districts of state.

### Table No. 3 District wise forest Cover in Marathwada (Sq.km)-2011

| Sr. No. | District | Geographical area | Dense | Open | Total | % | Scrub |
|---|---|---|---|---|---|---|---|
| 1 | Aurangabad | 10107 | 148 | 341 | 489 | 4.84 | 371 |
| 2 | Jalna | 7718 | 85 | 17 | 102 | 1.32 | 60 |
| 3 | Beed | 10693 | 206 | 55 | 261 | 2.44 | 389 |
| 4 | Osmanabad | 7569 | 60 | 32 | 92 | 1.22 | 61 |
| 5 | Latur | 7157 | 66 | 0 | 66 | 0.92 | 14 |
| 6 | Nanded | 10528 | 495 | 398 | 853 | 8.1 | 61 |
| 7 | Parbhani | 6355 | 107 | 27 | 134 | 2.11 | 10 |
| 8 | Hingoli | 4686 | 48 | 69 | 117 | 2.5 | 74 |
| | Total | 64813 | 1215 | 939 | 2114 | 23.45 | 1040 |

*Source: Department of Forest, Pune.*



Fig. 2 Status of Forest in Marathwada(2011)
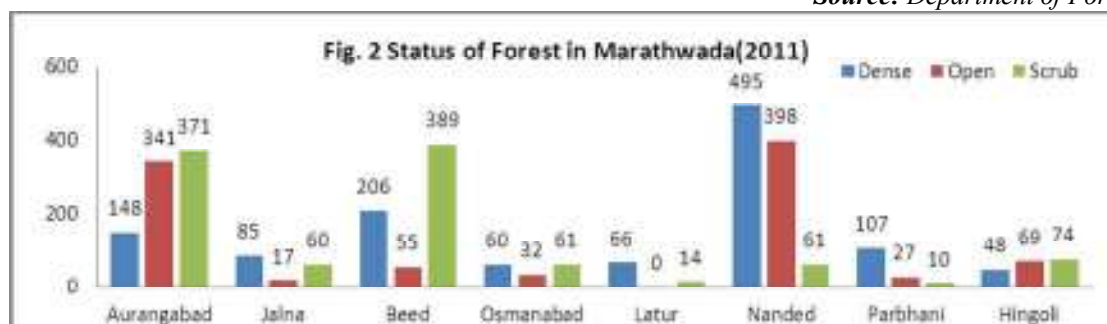
Above table 2.4 reveals that higher concentration of dense forest is observed in Nanded district i.e. 495 and 398 square kilometer. Whereas Jalna, Osmanabad, Latur and Hingoli districts have below 100 square. Forests / vegetation and climate are closely interdependent and have direct impact on physical and cultural environment.

They occupy an area of 47480 sq. km in Marathwada. Forests are the natural gifts that every life being is associated with. In the ancient times Rishi-Munis used to live in the forests. Forests have been the source of inspiration for many poets, artists and writers. In addition, tourists have always been attracted towards forests. In Maharashtra the average percentage of forests is 22%, where the contribution of Marathwada towards the forests is merely 3.4%. Mahur, Kinvat and Deglur from Nanded district account the chunk of the forests.

There are Teak, Sandalwood, Anjan, Moh, Temburni, Ain and other kinds of trees in these forests. In Aurangabad district, Gautalas well-known Sanctuary, Jayakwadi is also famous for bird sanctuary. Thorny scrubs forests are having major trees like Bor, Babul, Aloe Vera, etc. A variety of wild animals can be seen in the above said forests like wild bores, foxes, hares, etc. Leopards are seen but rarely.

**Conclusion:**

The land use statistics indicate that 2114 sq. km area of total land occupied by different type of forest out of total forest area nearly (853 sq. k.) is occupied by Nanded district. Whereas Latur and Osmanabad having below 100 sq. km. The highest percentage of dense forest found in Nanded (8.1 %) district. On the other hand Jalna (1.32), Osmanabad (1.22 %), Latur (0.92 %) and Hingoli (2.05 %) having below 100 sq. km dense. Aurangabad and Nanded districts cover more forest area than the other. The higher percent of dence and open forest observed in Nanded district. Whereas below 100 sq.km forest recorded in the district of Jalna, Osmanabad, Latur and Hingoli respectively. The % of area under forests has decreased in Aurangabad, Latur, and Parbhani districts.So, forest cover area have must be increased in overall Marathwada region. It must be develop of Social forestry

**References:**

1. *Director of Agriculture, Maharashtra Government Agriculture Statistics, Pune 2011*
2. *GSDA Report of Latur.*
3. *Socio-Economic Abstract of all District of Marathwada-1991 to 2011.*
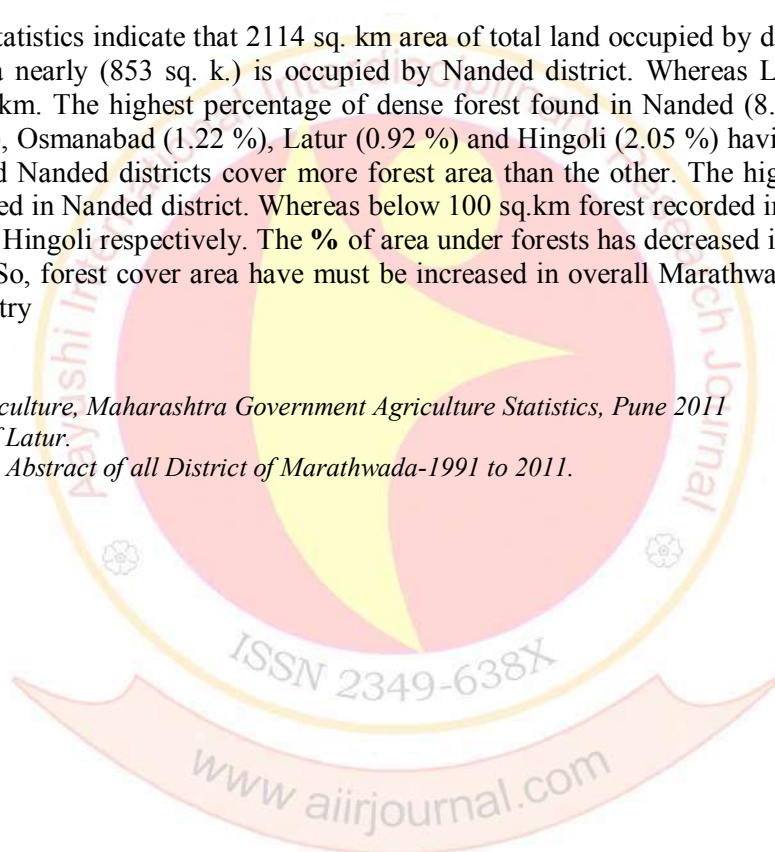
# Importance of Herbal Plants: Case Study of Sanjivani Bet, Wadwal Nagnath (M.S.) India

**Dr. Darshana S. Kanwate**
Asst. Prof. in Mahatma Phule College,
Kingaon, (MS).

**Abstract:**

A plant is an important source of medicine and plays a key role in world health. They provide oxygen necessary for us to breathe and provide nutrients through food, wood for fire, chemicals for the Industries etc. The use of plants as food has been the firstly aim from the beginnings of human culture. But the another important use for the plants are the use of rare disease modern medicine, through clinical tests, has been able to validate those plants that the tradition had used with the method of test and error, present study highlight the one of the small place who famous for their medicinal valuable plants. Name of this place is "Sanjivani Bet" and they are located in Maharashtra state in India. This place is famous for Ayurvedic Medicinal Plants and their medicine festival in Uttara Nakshtra.In the month September every Year.

**Keywords:** Sanjivani Bet, Uttara Nakshatra, Medicinal Plants, Nutrients.

**Introduction:**

Medicinal plants may be defined as those plants that are commonly used in treating and preventing specific ailments and diseases and that are generally considered to be harmful to humans .Plants have been used for medicinal purpose long before prehistoric period .Ancient Unani, Egyptian and Chinese writings described the use of herbs .In ancient time Unani Hakims, Indian Vaids and European and Chinese cultures were using herbs for over 4000 years as medicine.

Among ancient civilization, India has been known to be rich repository of medicinal plants .The forest in India is the principal repository of large number of medicinal and aromatic plants, which are largely collected as raw materials for manufacture of drugs and perfumery products .Recently WHO estimated that 80percent of people worldwide rely on herbal medicines for some aspect of their primary heath care needs. According to WHO around 21,000 plant species have the potential for being used as medicinal plants .The use of medicinal plants has attained a commanding role in health system all over the world.

India is a country known for ancient scripts, the number system, invention of zero and Vedas. Medicines in India are used by about 60 per cent of the world's population. These are not only used for primary health care not just in rural areas in developing countries, but also in developed countries as well where modern medicines are predominantly used. While the traditional medicines are derived from medicinal plants, minerals, and organic matter, the herbal drugs are prepared from medicinal plants only.

Maharashtra is one of the developed state in India .Physical and Cultural diversity are found in Maharashtra. Some of the medicinal plants are found in Maharashtra. Marathwada region is economically backward area in Maharashtra but there cultural and historical heritage are very strong. In this region near latur Wadwal Nagnath Bet (Hill) is very famous for its unique feature of producing a very rare species of Ayurvedic bushes and plants. It is 16.5 km away from Chakur and 39 Km from Latur city. The hill is of 600-700 feet height from the ground and is 3 km near the Wadwal -Nagnath village. The rare species of Ayurvedic plants grows in the Uttara Nakshatra and hence the well known ayurvedic practitioners from nearest states are visiting this hill in the same period.This place is famous for plant Ayurvedic medicines. vanaushdhi vaidyas are here very popular from old. every uttara nakshtra means in month of july here celebritie medicine festival by people of wadwal nagnath which is the nearest town and people are visited mostly from out of town, district, state etc.

**Aims and Objective :**
1) The main aim of the study of medicinal plant is the conservation, sustainable management and development of medicinal plants in sanjivani bet.
2) To promote the research and development for medicinal plants, agriculture techniques, post harvested management, storage and processing.
3) To aware the local people raising collection and utilization of medicinal plants.

**Hypothesis:**
1) To explain the selection of medicinal plants by member of a rural community located in marathwada region and abroad.
2) Indicated the overwhelming importance of medicinal plants in sanjivani bet.
3) To the study of importance of medicinal herbs and their identification and utilization for treating diseases in human beings.

**Methodology:**

The present work is intended to test some of the ideas put forward by examining a rural area in wadwal village in Marathwada region. A study was undertaken with the participation 5000 rural community in wadwal village, and to test a number of hypothesis concerning their use and local knowledge about then. The oral information concerning the use of plants with their effective uses.

**Study Area:**

Sanjivani Bet is famous medical tourism center in latur distract in maharashtra .It lies in $18^0 50'$ north latitude and $70^0 15'$ east longitude.

**Sanjivani Bet:**

It is famous because on this place we can find more than 70 medicinal plants .several people of various age group Maharashtra ,Andhra Pradesh and Karnataka visit "Sanjivani Bet "in the month of September in the Uttra Nakshtra stay there for at least three day and consume leaves of all plants around the sanjivani bet .Fourth day at the foot of the hill located is a pond they were bath this dam .In which they eat black rise due to which some people have an experience that the every disease are control which is impossible said medicinal science .It is claimed that diseases like Asthma ,Stomach Disorders ,Headache ,Arthritis ,Skin Diseases ,Infertility etc .are cured by merely consuming leaves of plants growing hear .

**Plants which can be grown in the rainy season and there local names**

| Sr. no. | Botanical Name | Local Name |
|---------|---------------|------------|
| 1 | Gymnema Sylvestries | Goodmar |
| 2 | Merremia emarginata | Undirkani |
| 3 | Cocculus Villosus | Vasnwel |
| 4 | Tinospos Cordifilia | Gulwel |
| 5 | Echinops Echinatus | Utakatar |
| 6 | Tradax Procumbens | Tantani |
| 7 | Argemone Mexicana | Pivala Dhotra |
| 8 | Abrus Precatorius | Gunj |
| 9 | Colius Fistula | Bhava |
| 10 | Coralluma Adenscens | Sindal Makd |
| 11 | Ocimum Gratisimeum | Rantulas |
| 12 | Pongumia Pinnata | Karanji |
| 13 | Calotropis Procera | Rui |
| 14 | Hamidesmus Indicus | Anantmul |
| 15 | Cappais Zeylanica | Waghati |
| 16 | Jasminum Auriculatum | Ranjai |
| 17 | Achyranthes Aspera | Nirgudi |
| 18 | Randi Brandisil | Aghada |
| 19 | Acacia Catechu | Khair |
| 20 | Santalum Album | Chandan |
| 21 | Cynodon Dactylon | Durva |
| 22 | Ocimum Sanctum | Tulas |
| 23 | Tephrosia Purpuria | Shankhpushpi |
| 24 | Dolicandron Littorala | Medsing |
| 25 | Adhatrada Vasa | Adulsa |

Similarly the medicinal plants like chikstgondni, Bhuilimh, Potyaankol, Deepmal, Chuchauri, Akalkhara,Gajga, Jatashankar, Bewcha, Pandharihalad, Vardhadaru, Arjun sadada, Chapha, Katesavar, Parusapimpal, Pangara etc. were also reserved during the survey work.

**Conclusion:**

1) Treatment with medicinal plants is considered very safe as there is no or minimum side effect .
2) The ancient scholars only believed that herbs are only solutions to care a number of health related problems and diseases.
3) In this place herbs such as Ajwain, Basil, Cardamom, Chrysanthemum, Coriander, Ginger and Turmeric are helpful in promoting good blood circulation.
4) Our lifestyle is now getting techno -savvy, we are moving away from nature while we cannot escape from nature because we are part of nature.

**Remedies :**

1) Month-will visit and collection of twigs with flowers and fruits growing in this region for herbarium preparation can be undertaken. This will establish authenticity and correct botanical identification of the plants.
2) Protection of these plants through "Live Fencing" by using some medicinal like caesalpinna (Gajga),agve (Ghaipat), Catissa (Karvand) etc.

3) Balbous plants like chlorphytum, dipcidi, ephiginae, sparagus, utginia, gloriosa, Scilla etc. should grow abundantly.

4) A full time office and staff may be appointed to look after, conserve, maintain, medicinal plant of this region.

5) A nursery of medicinal plants be developed for distribution and sale, uneducated unemployed youth thereby promoting job ollortunities.

6) In view of the unipue situation and environmental conditions at "Sanjivani Bet" The committee feels that modest naturopathy center be established to promote scientific development with respect to medicinal plants and Ayurvedic treatment. At present no such center exists in Marathwada.

7) In order to propagate and impress the importance of the "Sanjivani Bet" Seminars/ workshops be arranged so that   free exchange of information and thoughts between experts of various disciplines in made possible.

**Reference :**

1) *C.P.Khare :Indian Medicinal Plants :An Illustrated Dictionary*
2) *Acharya Balkrishna: Secrets of Indian Herbs, Patanjali Publication, Haridwar*
3) *WWW.nhp.gov.in/unani -mty*
4) *Parchure S.N.(1983):Charak Samhita ,Sagar Publications ,Pune*
5) *Ambasta S.P.(1986):The Useful Plants Of India ,CSIR, New Delhi*
6) *Arunchandra S.Pathak (2008): Maharashtra State Gazetteer, Latur District, Vol -III*
7) *Report On Survey of Medicinal Plants at Sanjivani  Bet ,Wadwal .*

# Impact of Irrigation on Sugarcane Production: A Regional Perspective of Latur District

**Dr. Ganesh L. Jadhav**
Asst. Professor, Dept. of Geography,
Sambhaji College (Arts, Commerce & Sci.), Murud.
Dist. Latur.

**Abstract:**
    *Food production is totally depended on availability of water to the crops. Irrigation is the supply of water to the land by means of channels, streams, and sprinklers in order to permit the growth of crops. It plays an important role in agricultural production. With the development of perennial irrigation facility area under sugarcane is increased because it requires less laours and less capital as compare to other cash crops. Increase in agricultural production and productivity leads to increase in the income of the farmers. Productivity measurement is an assessment of production in terms of the inputs applied to the productive process. Therefore attempt is made here to examine the impact of irrigated on production of Sugarcane in Latur district. The paper is mainly based on secondary data. To examine the impact of increase in irrigated area on production of Sugarcane the Pearson's Coefficient of Correlation, Coefficient of determination and regression technique has been utilized. The study reveals that there is positive correlation between per cent of irrigated area and production of Sugarcane in Latur district. It is found that increase of one per cent of irrigated area causes for increase of Sugarcane production by 19.65 M.T. in the study region.*
**Keywords:** Irrigation, Sugarcane Production, Correlation, Regression.

**Introduction:**

In modern sense the agriculture consist of practice of cultivation of crops raising livestock, fish, pig farm, goat farm and poultry. Land constitute its body, water runs through its veins like blood, air gives it Oxygen and man acts as dynamic actor to reflect its types, pattern and distribution (Singh R.P.,1992). Food production is totally depended on availability of water to the crops. Irrigation is considered as one of the most important and basic factors in the process of transformation of agriculture, where rainfall is both inadequate and unpredictable. Irrigation is basic determinant of agriculture because its inadequacies are the most powerful constraints on the increase of agricultural production, particularly in the drought prone regions. It is recognized for its protective role of insurance against the vagaries of rainfall and drought (Pawar C.T., 1989).

Irrigation is essentially the artificial application of water to overcome deficiencies in rainfall for growing crops (C. Sivarama Krishnarao and M. Iqbal Ali 1986). This could be done by artificial application of water to land for growing crops and is known by the term "irrigation". Irrigation is identified as a decisive factor in Indian agricultural land use due to high variability and inadequacy of rainfall. Irrigation is the watering of land by artificial means to foster plant growth (Merrium Webster's Collegiate Dictionary, 2004). Irrigation means the supply of water to the land by means of channels, streams, and sprinklers in order to permit the growth of crops (Susan Mayhew, 2004). Irrigation is basic determinants of agriculture because its inadequacies are the most powerful constraints to increase agricultural production. With the growth of irrigated area, the production of cash crops is increasing.

Sugarcane is most important cash crop in Maharashtra state. Sugarcane is tall tropical plant with thick stems from which sugar is made (Hey & Holloway, 2015). Sugarcane is twelve months crop and it is planted in between July- August and January. It is water loving tropical crop and therefore requires high temperature and maximum moisture. Therefore it is cultivated in that area where perennial irrigation facility is available. The area under Sugarcane cultivation is increased considerably in the Marathwada region of Maharashtra due to the development of medium and major irrigation projects and availability of Regur soils in river basin. Furthermore it requires less labour force as compare to other cash crops and less diligence. Now a day due to non-availability of agricultural labors majority farmer prefer sugarcane. Increase in agricultural production and productivity leads to increase in the income of the farmers. Productivity measurement is an assessment of production or output in terms of the inputs applied to the productive process (A. Siddiqui and Jat B.C., 2009). Therefore it is hypothesized that higher is the irrigated area more is the sugarcane production. So the attempt is made here to assess the impact of irrigated area on sugarcane production in terms of regional perspective in Latur district of Marathwada Region.

**Study Area:**

Latur is one of the drought prone districts of Marathwada Region of Maharashtra State. It suddenly became on the world map after it was severe hit by an earthquake on 30 September, 1993 at 03.55 hrs. with an intensity of 6.0-6.5 on Richter's scale, causing an enormous damage to the area in the loss of human life, livestock standing crops and property. It is located in the South-eastern part of Maharashtra State, It lies between North latitudes 17°55'00'' and 18°50'00'' and East longitude 76°15'00'' and 77°15'00'' and falls in parts of Survey of India degree sheets 56 B, 56 C and 56 F. The district is situated on Maharashtra Karnataka border and bounded to the East by Bidar district of Karnataka, to the North-east Nanded district, to the North by Parabhani district, to the North-west by Beed district and to the Western and Southern part by Osmanabad

district of Maharashtra state. The district headquarters is located at Latur City. For administrative convenience, the district is divided in 10 talukas viz, Latur, Ahmedpur, Udgir, Nilanga, Ausa, Renapur, Chakur, Shirur-Anantpal, Deoni and Jalkot. It has a population of 24, 55,543 as per 2001 census. The district has 5 Nagar Parishads, 10 Panchayat Samitis and 786 Gram Panchayats.

The district has a geographical area of 715700 hectare out of which only 3500 hectare is covered by forest, whereas cultivable area is 642300 hectare and net sown area is 561000 hectare. The district forms part of Godavari basin. Manjra River is the main river flowing through the district. The climate of the district is generally hot and dry. Rainfall is uncertain, unpredictable and inadequate in the study region.

**Objectives:**
The main objectives of this paper are as follow.
1) To examine the impact of irrigated area on Production of Sugarcane in Latur district.
2) To estimate the rate of change in production of Sugarcane in relation to change in percentage of net irrigated area.

**Data Collection and Methodology:**
The present study is based on secondary data source. In order to meet these objectives the relevant information and data regarding irrigated area and production of Sugarcane in Latur district are collected from Divisional Joint Director, Department of Agriculture, Latur Division, District Socio-economic Review and Statistical Abstract of Latur district and used for the year 2009-10 to 2012-13. Information regarding physiography and drainage collected from District Gazetteers of Latur district. Collected rough data are processed. The percentage of net irrigated area and production of sugarcane is computed to total net sown area.

To examine the impact of irrigated area on Sugarcane production the Pearson's Coefficient of Correlation technique has been utilized. The degree of relationship by considering growth of irrigated area as an independent variable 'X' and growth of Sugarcane production as dependent variable 'Y' is measured. The functional form of linear relationship has been measured by using regression equation Y on X i.e. y = a + bx. The rate of change in dependent variable has been estimated with the help of 'b' coefficient, which is the line of best fit. The 't' test is used with the view to understand the confidence level. Analysis of the study has been made with the help of the statistical techniques and on the basis of this results and conclusion are drawn.

**Discussion and Results:**
**Impact of Irrigated Area on Production of Sugarcane in Latur District:**
Rainfall is uncertain, unpredictable and inadequate in the study region. Rainfall variability is more than 33 percent in the study area therefore role of irrigation is very important. So the attempt is made here to assess the impact of percentage of net irrigated area to net sown area on production of Sugarcane in the tehsils of Latur district. In the context of objective the following findings has come to light**.**

**Table No. 1: Percentage of Net Irrigated Area and Production of Sugarcane in tehsils of the Latur District 2009-10 to 2012-13.**

| Sr. No | Tehsils | X ( % of Net irrigated area to net area sown) | Y (Production of Sugarcane in '00' M.T) |
|---|---|---|---|
| 1 | Latur | 35.49 | 613 |
| 2 | Renapur | 25.97 | 343 |
| 3 | Ahmadpur | 16.81 | 333 |
| 4 | Jalkot | 16.22 | 14 |
| 5 | Chakur | 19.53 | 160 |
| 6 | Shirur Anantpal | 20.9 | 122 |
| 7 | Ausa | 18.21 | 383 |
| 8 | Nilanga | 17.87 | 361 |
| 9 | Devani | 18.12 | 191 |
| 10 | Udgir | 12.24 | 125 |
| Coefficient of correlation | | | **0.723929** |
| Coefficient of determination | | | **0.524073** |

*Source: Compiled by researcher on the basis of Socio economicc Review and district Statistical Abstract of Latur District 2009-10 to 2012-13 Statistical officers, Divisional Joint Director Office of Agriculture, Latur Division, Latur.*

**1.** The high positive correlation is observed in between percentage of net irrigated area and production of Sugarcane in the tehsils of Latur District. The coefficient of correlation in this regard is +0.7239. The degree of linear association between these two variable obtained by using the coefficient of determination ($r^2$) is found to be at 0.5241, which reveals that the independent variable (X) i.e. net irrigated area are explaining 52.41 per cent of the total variations in dependant variable (Y) i.e. production of Sugarcane in the tehsils of Latur District.

It is a good explanation because 52.41 per cent of variation in 'Y' production of Sugarcane in the tehsils of Latur District to be influenced by the variable 'X' i.e. net irrigated area and about 47.59 percent of variation is left to be influenced by other variables.

**2.** The functional form of linear relationship of 'Y' on 'X' found to be at y = -131.2 + 19.65. The line of best fist is shown in figure no. 2. The regression coefficient indicates that increase of one percent net irrigated area causes for increase of 19.65 M.T. production of Sugarcane in the tehsils of Latur District. By testing the significance of regression coefficient (a test of significance), the validity of this causal relationship has been confirmed.

The calculated value of 't' in this exercise is found at 3.15. It is observed that this calculated value is higher than the tabulated value of 't' (3.14) at the 8 degree of freedom (df = n −2, where 'n' is 10) at 2 per cent level of significance.

**3.** In order to understand the degree of fit of regression equation and the accuracy level of predicted values (y) production of Sugarcane in the tehsils of Latur district the standard error (SE) of estimate is being done with the equation SE (Y) = SY $\sqrt{1-r^2}$, where SE (Y) is the standard deviation of residuals (Y-y); and 'SY' is the standard deviation of 'Y'.



The confidence intervals of the predicted values are worked out at Y ± SE (Y) (The SE (Y) for the present exercise is 112.1 and SY is the 174.64). Thus it is assumed that if the values of 'Y' (Y-y) lie within the range of Zero to ± SE, the prediction could be expected to be accurate. In other words, the role of independent variables in explaining the change in dependent variable can be accepted as correct.

The equation used $t = (b-\beta) \sqrt{(n-2)\Sigma(Xi-X^-)^2 \div \Sigma (Yi-yi)^2}$

In this context it has been observed that the predicted values (given in table no. 2) of 6 out of 10 tehsils in the present study lie within the range of ± SE, 4 within ± SE to ± 2 SE. Now the obvious inference is that the 60 per cent of the total number of observation (n is 8) the regression is a good indicator meaning thereby that the variations in production of

**Table No. 2 : Residuals from Regression of production of Sugarcane.**

| Sr. No, | Tehsils | yi | Yi-yi |
|---------|---------|-----|-------|
| 1 | Latur | 558.5375 | 54.462532 |
| 2 | Renapur | 384.0367 | -41.036706 |
| 3 | Ahmadpur | 216.1347 | 116.865287 |
| 4 | Jalkot | 205.3201 | -65.320065 |
| 5 | Chakur | 265.9921 | -105.992073 |
| 6 | Shirur Anantpal | 291.1041 | -169.104053 |
| 7 | Ausa | 241.7966 | 141.203410 |
| 8 | Nilanga | 235.5644 | 125.435580 |
| 9 | Devani | 240.1469 | -49.146897 |
| 10 | Udgir | 132.3670 | -7.367015 |

*Source: compiled by researcher.*

Sugarcane production is the function of the variations in net irrigated area. In the case of other tehsils with residuals between ± SE to ± 2 SE the situation is different because here the regression is a poor indicator. It clearly indicates that these are the tehsils whom the influence of variables other than the independent one the variations in production of Sugarcane in the tehsils of Latur district. In the later case may be due to the variation in climatic condition, variation in soil, variation in use of fertilizer and pesticides.

**Conclusions:**

This study reveals that there is positive correlation between growth of irrigated area and growth of Sugarcane production in the tehsils of Latur district. The coefficient of correlation in this regard is +0.7239. The degree of linear association between these two variable obtained by using the coefficient of determination ($r^2$) is found to be at 0.5240, which reveals that the independent variable (X) i.e. growth of irrigated area are explaining 52.40 per cent of the total variations in dependant variable (Y) i.e. Sugarcane production in the tehsils of Latur district. The percentage of irrigated area is found to be more effective than the other variables considering increase of Sugarcane production. The functional form of linear relationship of 'Y' on 'X' found
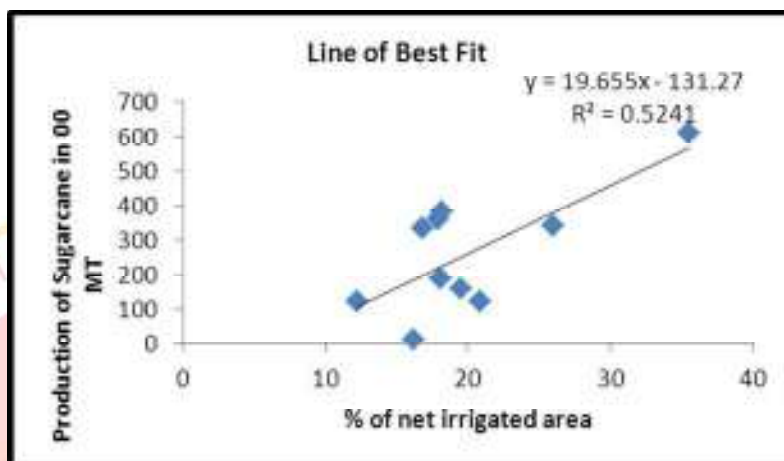
to be at y = 131.2 + 19.65x. The regression coefficient indicates that increase of one percent irrigated area causes for increase in production of Sugarcane by 19.65 M.T. in the study region. The confidence intervals of the predicted values states that variations in increase of Sugarcane production in the tehsils of Latur district is the function of the variations in irrigated area. Therefore it is to be stated that the increase in percentage of irrigated area is helpful to increase sugarcane production. But lack of surface irrigation is main barrier in the study region. Sugarcane is water consuming crop, which restrict extension of irrigated area. Public awareness should made regarding to cultivate other cash crops than Sugarcane to save water and to increase irrigated area in turn to increase agricultural productivity.

**References:**

1) A Siddiqui and Jat B.C., 2009: A study of Agricultural Productivity in Western Rajasthan, The Deccan Geograper, Vol.48, No.2 Dec. 2009 pp-107112 (ISSN-011-7269).
2) C. Sivarama Krishnarao and M. Iqbal Ali (1986): Impact of Irrigation on Cropping Pattern" Kurukshetra, August - Sept. 1986.p. 37.
3) Hey, Leonie & Holloway, Suzanne (2015): Oxford Advanced Learner,s Dictionary, Oxford University Press P.1566.
4) Merriam Webster's Collegiate Dictionary (2003): Merriam – Webster, Incorporated Spring field, Massachuselts, U.S.A. pp-6632.
5) Pawar C.T. (1989): Impact of Irrigation: A Regional Perspective, Himalaya Publishing House, Bombay.
6) Singh, R.P. (1992): Concept of Landuse, New Diamensions in Agricultural Geography, Volume 4, Concept Publishing Company, New Delhi, Pp.73
7) Susan Mayhew (2004): Oxford Dictionary of Geography, Indian Edition, Oxford University Press, Delhi  P. 280.

# A Geographical Analysis of Landuse efficiency in Beed District (M.S.)

**Dr. Jaideep Ramkrishna Solunke**
Dept. of Geography,
Shri Panditguru Pardikar Mahavidyalaya,
Sirsala, Tq.Parli -V., Dist.Beed-431128.

**Introduction:**

Geography is a discipline of exploration and discoveries. The lure to know the known in geographical investigations is the result of geographical imagination embedded in the human intellect. The word ''geography'' is derived from the Greek word ''geographia'' Greek word ''geo'' means earth and 'graphia' means description. It means geography is the discussion of the earth surface. In this sense geography is the science of earth surface. In the course of time this branch of discovery and explorations is very much developed. Hence, the nature and subject matter becomes very vast. Therefore, traditionally, geography is divided into two main branches. One of them is physical geography and another one is human geography.

Due to development of science and technology, human geography is also developed in the course of time; therefore, it is also divided into two main sub branches. One of them is Economic geography and another one is social geography. Agricultural geography is one of the important and systematic branches of economic geography. This branch of knowledge scientifically studies the Spatio-temporal pattern of agricultural activities. Agriculture is one of the oldest and basic primary economic activities of the man. Generally; it is understood to mean both cultivation of food and fiber crops and raising of livestock. It has remained an important source of livelihood even today over the years in spite of growing industrialization and urbanization in the world and nearly 50 per cent of working population is still engaged in agriculture. In the developing countries, agriculture sector has been a principal source of employment and largest source of income also. However, it provides raw material to industry and much of export items. Agriculture in India is a major source of economy. It contributes 50 per cent to national income, gives direct employment to about 68 per cent of total population and nearly 90 per cent population to rural area, and provides nearly 35 per cent of country's export, besides, supplying of wage goods required the non-agricultural section in industry. Hence, it is not surprising that agriculture in India has been receiving much attention in the sector allocation of inputs of in the five-year plans in India and therefore, top priority has been assigned to develop agricultural sector in our country.

**Study Area:**

Beed district is situated on the central part of the Maharashtra and lies between 18°27' and 19°27' north latitudes and 74°49' and 76°44' east longitudes[1]. The east west extension of Beed district is 268 kms. The shape of the Beed district is broadly that of a trapeze, the northern and southern sides of which are nearly parallel. The total geographical area of Beed district is 10615.3 sq.kms and its proportion as compared with Maharashtra state it is about 3.5 percent. The proportion of area of the Beed district in Marathwada division is 19.20 percent. Total geographical area 10,380.4 (97.79%) sq.km area was 2.21% urban and 97.79% rural.

**Objectives:**

1.      To study the geographical factors on which development of agriculture depend.
2.      To assess Landuse efficiency Croup Concentration in the study region.

**Database and Methodology:**

For the present research work data are collected from both the sources – Primary and Secondary. Primary data was collected through questionnaires, interviews and other data collection techniques from different sources. Secondary data will be collected from Socio-Economic Abstracts, District Census Handbooks, Gazetteers, Agricultural Epitomes, Periodicals and offices like Department of Agriculture, Irrigation Departments, and Zillah Parishad etc.

**Landuse Efficiency:**

The proportion of potential agricultural land (uncultivated land) increased from 6.35% to 7.44% it means area under this category was increased by 1.09% in during 1990-91 to 2010-11 in the Beed district. There is scope for extension of cultivated land by bringing fallow and potential land under cultivation. Therefore, immediate need is to give more emphasis on intensity of cropping and increasing yield from existing calculated area. Problem of under use of net sown area, low productivity and risk of crop failure are talking the rural population. Therefore, it is a faithful to investigate the degree of intensity with which the net sown area is utilized. Landuse efficiency may be defined as the extent to which the net sown area is cropped.The gross cropped area as percentage of the net sown area gives measure of land use efficiency, which means the intensity of cropping. The index of land use efficiency is obtained by using the following formula.

$$\text{Index of Land efficiency} = \frac{Gross\ Cropped\ Area}{Net\ Sown\ Area} * 100$$

Table no. 0.1 reveals that, in during 1990-91 to 2010-11 region gross cropped area, and net sown area was 10 lakh. 31.29 hectares and 7 lakh 97 thousand, 6 hundred 61.70 hectares respectively in the study region. Whereas, in during 2000-01 to 2009-10 gross cropped area and net sown area was experienced 9 lakh, 63 thousand 6 hundred 30.26 hectares. and 8 lakh, 35 thousand two hundred 33 hectares respectively in the study region. The index of land use efficiency was found in 125.37 in during 1990-91 to 2000-01, where as in during 2000-01 to 2010-11 land use efficiency index was observed 115.37. It means that index of land use efficiency was distressed by 10% in the study region in during the period of investigation.

**Table no. 01 Statement showing Landuse efficiency in Beed District (Area in Hectors)**

| Sr. No. | Name of Tehsil | (1990-91 to 2000-2001) | | | (2000-01 to 2010-11) | | | Vol. of change in Landuse efficiency |
|---|---|---|---|---|---|---|---|---|
| | | Gross Cropped Area | Net Sown Area | Index of Lnaduse Efficiency | Gross Cropped Area | Net Sown Area | Index of landuse Efficiency | |
| 1 | Asti | 1,20,100.91 | 1,18,908,40 | 101.00 | 1,40,499,98 | 1,30,386,00 | 107.76 | +6.76 |
| 2 | Patoda | 68,871.01 | 45222.10 | 152.30 | 61507.80 | 48273.00 | 127.42 | -24.88 |
| 3 | Shirur K | 59,594.00 | 48294.00 | 123.40 | 57357.74 | 51787 | 110.76 | -12.64 |
| 4 | Georai | 1,54,311.50 | 137882.90 | 111.97 | 139908.78 | 134862 | 103.74 | -08.23 |
| 5 | Mjalgaon | 1,02066.63 | 78036.00 | 130.79 | 104981.66 | 82562 | 127.15 | -03.64 |
| 6 | Wadvani | 26,170.00 | 19261.00 | 135.87 | 25865.00 | 19576 | 132.13 | -03.74 |
| 7 | Beed | 1,50,078.13 | 121237.00 | 123.79 | 135391.00 | 124985 | 108.33 | -15.44 |
| 8 | Kaij | 1,20,940.91 | 93635.40 | 129.16 | 95821.84 | 89129 | 167.54 | -21.65 |
| 9 | Dharur | 37,266.00 | 24003.10 | 155.25 | 36652.00 | 21876 | 167.54 | +12.29 |
| 10 | Parli | 68,433.72 | 54277.60 | 126.08 | 70485.00 | 57681 | 122.20 | -03.88 |
| 11 | Ambajogai | 92,128.48 | 56904.20 | 161.90 | 95241.90 | 74116 | 128.50 | -33.04 |
| | Total District | 10,00031.29 | 7,97661.70 | 125.37 | 963630.26 | 835233 | 115.37 | -10.00 |

*Sources: Census of India, 2011.*

In during 1990-91 to 2000-01, below 120 landuse efficiency index was found in Asti and Georaitahsils, while 120 to 140 land use efficiency index was observed in Shirur (K.) Majalgaon, Wadwani, Beed, Kaij, and Parli V. tahsils whereas above 140 land use efficiency index was experience in Patoda, Dharur and Ambajogaitahsils in the study region  In during 2000-01 to 2010-11 below 125 land use efficiency index was found in Asti, Shirur (k), Georai, Beed, Kaij and Parli V. tahsils while 125 to 150 land use efficiency index was observed in Patoda, Wadwani, Majalgaon and Ambajogaitahsils whereas above 150 land use efficiency index was noticed in Dharurtahsils in the study region. Index of land use efficiency was distressed in every tahsil, in exception of Asti, and Dharurtahsils in during the period of investigation in the study region. It means that positive and negative changes were occurred of land use efficiency index in the study region. Below -23 negative changes was found in Shirur (k), Georai, Majalgaon, Wadwani, Beed, Kaij and Parli V. tahsils whereas above -23 negative change landuse efficiency index was noticed in Patoda and Ambajogaitahsils. Below +10 positive changes was registered in Asti tahsil and above +10 positive changes in landuse efficiency index was experienced in Dharurtahsil in the study region in during the period of investigation.

**Results:**

1. In during 2000-01 to 2010-11 below 125 land use efficiency index was found in Asti, Shirur (k), Georai, Beed, Kaij and Patodatahsils while 125 to 150 land use efficiency index was observed in Patoda, Wadwani, Majalgaon and Ambajogaitahsils whereas above 150 land use efficiency index was noticed in Dharurtahsils in the study region.

2. Index of land use efficiency was distressed in every tahsil, in exception of Asti, and Dharurtahsils in during the period of investigation in the study region. It means that positive and negative changes were occurred of land use efficiency index in the study region. Below -13 negative changes was found in Shirur (k), Georai, Majalgaon, Wadwani and Patodatahsils while -13 to -23 negative changes was observed in Beed and Kaijtahsils, whereas above -23 negative change landuse efficiency index was noticed in Patoda and Ambajogaitahsils. Below +10 positive changes was registered in Asti tahsil and above +10 positive changes in landuse efficiency index was experienced in Dharurtahsil in the study region in during the period of investigation.

**References:**

1. Datye V.S. and Gupte S.C. (1984) 'Association between Agricultural Landuse and Physio-economic Phenomena A Motivate Approach, Translocation, Institute of Indian Geographers, Vol. 6, pp. 61-72.
2. Jagdish C. Kuniyal (1987) 'Crop Concentration & Diversification in National District, U.P. Himalaya', The National Geographical Journal of India, Vol.33, (part 2) June 1987, pp.
3. Sharma S.K. and Jain Ajitkumar (1988) 'Diffusion of innovations in the cotton growing tract of Madhaya Pradesh', The geographer, Vol. XXXV, No.2, July 1988, pp 34-44.

# Environmental Impact of Agriculture

**Dr. Ramdas B. Madale**
Assist.Prof. Geography,
S.V. College Mukramabad,
Tq.Mukhed Dist.Nanded.

**Abstract:**

Ultimately, the environmental impact depends on the production practices of the system used by farmers. Some of the environmental issues that are related to agriculture are climate change, deforestation, genetic engineering irrigation problems, pollutants, soil degradation and waste. The environmental impact of agriculture is the effect that different farming practices have on the ecosystems around them, and how those effects can be traced back to those practices. The environmental impact of agriculture varies based on the wide variety of agricultural practices employed around the world. Ultimately, the environmental impact depends on the production practices of the system used by farmers. The connection between emissions into the environment and the farming system is indirect, as it also depends on other climate variables such as rainfall and temperature.

**Keywords :** climate change, irrigation, pollutants, soil degradation, waste, deforestation.

**Introduction:**

Means based and effects based are the two types of indicators of environmental impact. Means based indicators is based on the farmers production methods and effect based indicators which is the impact that farming methods have on the farming system on emissions the environment. An example of a means-based indicator would be the quality of groundwater that is affected by the amount of nitrogen applied to the soil. An indicator reflecting the loss of nitrate to groundwater would be effect-based. The means-based evaluation looks at farmer's practices of agriculture, and the effect-based evaluation considers the actual effects of the agricultural system. For example, means-based analysis might look at pesticides and fertilization methods that farmers are using and effect-based analysis would consider how much $Co_2$ is being emitted or what the nitrogen content or the soil is.

**Objective:**

To study the environmental impact of agriculture.

**Research Methodology:**

The secondary source has been used for data collection in this regard to this subject.

**The Environmental Impact of Agriculture:**

The environmental impact of agriculture involves a variety of factors from soils, water, air, animal and soil variety, people, plants, and the food itself. Some of the environmental issues that are related to agriculture are climate change, deforestation, genetic engineering, irrigation, pollutants, soil degration and waste.

**Climate Change:**

Agricultural commodities even today are sensitive to climate variability associated with global warming. Droughts, floods, tropical cyclones, heavy precipitation events, not extremes and heat waves are known to negatively impact agricultural production and farmers livelihood.

Climate change and agriculture are interrelated processes, both of which take place on a worldwide scale, global warming is projected to have significant impacts on conditions affecting agriculture, including temperature, precipitation and glacial run-off. These conditions determine the carrying capacity of the biosphere to produce enough food for the human population and domesticated animals. Raising carbon dioxide levels would also have effects, both determental and beneficial, on crop yields. Assessment of the effects of global climate changes on agriculture might help to properly anticipate and adapt farming to maximize agricultural production.

Although the net impact of climate change on agricultural production is uncertain it is likely that it will shift the suitable growing zones for individual crops. Adjustment to this geographical shift will involve considerable economic costs and social impacts.

At the same time, agriculture has been show to produce significant effects on climate change, primarily through the production and release of greenhouse gases such as carbon dioxide, methane, and nitrous oxide. In addition, agriculture that practices tillage, fertilization, and pesticide application also releases ammonia, nitrate, phosphorus, and many other pesticides that effect air, water and soil quality, as well as biodiversity.

Agriculture also alters the Earth's land cover which can change its ability to absorb or reflect heat and light, thus contributing to raditive forcing. Landuse change such as deforestation and desertification, together with use of fossil fuels, are the major anthropogenic sources of carbon dioxide; agriculture itself is the major contribution to increasing methane and nitrous oxide concentrations in earth's atmosphere.

## Irrigation:

Irrigation can lead to a number of problems among some of these problems is the depletion of underground aquifers through over drafting. Soil can be over irrigated because of poor distribution uniformity or management wastes water, chemicals, and may lead to water pollution. Over-irrigation can cause deep drainage from rising water tables that can lead to problems of irrigation salinity requiring watertable control by some form of subsurface land drainage. However, if the soil is under irrigated, it gives poor soil salinity control which leads to increased soil salinity with consequent buildup of toxic salts on soil surface in areas with high evaporation. This requires either leaching to remove these salts and a method of drainage to carry the salts away irrigation with saline or high-sodium water may damage soil structure owing to the formation of alkaline soil.

## Pollutants:

Synthetic pesticides such as 'Malathion', 'Rogor', 'Kelthane' and 'Confidor' are the most widespread method of controlling pests in agriculture. Pesticides can leach through the soil and enter the groundwater, as well as linger in food products and result in death in humans and non-targated wildlife. A wide range of agricultural chemicals are used and some become pollutants through use, misuse, or ignorance. The erosion of topsoil, which can contain chemicals such as herbicides and pesticides, can be carried away from forms to other places. Pesticides can be found in streams and ground water. Atrazine is a herbicide used to control weeds that grow among crops. This herbicide can disrupt endocrine production which can cause reproductive problems in mammals, amphibians and fish that have been exposed. Pollutants from agriculture have a huge effect on water quality. Agricultural nonpoint source (NPS) solution impacts lakes, rivers, wetlands, estuaries, and groundwater. Agricultural NPS can be caused by poorly managed animal feeding operations, overgrazing, plowing, fertilizer, and improper, excessive, or badly timed use of pesticides. Pollutants from farming include sediments, nutrients, pathogens, pesticides, metal and salts. Animal agriculture can also cause pollutants to enter the environment. Bacteria and pathogens in manure can make their way into streams and groundwater if grazing storing manure in lagoons and applying manure to fields is not properly managed.

## Soil degradation:

Soil degradation is the decline in soil quality that can be a result of many factors, especially from agriculture. Soil hold the majority of the world's biodiversity, and healthy soils are essential for food production and an adequate water supply. Common attributes of soil degradation can be salting, water logging, compaction, pesticide contamination, decline in soil structure quality, loss of fertility, changes in soil acidity, alkalinity, salinity, and erosion. Soil erosion is the wearing away of topsoil is very fertile, which makes it valuable to farmers growing crops. Soil degradation, which affects the microbial community of the soil and can alter nutrient cycling, pest and disease control, and chemical transformation properties of the soil.

## Waste:

Plasticulture is the use of plastic mulch in agriculture. Farmers use plastic sheets as mulch to cover 50-70% of the soil and allows them to use drip irrigation systems to have better control over soil nutrients and moisture. Rain is not required in this system, and farms that use plasticulture are built to encourage the fastest run off of rain. The use of pesticides with plasticulture allows pesticides to be transported easies in the surface runoff towards wetlands or tidal creeks. The runoff from pesticides and chemicals in the plastic can cause serious deformations and death in shellfish as the runoff carries the chemicals towards the oceans.

## Deforestation:

Deforestation is clearing the Earth's forests on a large scale world wise and resulting in many land damages. One of the causes of deforestation is to clear land for pasture or crops. According to British environmentalist Norman Myers, 5% of deforestation is due to cattle ranching, 19% due to over-heavy logging, 22% due to the growing sector of palm oil plantations, and 54% due to slash and burn farming.

Deforestation causes the loss of habitat for millions of species, and is also a driver of climate change. Trees act as a carbon sink : that is, they absorb carbon dioxide, an unwanted greenhouse gas, out of the atmosphere. Removing trees releases carbon dioxide into the atmosphere and leaves behind fewer trees to absorb the increasing amount of carbon dioxide in the air. In this way, deforestation exacerbates climate change. When trees are removed from forests, the soils tend to try out because there is no longer shade, and there are not enough trees to assist in the water cycle by returning water vapor back to the environment with no tree, landscapes that were once forests can potentially of trees also causes extreme fluctuations in temperature.

## Genetic Engineering:

Genetic engineered crops are herbicide-tolerant and their overuse has created herbicide resistant super weeds, which may ultimately increase the use of herbicides seed contamination is another problem of genetic engineering; it can occur from wind or bee pollination that is below from genetically-engineered crops to normal crops.

About 50% of corn and soyabean samples were found to be contaminated by Monsanto's (genetic engineering company) genes. This accidental contamination can cause organic farmers to lose a lot of money.

**Conclusion:**

Current agricultural practices involve deliberately maintaining ecosystem in a highly simplified, disturbed, and nutrient-rich state. To maximize crop yields, crop plant varieties are carefully selected to match local growing conditions. Limiting factors, especially water, mineral nitrogen, and mineral phosphate, are supplied in excess, and pests are actively controlled. These three features of modern agriculture-control of crops and their genetics, of soil fertility via chemical fertilization and irrigation and pests (seeds, insects, and pathogens) via chemical pesticides are the hallmarks of the green revolution. They have caused for once rare plants (barly, maize, rice and wheat) to become the dominant plants on earth as humans become the dominant animal. Indeed, these four annual grasses now occupy, respectively, 67 million hectares, 140 million hectors, 151 million hectores and 230 million hectores each, worldwide, which is 39.8% of global cropland. For comparison, the total forested area of the United State, including Alaska is 298 million hectores. Entire regions of the world now are dominated by virtual monocultures of a given crop. These monocultures have replaced natural eco-systems that once contained hundreds to even thousands of plant species, and man species of vertebrates. Thus, agriculture has caused a significant simplification and homogenization of the world's ecosystems.

**Reference:**

1. ^abc van der warf, Hayo; Petit, Jean (December 2002). 'Evaluation of the environmental impact of agriculture at the farm level : a comparison and analysis of 12 indicator-based methods'. Agriculture Eco-system and Environment 93 (1-3) : 131-145. April. 2015.
2. ^Hanu, Jeremy (May 15, 2008) 'Tropical deforestation is one of the worst crises since we came out of our caves'. Mongabay.com/A place out of Time : Tropical Rainforests and the Perils They Face. Achieved from the original on May 29, 2012.
3. ^abc 'Soil Erosion-causes and effects'. www.omfra.gov.on.ca. Retrieved 2018-04-11.
4. ^'Agricultural Nonpoint Source Fact Sheet'. United States Environmental Protection Agency. EPA. 2015-02-20. Retrieved 22 April 2015.
5. Impact of Climate Change in Agriculture, UGC Approved International Research Referred Journal for all subjects and all languages. ISSN 2319-8648.
6. Geographical Perspectives on Environmental and Sustainable Development, National Seminar 10th – 11th Aug. 2012 organized by Dept. of Geography, M.B. College
7. https://en.m.wikipedia.org>wiki>Envir....

# Minor Irrigation Projects in Nanded District

**Dr. V. N. Vinkar**
Head, Dept. of Geography,
Kai. Bapusaheb Patil Ekambekar.
Mahavidyalaya, Udgir Dist. Latur.

**Introduction:**

Irrigation is an artificial application of water to land by human effort to assist the growth of crops. Water is the most important factor for the growth of plants. If water is available in adequate quantities crops can be grown successfully. If water supply is available in adequate quantity then the life expectancy of crops is increased.

Water is one of the important inputs, besides fertilizers, insecticides, high yielding seeds and modern technology for agricultural development. If irrigation facilities are assured to the farmers, he can be made to shake off his reluctance to provide inputs required to increase agricultural production. Agriculture development is not possible without irrigation. So irrigation is the soul of agriculture. Irrigation depends on conditions of climate. Irrigation is essential for growing crops. Irrigation is regarded as an integral part of a ground. It help to restructure and it is one of the basic ingredients of agriculture activities & used for the purpose of irrigation supply of water which comes from well, tube well other water well tanks. This could be done by artificial application of water to land for growing crops and is known by the term irrigation.

**Objective:**

1) To study the minor irrigation projects in Nanded district.
2) To study the irrigation in Nanded district.
3) To study the Tahsil wise irrigation projects in Nanded district.

**Study Area:**

Nanded district is situated in south eastern part of the Maharashtra state. It lies between $18^0 15^'$ N to $19^0 55^'$ latitude and $77^0 7^'$ E to $78^0 10^'$ E longitude.

Nanded district is bounded by Yavatmal district on north, Latur district on the south west and Parbhani district on the north west, whereas on the east and south east bounded by Adilabad and Nizambad districts of Andhra Pradesh and on the south west by Bidar district Karnataka state.

The study area has an area of 10502 sq. kms. which is covered about 3.41 % of the total area of Maharashtra state. Nanded district comprising sixteen Tahsils.

**Methodology:**

The data used for study has been collected from secondary sources. Secondary data has been collected through census of India, statistical abstract of Maharashtra state, socio-Economic review, Irrigation department, various books and website etc. various methods and techniques have been used for the purpose of analysis and interpretation. The details relabeling the various methods and techniques are discussed in the appropriate place. The data thus collected through secondary sources were processed and represented by statistical and cartographic techniques as the study prosecutes to be geographical spirit. The chorographic and chorology methodologies have been adopted.

**Discussion:**

### Irrigation projects in Nanded district (Year 2011 – 12)

| Taluka Name | Number of irrigation project |
|---|---|
| Mahoor | 20 |
| Kinwat | 27 |
| Himayatnagar | 07 |
| Hadagaon | 16 |
| Ardhapur | 02 |
| Nanded | 12 |
| Mukhed | 03 |
| Bhokar | 08 |
| Umari | 04 |
| Dharmabad | 00 |
| Biloli | 04 |
| Naigaon | 09 |
| Loha | 16 |
| Kandhar | 15 |
| Mukhed | 10 |
| Degloor | 17 |
| Total | 170 |

*Source : Irrigation Dept. Nanded*

**Irrigation Projects in Nanded District in the Year 2011-12**
■ Number of irrigation project
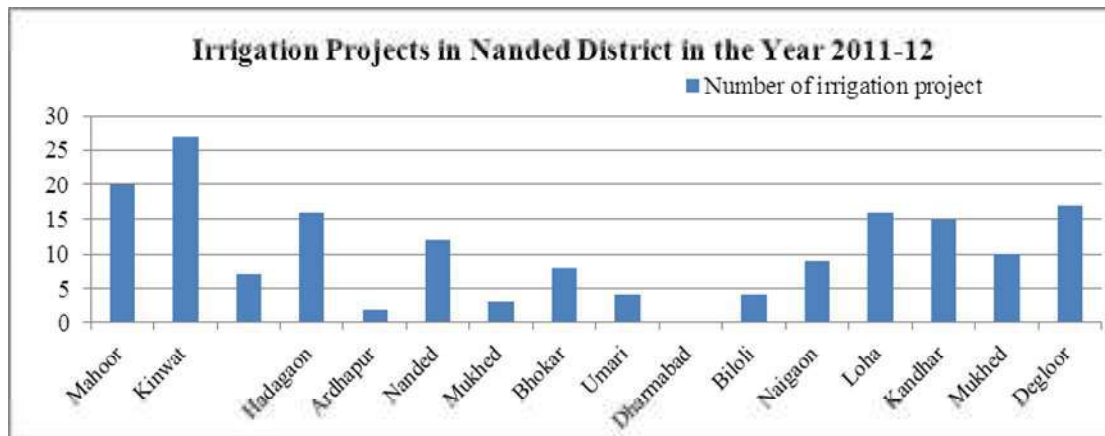
Irrigation can do more than just support farming activities. The efficient use of water permits the applications of modern agricultural techniques altogether, used in right combination can lead to very successful agriculture as demonstrated by the success achieved by the use of high yielding varieties.

Nanded district has a large dry agricultural terrain, having stanty and sporadic rainfall. The large part of the study region may have been dependent completely on monsoon. The average annual rainfall in the district is recorded about 813 mm.

Although climatically most of district barring the northern part of the Kinwat tahsil in the hilly region, receives a precious rainfall. The distribution of rainfall is very uneven. North eastern part of the district gets good rainfall and the rainfall decreases as one proceeds towards south.

Total number of minor projects in Nanded district are 170; highest number of minor irrigation projects i.e. 27 are in Kinwat taluka and the lowest number of minor projects are in Dharmabad taluka.

**Conclusion:**

The minor irrigation project is important project in the study area. In Nanded district highest minor irrigation project are in Kinwat taluka and lowest minor irrigation projects in Dharmabad taluka.

**Reference:**
1) Pande R.B. (1999) "Industrial potential survey of Nanded district."
2) Lal D.S. (2005) "Climatology" Sharda pustak BHavan Allahabad 211002.
3) Singh Jasbir and Dhillon S.S. (1995) "Agricultural Geography" Tata MC Graw Hill publication New Delhi.
4) www.google.co.in

# Planning Regions for Development of Latur District in Maharashtra (India)

**Dr. Mukesh Jaykumar Kulkarni**
Department of Geography,
Maharashtra UdayagiriMahavidyalaya, Udgir, Latur.

**Abstract:**

The present paper aims to delineate the planning regions for development on basis of levels of regional development of Latur district in Maharashtra. The entire paper is based on secondary sources of data. Data has been processed and analyze by statistical technique such as co-efficient index and composite index of development (CID) for calculate the levels of development. For this research purpose a tahsil unit of Latur district is considered. The purpose of this study is to remove the disparities and inequalities between the developed and backward regions.

In order to bring out, the region under study from the various kind of disparities and imbalances in regional development, an attempt has been made here to find out different levels of development with the study area and on the basis of levels of development an attempt has been made to delineate homogeneous three broad sub micro regions and ten micro planning regions for planned development in the study region.All micro sub-regions and micro units follow administrative boundaries, so that there should not be any problem of data collection, decision making and thus plan can be performed more effectively. It is hoped that this study will be of immense value in future planning of the region. Thus the regional planning is found to be an effective instrument of economic change. It must aim at balanced development of all micro regions of a region on the basis of regional potentialities.The regional planners and policy makers take into consideration, the diagnostic plan on priority basis to eliminate the regional imbalances and disparities to make the region socially and economically balanced.

**Keywords:** Levels of Development, Co-efficient of development, Composite Index,Planning regions

## Introduction:

Regional development is the result of interaction between various economic and social institutional factors. The task of regional planning is to prepare a comprehensive regional development plan, an integrated and co-ordinate plan between the physical, economic and social components that is between different levels of development in the region.

The disparities and imbalances in natural conditions in terms of terrain, climate such as temperature, rainfall, soil type, drainage, forest, minerals, transport and communication network etc. lead to imbalance socio-economic development. Even a small micro level region like Latur district does not have homogeneous social and economic development. There are some areas which are better developed due to favourable natural conditions, while others are socially and economically much backward.

The change, either positive or negative directions, provides an understanding of the region to consider for socio-economic planning. With the help of change in the socio-economic conditions, one may diagnose the region for planning. The term change often is used for both positive as well as the negative sense. Here, we are concerned to understand various aspects associated with socio-economic conditions of the study area and to find the levels of different regions with the district at tahsil levels and to diagnose these regions with the help of certain indices for the planning to uplift such region, which are socially and economically, lag behind. It is in fact, natural phenomena that all the regions on the earth are not equally endowed with the natural resources. Some regions are fortunate to have a favorable natural condition, which others, at the same time do not have. So here an attempt has been made to study the levels of development and delineating planning regions in the study region.



## Study Area:

Latur district has been selected for the present investigation. The study region is situated in the south-east part of the Maharashtra and it lies between $17^0 52$ north latitude to $18^0 50$ north latitudes and $76^0 12$ east longitudes to $77^0 18$ east longitudes.

It is bounded on the north by Beed and Parbhani districts, on the north-east by Nanded district, on the south-east and south by the Karnataka state and on the north-west, west and south by Osmanabad district. For administrative purpose the district in divided into two revenue divisions i.e. Latur and Udgir division and in 10 tahsils Viz. Latur, Ausa, Renapur, Udgir,
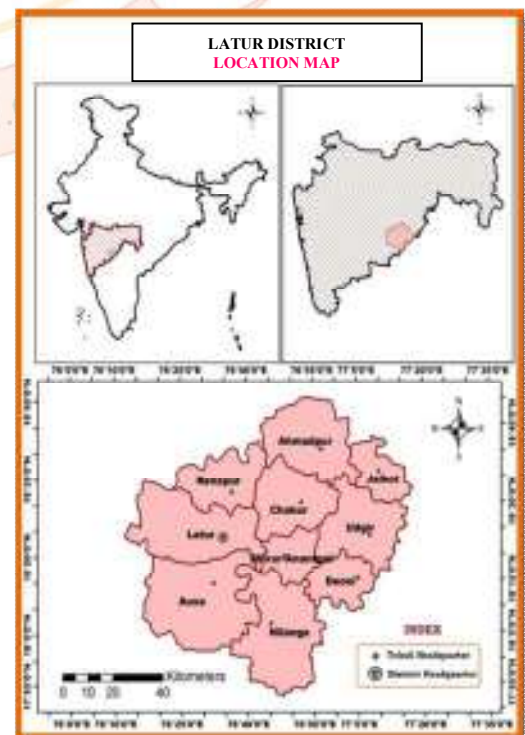
Ahmadpur, Chakur, Nilanga, Deoni, Jalkot and Shirur-Anantpal. Deoni, Jalkot and Shirur-Anantpaltahsils are newly created tahsils (Fig.1.1).

The total geographical area of Latur district is 7157 sq.km. andit covers 2.39 percent of the total geographical area of Maharashtra.

## Objectives:

The basic objective of the paper is to delineate the planning regions for development on basis of levels of regional development of Latur district in Maharashtra. Further, to analyze them basically to the geographical point of view.

## Database and Methodology:

The study is entirely based on secondary sources of data. The required essential data has been collected from the District Census Handbook, Latur and Socio-economic Review of Latur District.

There are different ways to calculate the index of levels of development. Different socio-economic variables have been selected to determine the levels of development. Sixteen following variables have been selected to identify the levels of development.

1) Population density
2) Sex ratio
3) Percentage of general literacy
4) Percentage of urban population to total population
5) Percentage of work participation rate
6) Percentage of population engaged in secondary and tertiary activities to total population.
7) Percentage of cultivable area to total area.
8) Percentage of irrigated area to total cultivable area.
9) Percentage of villages having educational facilities.
10) Percentage of villages having medical facilities.
11) Percentage of rural population served by weekly market facility.
12) Percentage of co-operative agricultural society facility to total Population.
13) Percentage of villages having post offices.
14) Percentage of villages having bank facilities.
15) Percentage of villages having approach by pucca road facility
16) Percentage of service centres to total villages

The method adopted to determine levels of development evolves two stages, first determination of levels of development of tahsil in terms of discrete variables and then integration of the values obtained to give a compute index of development taking all the variables into account. The co-efficient of a tahsil in terms of a single variable is expressed as :

$$CDI = \frac{Pi}{PI} \times 100$$

Where,

CDI = The co-efficient of development for variable i,

Pi = Percentage of variable i, in the area unit.

PI= Mean Percentage of variable i, in the study region.

By summing the development indices taking into account all variables. We get composite index of development by following equation.

$$CID = \frac{CDI_1 + CDI_2 + CDI_3 ---- CDI_n}{N}$$

Where,

CID = Composite index of development.

N = Number of variables

Levels of development are thus calculated for all ten tahsils on the basis of above formula. The composite development indices so obtained are given in the Table 1.1.

The composite indices of development for all tahsils have been treated statistically and three tier classifications of levels of development is determined as high, moderate and low level of development. The regional levels of development have been given in table.1.1. The Latur and Udgirtahsilsare includes in high levels of development in all sixteen variables. Ausa and Nilangatahsils are included in moderate levels of development and remaining six tahsils like Renapur, Ahmedpur, Jalkot, Chakur, ShirurAnantpal and Deoni are included in low levels of development.On the basis of levels of development here, an attempt has been madeto delineate the planning regions for development.

### Table 1.1: Latur District : Composite Index of Development

| Sr.No. | Tahsil | CDI | CID | Classification |
|--------|--------|-----|-----|----------------|
| 1 | Latur | 2342.53 | 146.40 | High |
| 2 | Renapur | 1534.28 | 95.89 | Low |
| 3 | Ahmedpur | 1493.89 | 93.36 | Low |
| 4 | Jalkot | 1261.94 | 78.87 | Low |
| 5 | Chakur | 1480.53 | 92.53 | Low |
| 6 | ShirurAnantpal | 1460.44 | 91.27 | Low |
| 7 | Ausa | 1707.04 | 106.69 | Moderate |
| 8 | Nilanga | 1758.45 | 109.90 | Moderate |
| 9 | Deoni | 1487.34 | 92.95 | Low |
| 10 | Udgir | 2085.56 | 130.34 | High |

*Source: Compiled by the Author.*

**Planning Regions for Development:**

Having analysed the socio-economic facilities and the study of service centres it is now possible to devide the region into planning units on the basis of development potentialities and regional problems. The Latur district as the foregoing analysis of socio-economic facilities reveals, is characterized by homogeneity and heterogeneity, giving rise to regional differentiation in service centres distribution and potentials. The development potential is the combined interaction of demographic potential, development potential and infrastructure potential, out of which the role of development is an important one (Singh and Routrary, 1980, P.205).

Here, an attempt has been made to delineate homogenous planning units for planned development, on the basis of development potentialities. These planning units are not a mere identification of development potentials, but they serve to fix a priority area for planning purpose, with due consideration to the availability of the possible development potential factor as well as the problems. On the basis of the preceding study, an attempt has been made to suggest planning regions of the areas under study, as below.

The physical limitation, cultural characteristics of the people, principle characteristics of human resource, pattern of service centres, pattern of socio-economic condition, development potential and the overall orientation of the region, have been considered the delimiting the planning regions. The suggested planning regions are as under:



LATUR DISTRICT
Planning Regions
(Based on Levels of Development)

| | | |
|---|---|---|
| I. | Relatively more developed region: | I. a) Latur tahsil    I. b) Udgir tahsil |
| II. | Moderately developed region: | II. a) Nilanga tahsil    II. b) Ausa tahsil |
| III. | Less developed Region: | III. a) Ahmedpur tahsil   III. b) Renapur tahsil |
| | | III. c) Chakur tahsil    III. d) Deoni tahsil |
| | | III. e) Jalkot tahsil    III. f) Shirur Anantpal tehsil |

The peculiarities and possibilities of each of these regions have been summarized below (Fig. 1.2).

**I.    Relatively More Developed Region:**

This region stands out significantly from the other adjoining regions in the nature of its potentials. The mostly, covered area of Latur and Udgir tahsils are totally oriented towards Latur and Udgir cities for all sorts of facilities and services due to the progress of education, health, industries and commerce in the cities, there are migration from the surrounding areas to Latur and Udgir cities. This region has densely populated and degree of urbanization is highest. Thus this is the most developed part of the study region.

The region has the facility of several goods, roads and the railway line that have been helpful in the development of agriculture, industries and transportation is intimately linked with the further expansion of tertiary as well as secondary sectors. Latur city being located in the heart of the study region, acts as a service centre offering all related services like trading, marketing, transporting, banking, advertizing etc. These services need expansion by which unemployed population can be put on the track. In the secondary sector
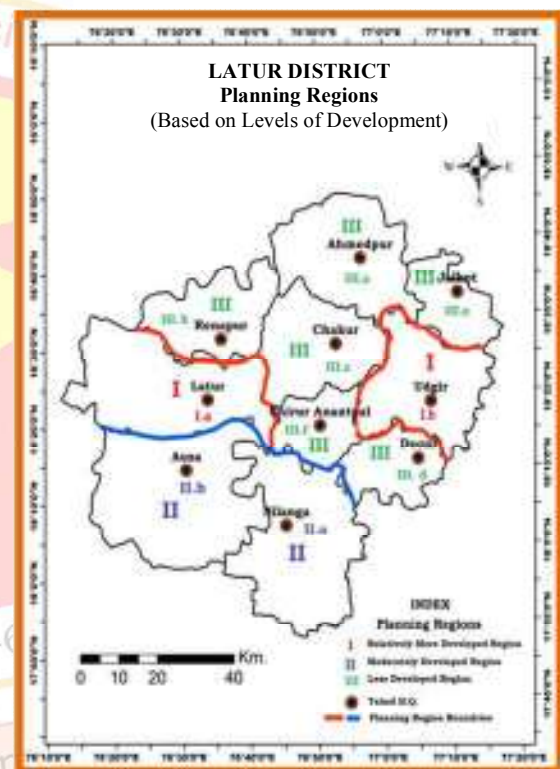
industries of electronic items, chemical and allied items and various industries of consumer goods have good prospects of development, because of the availability of large urban market and also regional market.

## II.    Moderately Developed Region:

This region consists of Nilanga and Ausa tahils. The region has the facility of extensive canal and well irrigation as it occurs in the Manjra and Terna river valley. The application of modern agricultural techniques has resulted into development of monoculture cultivation. The economic prosperity this region has enjoyed during the past two decades had led to increased urbanization and industrialization. This region has better irrigation facilities and fertile soil. They have well co-operative societies because this area is agriculturally developed. This region has better work participation rate, urban proportion and transportation facilities. In this agriculturally developed region, successful agro-based industry can be developed through planned efforts to raise the economic standard of the farmers, and also immediate steps are required to raise the quality of human resource.

## III.    Less Developed Region:

It consist of Ahmedpur, Renapur, Chakur, Deoni, Jalkot and Shirur Anantpal tahsils. This region forms a core around the first region. It is characterized by mountainous terrain of Balaghat ranges and dryer climate. Jalkot, Renapur and Shirur Anantpal tahsils are lagging behind due to lack of development of irrigation potentials. Ahmedpur and Chakur tahsils suffer from the same drawback i.e. lack of development of irrigation potentials. Thus, this is a single purpose agricultural area with low agricultural potentials. Vast agricultural resources are available for further integrated area development. Agriculture of the area mainly suffers from the inadequate means irrigation. In this region poor irrigation facilities have retarded the progress of this area. In this region transport, medical facilities and literacy are inadequate. This region needs a planning programme for the balanced development of agriculture and other sector. Requirement of this region is adult education programmes for public awareness, other educational facilities, also expansion of socio-economic facilities, increase human resource, increase the service centres as proportion to area and population, intensification of agriculture for future overall development.

## Conclusions:

The planning regions of the study region are characterized by some similarities and differences in the physical characteristics, resource distribution to considerable amount of regional differences in development potentialities. As expected natural and socio-cultural resources are not equally distributed throughout the region. It is observed therefore that balanced development of the region cannot be reached unless the region is divided into well marked micro units on the basis of development potentialities and regional problems. In view of this, an attempt has been made to divide the study region into three sub regions and ten micro planning regions from the angle of planning potentials and suggesting strategy for development. All micro sub-regions and micro units follow administrative boundaries so that there should not be any problem of data collection, decision making and thus plan can be performed more effectively. It is hoped that this study will be of immense value in future planning of the region. Thus the regional planning is found to be an effective instrument of economic change. It must aim at balanced development of all micro regions of a region on the basis of regional potentialities.

## References:

1. Bhat, L.S. (1971): "Regional Planning in India", SPS, Calcutta.
2. Census of India (2011, C.D.): General Population Tables. Series-II Maharashtra, Part-II, A Directorate of Census Operations, Govt. of Maharashtra, Mumbai.
3. Chandrashekhara, C.S. (1972): 'Balanced Regional Development and Planning Regions',in Economic and Socio-Cultural Dimensions of Regionalism edited by Chandrashekhara, Census of India, New Delhi.
4. Dubey, K.N. (ed.) (1990): Planning and Development in India, Asia Publishing House, New Delhi.
5. Government of Maharashtra, Socio-Economic Review and Statistical Abstract of Latur District. (2000-2001 and 2009-2010)
6. Mishra, R.P. (1971) "Growth Poles and Growth Centres in Urban and Regional Planning in India", Development Studies, No.2, Institute of Development Studies, University of Mysore, Pp.17-18.
7. Mitra, A. (1965): 'Levels of Regional Development in India', Census of India, New Delhi.
8. Myrdal, G. (1957: "Economic Theory and Under Development Regions', London, Gevald and Co. Ltd.
9. Perroux, F. (1950): "Economic Space: Theory and Applications", Quarterly Journal of Economics, Vol.6, Pp.91.
10. Pilot Research Project (1969-74):'Growth Centres and Integrated Area Development Plan.'
11. Vision 2032 (2008): Government of Maharashtra, Latur District,Vision 2032 Report.
12. Vyas, P.R. (1991): 'Social Amenities and Regional Development', Published Ph.D. Thesis, Rawat Publications, Jaipur, India.

# A Case Study of Tourists Visiting to Ellora Caves in Aurangabad District

**Dr. Drakshayani D. Sarwade**
Department of Geography,
Shivchhatrapati College, Aurangabad.

**Abstract:**
        This research article studies the figure of number of tourists visiting to Ellora caves in Aurangabad district for a period of five years from 2009-10 to 2013-14. This study primarily focuses on the number of Indian and foreign nationals visiting the Ellora caves during the above mentioned five years. The conclusions are drawn in the end of the article.

**Introduction:**
        Ellora Caves located in Aurangabad district of Maharashtra, India is one of the largest rock-cut monastery-temple cave complexes in the world and a UNESCO World Heritage Site, featuring Buddhist, Hindu and Jain monuments and artwork, dating from the 600-1000CE period. Cave 16, in particular, features the largest single monolithic rock excavation in the world, the Kailas temple, a chariot shaped monument dedicated to Shiva. The Kailas Temple excavation also features sculptures depicting the gods, goddesses and mythologies found in Vaishnavism Shaktism as well relief panels summarizing the two major Hindu Epics.

        There are over 100 caves at the site, all excavated from the basalt cliffs in the Charanandri Hills, 34 of which are open to public. These consist of 12 Buddhist caves (1-12), 17Hindu caves (13-29) and 5Jain caves (30-34). (Wikipedia)

**Objectives:**
  i.    To study the number of tourists visiting to Ellora caves from 2009-10 to 2013-14.
  ii.   To study the number of Indian and foreign nationals visiting to Ellora caves from 2009-10 to 2013-14.

**Methodology:**
        This study is primarily based on secondary sources of data. The required data is collected from authentic source. For this the information provided by the Archaeological Survey of India, (ASI), Aurangabad, (MS) is primarily used. Also the information available on websites is also invoked for the purpose.

**Study Area:**
        Ellora caves $20.0268^0$ N $75.1771^0$ E situated in Khultabad tehsil in Aurangabad District.
Ellora caves have been declared as world Heritage sites by the UNESCO in the year 1983. During the period of five years (2009-10 to 2013-14) 6443846 tourists visited the monument. The figure of Indian nationals visiting the caves was 6284795 whereas the figure offering nationals visiting the caves was 159051. We can conclude from this figure that the number of Indian nationals as well as foreign nationals visiting the world heritage site is more in number.

**Table showing Number of Tourists visiting to Ellora Caves (2009-2014)**

| Year | Indian Tourists | Foreign Tourists | Total Tourists |
|---|---|---|---|
| 2009-10 | 900483 | 27904 | 928387 |
| 2010-11 | 1185607 | 32276 | 1217883 |
| 2011-12 | 1330506 | 33954 | 1364460 |
| 2012-13 | 1526717 | 36085 | 1562802 |
| 2013-14 | 1341482 | 28832 | 1370314 |
| **Total Tourist** | 6284795 | 159051 | 6443846 |

*Source:* Archaeological Survey of India, (ASI), Aurangabad.

**Chart showing Number of Tourists visiting to Ellora Caves (2009-2014)**

Every year many Indian as well foreign tourists visit this monument. According to the figures given by Archaeological Survey of India (ASI), during the year 2009-10, 9,28,387 tourists visited this monument. The number of Indian nationals visiting this monument was 9,00,483 while the number of foreign nationals visiting the monument was 27,904.

In the year 2010-11 the figure of total number of tourists visiting this monument was 12,17,883. The number of Indian nationals was 11,85,607 while the foreign nationals accounted for 32,276.

Since there was growth in the number of tourists visiting the monument, it had continued to be the place of tourist attraction. In the year 2011-12, 13,64,460 tourists visited this monument. The number of Indian nationals visiting the monument was 13,30,506 and the number of foreign nationals visiting the monument was 33,954.

In the year 2012-13 it had continued to be the tourist attraction place. In comparison with last year it is seen that tourist number is increased by approximately 2,00,000. The total tourist number was 15,62,802. The number of Indian nationals visiting the monument was 15,26,717 and the number of foreign nationals visiting the monument was 36,085.

In the year 2013-14, total 13,70,314 tourists visited Ellora caves. In this Indian nationals accounted for 13,41,482 while foreign national figure touched a low at 28,832.

**Conclusion:**

- A great increase is witnessed in the number of Indian and foreign national tourists to the Ellora caves in four years from 2009-10 to 2012-13. While year 2013-14 witnessed a great decrease in the number of Indian and foreign tourists to the caves.
- By comparing the figure of 2009-10, we can conclude that in the year 2010-11 the number of tourists visiting this monument is increased by 2,89,496.
- In the preceding year 2013-14 we can see a great decrease in the number of tourists visiting Ellora caves compared to previous year. Out of this figure, number of Indian tourists are found decreased by nearly 1.75 lakhs which is great. In this year only 13,41,482 Indian nationals visited the caves. At the same time this year also observed a drop of seven thousand number of foreign national tourists to the caves. It pegged at 28,832 only.

**References:**

1. *Archaeological Survey of India, (ASI), Aurangabad*
2. *https://en.m.wikipedia.org/wiki/Ellora_Caves.*
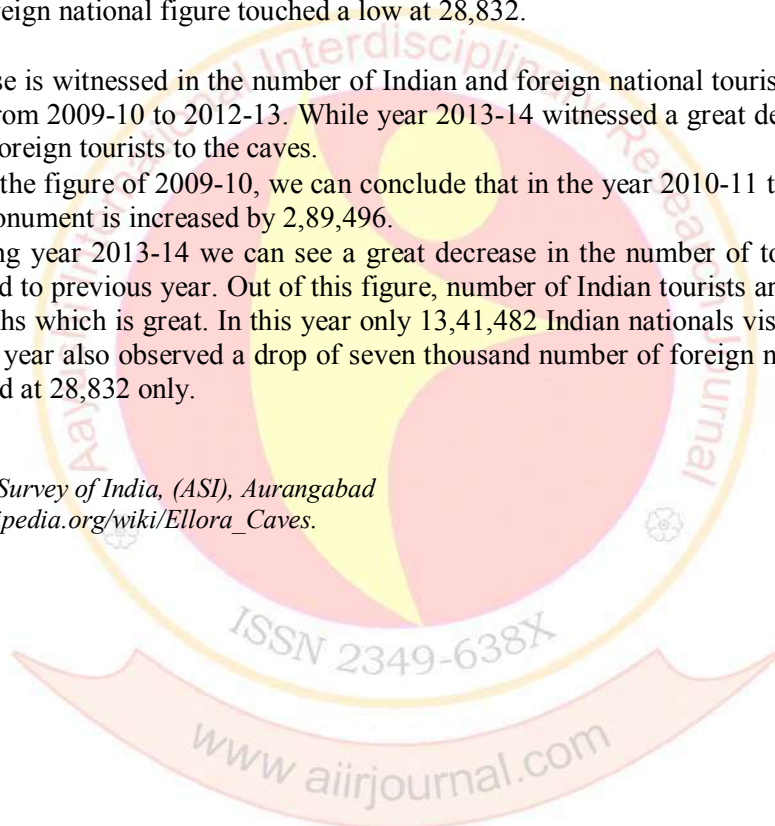
# An Empirical Study on Environmental Issues in India

**Dr. Arun Keshavrao Hange**
Head, Department of Geography,
Shivaji Mahavidyalaya, Renapur Dist. Latur.

**Introduction:**

The word "Environment" is most commonly used to describe "natural" environment and means the sum of all living and non-living things that surround an organism, or group of organisms. Environment includes all elements, factors, and conditions that have some impact on growth and development of certain organism. The environmental issues in India become more serious every day and she is turning into a bit of a mess on this front but with a serious lack of education and over 1 Billion people, a huge amount of which are in dire poverty, it's hardly surprising. The recent boom in its industries, little or no environmental education, infrastructure nearly at bursting point not to mention the huge deforestation that's going on.. In fact, there is no shortage at all of government legislation protecting the environment but unfortunately it is never enforced due to flagrant abuse of power, corruption and lack of resources. One of the critical ecological problems is the global warming that caused by large emissions of carbon dioxide in atmosphere by cars, airplanes, fabrics all over the world.

## 1. The Major Environmental Issues in India:

The rapid growing population and economic development is leading to a number of environmental issues in India. It is estimated that the country's population will increase to about 1.26 billion by the year 2016. Major Environmental issues are Forest and Agricultural land degradation. Resource depletion (water, mineral, forest, sand, rocks etc.,) Environmental degradation. Public Health, Loss of Biodiversity, Livelihood Security for the Poor. Population The four basic demographic factors of births, deaths, migration and immigration produce changes in population size, composition, distribution and these changes raise a number of important questions of cause and effect. Population growth and economic development are contributing to many serious environmental calamities in India. These include heavy pressure on land, land degradation, forests, habitat destruction and loss of biodiversity. Changing consumption pattern has led to rising demand for energy. The final outcomes of this are air pollution, global warming, climate change, water scarcity and water pollution.

## 2. Forest and agricultural land degradation:

Forest and agricultural land degradation an estimated 60% of cultivated land suffers from soil erosion, water logging, and salinity. It is also estimated that between 4.7 and 12 billion tons of topsoil are lost annually from soil erosion.. From 1947 to 2002, average annual per capita water availability declined by almost 70% to 1,822 cubic meters, Overexploitation of groundwater is problematic in the states of Haryana, Punjab, and Uttar Pradesh. The Indian Agricultural Research Institute has estimated that a 3 °C rise in temperature will result in a 15 to 20% loss in annual wheat yields. These are substantial problems for a nation with such a large population depending on the productivity of primary resources and whose economic growth relies heavily on industrial growth. Forest area covers 18.34% of India's geographic area (637000 km²). Nearly half of the country's forest cover is found in the state of Madhya Pradesh (20.7%) and t he seven states of the northeast (25.7%) ; the latter is experiencing net forest loss Forest cover is declining because of harvesting for fuel wood and the expansion of agricultural land. These trends, combined with increasing industrial and motor vehicle pollution output, have led to atmospheric temperature increases, shifting precipitation patterns.

## 3. Pollution:

**i. Air pollution:**

Indian cities are polluted by vehicles and industry emissions. Road dust due to vehicles also contributing up to 33% of air Pollution In cities like Bangalore around 50% of children suffer from asthma One of the biggest causes of air pollution in India is from the Transport system. It also appeared that the excessive pollution was having an adverse effect on the Taj Mahal. After a court ruling all transport in the area was shut down shortly followed by the closure of all industrial factories in the area. The air pollution in the big cities is rising to such an extent that it is now 2.3 higher than the amount recommended by **WHO** (world health organization). On the positive side, the government appears to have noticed this massive problem and the associated health risks for its people and is slowly but surely taking steps. The first of which was in 2001 when it ruled that its entire public transport system, excluding the trains, be converted from diesel to compressed gas (CPG).

**ii. Water pollution:**

Water pollution Out of India's 3,119 towns and cities, just 209 have partial treatment facilities, and only 8 have full wastewater treatment facilities 114 cities dump untreated sewage and partially cremated

bodies directly into the Ganges River. Downstream, the untreated water is used for drinking, bathing, and washing. This situation is typical of many rivers in India as well as other developing countries.

### iii. Noise pollution:

Noise pollution The Supreme Court of India gave a significant verdict on noise pollution in 2005. Unnecessary honking of vehicles makes for a high decibel level of noise in cities. The use of loudspeakers for political purposes and by temples and mosques make for noise pollution in residential areas. Recently Government of India has set up norms of permissible noise levels in urban and rural areas. How they will be monitored and implemented is still not sure.

### iv. Land pollution:

Land pollution Land pollution in India is due to pesticides and fertilizers as well as corrosion. In March 2009, the issue of Uranium poisoning in Punjab came into light, caused by fly ash ponds of thermal power stations, which reportedly lead to severe birth defects in children in the Faridkot and Bhatinda districts of Punjab Although the British started deforestation in India, the pressures to modernize since the partition of 1947 have only increased the rates of deforestation, which causes soil erosion which leads to Land Pollution.

### Biodiversity conservation in india:

Biodiversity conservation in India lying within the Indomalaya ecozone, hosts significant biodiversity. It is home to 7.6% of all mammalian, 12.6% of avian, 6.2% of reptilian, and 6.0% of flowering plant species. In recent decades, human encroachment has posed a threat to India's wildlife In response, the system of national parks and protected areas, first established in 1935, was substantially Expanded. In 1972, India enacted the Wildlife Protection Act and Project Tiger to safeguard crucial habitat; further federal protections were promulgated in the 1980s. Along with over 500 wildlife sanctuaries, India now hosts 14 biosphere reserves, four of which are part of the World Network of Biosphere Reserves. 25 wetlands are registered under the Ramsar Convention.

### 4. Fundamental Duties of the citizens of India with respect to the environment:

Fundamental Duties of the citizens of India with respect to the environment

Clause (g) of Article 51 A 2 (g)1 Clause (g) provides that it shall be the duty of every citizen of India - *to protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures*.

Clause 2(g)4 Provides that- Earth is the common heritage of man and animals. We have no right to annihilate or drive away from their territory or natural habitat the wild denizens. Ancient Indian thought talks of Sarvesham Shantir bhavatu (peace unto all living beings and entire environment) or Ahimsa paramodharma. Ahimsa paramo tapah (non-violence is the greatest duty and the greatest penance

Clause 2(g)5 Provides that - The Environment (Protection) Act, 1986, is an important step in that direction. The range of its provisions and the far-reaching measures that can be undertaken through statutory rules and orders that can be issued under the Act, show that the duty to protect and improve the natural environment has been spelt out quite elaborately in our law.

### 5. Environmental Protection Acts:

Environment (Protection) Act, 1986 Objective To provide the protection and improvement of environment. To make rules to regulate environmental pollution; To notify standards and maximum limits of pollutants of air, water, and soil for various areas and purposes; Prohibition and restriction on the handling of hazardous substances, and location of industries or with fine which may extend Whoever Person found to be the cause of pollution, may be liable for punishment for a term which may extend to five years to one lakh rupees or both (Sec 15, 16, 17) If not comply fine of Rs. 5000 per day extra, still if not comply for more than one year, then imprisonment may extend up to 7 years.

### 6. Forest and Wildlife Protection Act:

Forest and Wildlife Protection Act. 1927 –The Indian Forest Act and Amendment 1984; 1972 – The Wildlife Protection Act Rules 1973 and Amendment 1991 1980 – The Forest (Conservation) Act and Rules, 1981

WATER 1882 – The Easement Act. 1897 – The Indian Fisheries Act. 1956 – The River Boards Act. 1970 – The Merchant Shipping Act. 1974 – The Water (Prevention and Control of Pollution) Act. 1991 – The Coastal Regulation Zone Notification.

### 7. The Air (Prevention and Control of Pollution) Act:

The Air (Prevention and Control of Pollution) Act The Factories Act and Amendment in 1987 1981 – The Air (Prevention and Control of Pollution)Act 1982 –The Air(Prevention and Control of Pollution) Rules 1982 – The Atomic Energy Act 1987 – The Air (Prevention and Control of Pollution) Amendment Act 1988- The Motor Vehicles.

## 8. The Bhopal Gas Tragedy:

The Bhopal Gas Tragedy the Bhopal disaster is the world's worst industrial catastrophe. It occurred on the night of December 2–3, 1984 at the Union Carbide India Limited (UCIL) pesticide plant in Bhopal, Madhya Pradesh. A leak of methyl isocyanate gas and other chemicals from the plant resulted in the exposure of hundreds of thousands of people. A government affidavit in 2006 stated the leak caused 558,125 injuries including 38,478 temporary partial and approximately 3,900 severely and permanently disabling injuries and the estimated death was 15,000

Environmental rehabilitation after Bhopal Gas Tragedy. When the factory was closed in 1985 – 1986, pipes, drums and tanks were cleaned and sold. The area around the plant was used as a dumping area for hazardous chemicals. Reported polluting compounds include naphthol, naphthalene, Sevin , chromium, lead, hexachloroethane, hexachlorobutadiene. In order to provide safe drinking water to the population around the UCC factory, there is a scheme for improvement of water supply. [34] In December 2008, the Madhya Pradesh High Court decided that the toxic waste should be incinerated at Ankleshwar in Gujarat

Lavasa– A hill city or a controversial city? Lavasa City, Lavasa is India's first hill city since Independence. The First controversial issue is about the environmental impact. State government has granted clearance to this project which will have adverse impact on the biodiversity and which is violation of environmental laws. If the water from Varasgaon Dam is diverted to Lavasa, it will result in problems in water supply to Pune city. On January 19, 2011, the Indian ministry of environment and forest ruled Lavasa hill-city as illegal, because of environmental issues. It is very close to Pune and Mumbai. it is 50 km away from Pune and 180 km away from Mumbai

Second Issue involved here is – Clearances which the Lavasa Corporation got during the period 2002-2004 because of the shares held by daughter, son-in-law and close associates of Sharad Pawar. The Lavasa project issue is a clear example of dirty politics. It clearly shows that some politicians have no concern for the environment, people and country; they are only concerned about.

## References:

1. Agrawal, Pradeep, (2015), "The role of exports in India's economic growth," Journal of International Trade & Economic Development
2. Agrawal, Pravin; Alok, Kumar; S.S. Hooda; N.R. Sudheendra; and A, Santhamani,(2010), "Anthropogenic carbon emissions in India: An econometric analysis
3. Agrawal, Arun, (2005), "Environmentality," Current Anthropology
4. "Environmental laws of India," C.P.R. Environmental Education Center,
5. www.cpreec.org (accessed May, 2015).
6. "Environmental Overview: Global Environmental Concepts", Sweden Review, 2010. Country Watch.
7. Khan, M.A., (2001), "Pollution of water resources due to industrialization in aid zone of Rajasthan, India," Journal of Environmental Sciences,
8. Ram Kumar, (2014), Comments on the Indian environmental issues.

# Planning and Managing of Natural Resources

**Dr. Anand Walankikar**
V.D.M.D.College,
Degloor, Dist-Nanded.

**Abstract:**

*Knowledge is a valuable resource in the development of natural resource management (NRM) strategies. However, available knowledge is often under-utilized, particularly that knowledge not created by science. Planning and managing the use of natural resources is a complex process which requires taking decisions that inevitably involve several objectives of an economic, environmental and social nature. Natural resources management typically requires prediction of environmental changes over large areas or long time periods. In the case of forest management, for example, decisions can affect timber production, water catchment properties, recreational values, aesthetic values, energy usage, or employment opportunities. Collaborative approaches to natural resource management are being promoted as promising ways to deal with complex and contentious natural resource issues. The National Park Service and the National Conservation and Park Association have recently adopted collaboration as a strategy for promoting racial and ethnic diversity in park planning, outdoor recreation, and environmental conservation education. This Research paper throws light on how natural resources can be managed using traditional technology along with emphasizing on the various approaches to Natural Resource Management in the modern context.*

**Keywords:** natural resource management, strategies, collaborative approaches, Adaptive Management

## Introduction:

Natural resource management issues are inherently complex as they involve the ecological cycles, hydrological cycles, climate, animals, plants and geography etc. All these are dynamic and inter-related. A change in one of them may have far reaching and/or long term impacts which may even be irreversible. In addition to the natural systems, natural resource management also has to manage various stakeholders and their interests, policies, politics, geographical boundaries, economic implications and the list goes on. It is very difficult to satisfy all aspects at the same time. This results in conflicting situations.

Planning and managing the use of natural resources is a complex process which requires taking decisions that inevitably involve several objectives of an economic, environmental and social nature. Natural resources management typically requires prediction of environmental changes over large areas or long time periods. In the case of forest management, for example, decisions can affect timber production, water catchment properties, recreational values, aesthetic values, energy usage, or employment opportunities.

Collaborative approaches to natural resource management are being promoted as promising ways to deal with complex and contentious natural resource issues (Conley & Mootie, 2003). The National Park Service and the National Conservation and Park Association have recently adopted collaboration as a strategy for promoting racial and ethnic diversity in park planning, outdoor recreation, and environmental conservation education.

After the United Nations Conference for the Environment and Development (UNCED) held in Rio de Janeiro in 1992, most nations subscribed to new principles for the integrated management of land, water, and forests. Although program names vary from nation to nation, all express similar aims.

## Meaning of Natural Resource Management:

'***Natural resource management'*** refers to the management of natural resources such as land, water, soil, plants and animals, with a particular focus on how management affects the quality of life for both present and future generations.

Natural resource management deals with managing the way in which people and natural landscapes interact. It brings together land planning, water management, biodiversity conservation, and the future sustainability of industries like agriculture, mining, tourism, fisheries and forestry. It recognizes that people and their livelihoods rely on the health and productivity of our landscapes, and their actions as stewards of the land, play a critical role in maintaining this health and productivity.

Natural resource management is also congruent with the concept of sustainable development, a scientific principle that forms a basis for sustainable global land management and environmental governance to conserve and preserve natural resources.

Natural resource management specifically focuses on a scientific and technical understanding of resources and ecology and the life-supporting capacity of those resources. In academic contexts, the sociology of natural resources is closely related to, but distinct from, natural resource management.

## Natural Resource Management Approaches:

Natural resource management approaches can be categorized according to the kind and right of stakeholders, natural resources:

- State Property Regime
- Private Property Regime
- Common Property Regime
- Non-property Regimes (open access)
- Hybrid Regimes

## State Property Regime

Ownership and control over the use of resources is in hands of the state. Individuals or groups may be able to make use of the resources, but only at the permission of the state. National forest, National parks and military reservations are some US examples. Water access entitlements are an example from Australia.

## Private Property Regime

Any property owned by a defined individual or corporate entity. Both the benefit and duties to the resources fall to the owner(s). Private land is the most common example.

## Common Property Regimes

It is a private property of a group. The group may vary in size, nature and internal structure e.g. indigenous tribe, neighbours of village. Some examples of common property are community forests and water resources.

## Non-property Regimes (open access)

There is no definite owner of these properties. Each potential user has equal ability to use it as they wish. These areas are the most exploited. It is said that "Everybody's property is nobody's property". An example is a lake fishery. This ownership regime is often linked to the tragedy of the commons.

## Hybrid Regimes

Many ownership regimes governing natural resources will contain parts of more than one of the regimes described above, so natural resource managers need to consider the impact of hybrid regimes. An example of such a hybrid is native vegetation management in NSW, Australia, where legislation recognizes a public interest in the preservation of native vegetation, but where most native vegetation exists on private land.

## Some other Management Approaches

The various approaches applied to natural resource management include:

- Top-down or Command and control
- Bottom-Up (regional or community based NRM)
- Adaptive management
- Precautionary approach
- Integrated approach (INRM)

## Regional or Community Based NRM:

The community based NRM approach combines conservation objectives with the generation of economic benefits for rural communities. The three key assumptions being that: locals are better placed to conserve natural resources, people will conserve a resource only if benefits exceed the costs of conservation, and people will conserve a resource that is linked directly to their quality of life. When a local people's quality of life is enhanced, their efforts and commitment to ensure the future well-being of the resource are also enhanced  Regional and community based natural resource management is also based on the principle of subsidiarity.

The United Nations advocate community based NRM in the Convention on Biodiversity and the Convention to Combat Desertification. Unless clearly defined, decentralized NRM can result an ambiguous socio-legal environment with local communities racing to exploit natural resources while they can e.g. forest communities in central Kalimantan (Indonesia).

A problem of community based NRM is the difficulty of reconciling and harmonizing the objectives of socioeconomic development, biodiversity protection and sustainable resource utilization. The concept and conflicting interests of community based NRM, show how the motives behind the participation are differentiated as either people-centered (active or participatory results that are truly empowering) or planner-centered (nominal and results in passive recipients). Understanding power relations is crucial to the success of community based NRM. Locals may be reluctant to challenge government recommendations for fear of losing promised benefits.

Community based NRM is based particularly on advocacy by nongovernmental organizations working with local groups and communities, on the one hand, and national and transnational organizations, on the other, to build and extend new versions of environmental and social advocacy that link social justice and

environmental management agendas with both direct and indirect benefits observed including a share of revenues, employment, diversification of livelihoods and increased pride and identity. CBNRM has raised new challenges, as concepts of community, territory, conservation, and indigenous are worked into politically varied plans and programs in disparate sites. Warner and Jones address strategies for effectively managing conflict in CBNRM.

The capacity of indigenous communities to conserve natural resources has been acknowledged by the Australian Government with the Caring for Country Program. Caring for our Country is an Australian Government initiative jointly administered by the Australian Government Department of Agriculture, Fisheries and Forestry and the Department of the Environment, Water, Heritage and the Arts. These Departments share responsibility for delivery of the Australian Government's environment and sustainable agriculture programs, which have traditionally been broadly referred to under the banner of 'natural resource management'.

These programs have been delivered regionally, through 56 State government bodies, successfully allowing regional communities to decide the natural resource priorities for their regions.

Governance is seen as a key consideration for delivering community-based or regional natural resource management. In the State of NSW, the 13 catchment management authorities (CMAs) are overseen by the Natural Resources Commission (NRC), responsible for undertaking audits of the effectiveness of regional natural resource management programs.

**Adaptive Management:**

The primary methodological approach adopted by catchment management authorities (CMAs) for regional natural resource management in Australia is adaptive management.

This approach includes recognition that adaption occurs through a process of 'plan-do-review-act'. It also recognizes seven key components that should be considered for quality natural resource management practice:

- Determination of scale
- Collection and use of knowledge
- Information management
- Monitoring and evaluation
- Risk management
- Community engagement
- Opportunities for collaboration.

**Integrated natural resource management (INRM)**

A process of managing natural resources in a systematic way, which includes multiple aspects of natural resource use (biophysical, socio-political, and economic) meet production goals of producers and other direct users (e.g., food security, profitability, risk aversion) as well as goals of the wider community (e.g., poverty alleviation, welfare of future generations, environmental conservation). It focuses on sustainability and at the same time tries to incorporate all possible stakeholders from the planning level itself, reducing possible future conflicts. The conceptual basis of INRM has evolved in recent years through the convergence of research in diverse areas such as sustainable land use, participatory planning, integrated watershed management, and adaptive management.INRM is being used extensively and been successful in regional and community based natural management.

**Frameworks and Modeling:**

There are various frameworks and computer models developed to assist natural resource management.

**Geographic Information Systems (GIS)**

GIS is a powerful analytical tool as it is capable of overlaying datasets to identify links. A bush regeneration scheme can be informed by the overlay of rainfall, cleared land and erosion.Australia, Metadata Directories such as NDAR provide data on Australian natural resources such as vegetation, fisheries, soils and water. These are limited by the potential for subjective input and data manipulation.

*Other elements of Natural Resource Management*

**Biodiversity Conservation:**

The issue of biodiversity conservation is regarded as an important element in natural resource management. What is biodiversity? Biodiversity is a comprehensive concept, which is a description of the extent of natural diversity. Gaston and Spicerpoint out that biodiversity is "the variety of life" and relate to different kinds of "biodiversity organization". According to Gray, the first widespread use of the definition of biodiversity, was put forward by the United Nations in 1992, involving different aspects of biological diversity.

**Precautionary Biodiversity Management**

The "threats" wreaking havoc on biodiversity include; habitat fragmentation, putting a strain on the already stretched biological resources; forest deterioration and deforestation; the invasion of "alien species" and "climate change". Since these threats have received increasing attention from environmentalists and the public, the precautionary management of biodiversity becomes an important part of natural resources management. According to Cooney, there are material measures to carry out precautionary management of biodiversity in natural resource management.

**Concrete "policy tools"**

Cooney claims that the policy making is dependent on "evidences", relating to "high standard of proof", the forbidding of special "activities" and "information and monitoring requirements". Before making the policy of precaution, categorical evidence is needed. When the potential menace of "activities" is regarded as a critical and "irreversible" endangerment, these "activities" should be forbidden. For example, since explosives and toxicants will have serious consequences to endanger human and natural environment, the South Africa Marine Living Resources Act promulgated a series of policies on completely forbidding to "catch fish" by using explosives and toxicants.

**Administration and guidelines**

According to Cooney, there are 4 methods to manage the precaution of biodiversity in natural resources management;

1."Ecosystem based Management" including "more risk-averse and precautionary management",where "given prevailing uncertainty regarding ecosystem structure, function, and inter-specific interactions, precaution demands an ecosystem rather than single-species approach to management".

2."Adaptive management" is "a management approach that expressly tackles the uncertainty and dynamism of complex systems".

3."Environmental impact assessment" and exposure ratings decrease the "uncertainties" of precaution, even though it has deficiencies, and

4."Protectionist approaches", which "most frequently links to" biodiversity conservation in natural resources management.

**Land management:**

In order to have a sustainable environment, understanding and using appropriate management strategies is important. In terms of understanding, Young[50]emphasises some important points of land management:

- Comprehending the processes of nature including ecosystem, water, soils
- Using appropriate and adapting management systems in local situations
- Cooperation between scientists that have knowledge and resources and local people that have knowledge and skills

Dale et al. (2000) study has shown that there are five fundamental and helpful ecological principles for the land manager and people who need them. The ecological principles relate to time, place, species, disturbance and the landscape and they interact in many ways.It is suggested that land managers could follow these guidelines:

- Examine impacts of local decisions in a regional context.
- Plan for long-term change and unexpected events.
- Preserve rare landscape elements and associated species.
- Avoid land uses that delete natural resources.
- Retain large contiguous or connected areas that contain critical habitats.
- Minimize the introduction and spread of non-native species.
- Avoid or compensate for the effects of development on ecological processes.
- Implement land-use and land-management practices that are compatible with the natural potential of the area.

**Conclusion:**

Sustainable management of natural resources is vital as agricultural development with positive growth and long term sustainability cannot thrive on a deteriorating natural resource base. We are today; confronted with widespread land degradation, ground water imbalances, impaired soil health and contamination of food and environmental pollution etc. The situation is getting further compounded with the recent climate change impacts on agriculture. Natural Resources form the 'core' source of livelihood. The ecological management of natural resources has been the underlying factor contributing towards a dignified, locally appropriate and ecologically sustainable lifestyle among societies. Natural resources with favourable conditions can generate

required abilities and assets for outcome of desired livelihood security options at the household, community and village levels. In the recent past, a series of changes (at local, regional, national and global levels) in socio-economic and environmental conditions have increasingly affected the nature, status and conditions of the natural resources – the 'core' source of livelihood. These have significantly affected the fabric of sustainability of livelihood.

**References:**
1. *Clarkson, M.B.E. (1995). A stakeholder framework for analyzing and evaluating corporate social performance. Academy of Management Review, vol. 20, Issue. 1, pp. 92–117*
2. *Freeman, E.R. (1999). The politics of stakeholder theory: some further research directions. Business Ethics Quartley, vol. 4, Issue. 4, pp. 409–421*
3. *Grimble, R. (1998). Stakeholder methodologies in natural resource management, Socioeconomic Methodologies. Chatham: Natural Resources Institute, pp. 1-12*
4. *Grimble, R., Wellard, K. (1997). Stakeholder methodologies in natural resource management: a review of principles, contexts, experiences and opportunities. Agricultural Systems, vol. 55, Issue. 2, pp. 173–193*
5. *Narayana, V.V and Rambabu. 1982. Estimation of soil erosion in India. Journal of irrigation and drainage engineering.*
6. *Sarin, Madhu and RenuKhanna. 1991. Wasteland development by a women's group: a case study. New Delhi: ILO.*
7. *Sharma J.P. and B.P. Sinha. 1993. Traditional wisdom of hill farmers of Uttarkashi. National Seminar on Indigenous Technology for Sustainable Agriculture.*
8. *Shiva, Vandana. 1988. Women and environment: case studies from selected villages of Orissa.*
    ***Websites***
1. *http://en.wikipedia.org/wiki/Natural_resource_management*
2. *http://planningcommission.nic.in/aboutus/committee/wrkgrp11/wg11_agnrm.pdf*
3. *http://www.pradan.net/index.php?option=com_content&task=view&id=39&Itemid=25*
4. *Newhttp://ignca.nic.in/cd_07006.htm*
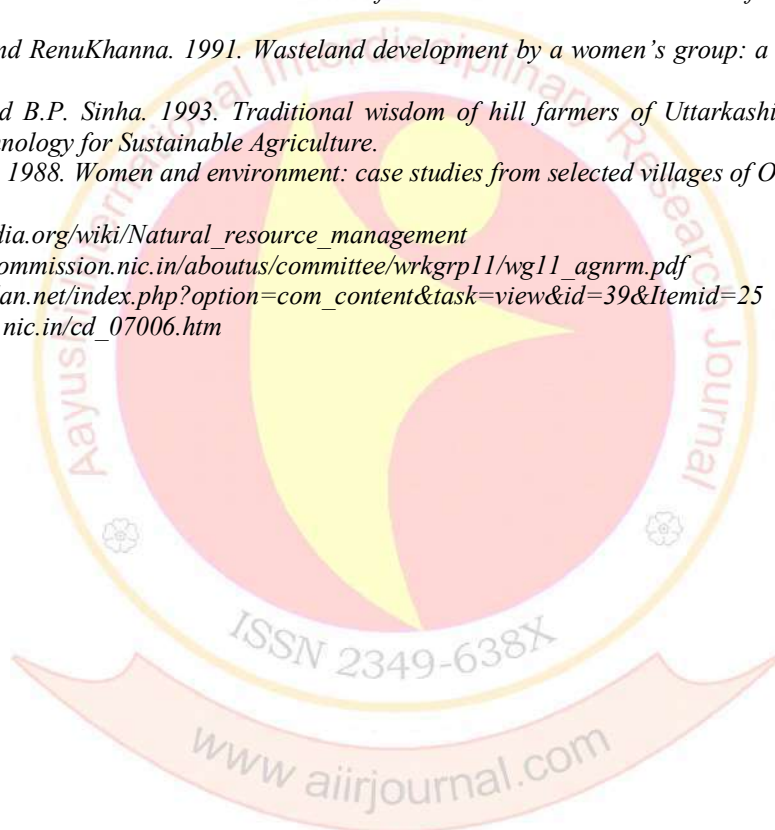
# Spatio-Temporal Pattern of Sex Ratio in Maharashtra

**Dr. Arjun Nanaware**
Dept. of Geography & Research center,
Shri Shivaji Mahavidyalaya, Barshi, Dist. Solapur. (MS)

**Abstract:**

  *Geography of population was concerned with demonstrating how spatial variations in distribution, composition, migration and growth are related to the spatial variation in the nature of places. Sex ratio is an important aspect of geography. In India, the sex ratio is expressed in terms of number of females per thousand males. The sex ratio is a function of three basic factors, i.e. sex ratio at birth, differentials in mortality between sexes at different stages of life and sex selective migration. Sex ratio is an important demographic indicator reflecting the socio-economic structure of any society. The balance between the two sexes affects the social and economic relationship within a community. The ratio of male and female of the study region play very important role of economic development therefore an attempt is made here to analyse the spatio-temporal pattern of sex ratio in Maharashtra state. The paper is based on the Secondary Sources. To analyse spatio-temporal pattern of sex ratio the district of Maharashtra are grouped into four categories on the basis Mean and Standard deviation. The study reveals that the very high sex ratio in Ratnagiri, Sindhudurg district is mainly due to the male selective emigration because of adverse geographical factors i.e. rugged topography, heavy rainfall, more area under dense forest, inferior soil leads to lower development of human activities and problem of unemployment.*

**Key wards:** pattern, Sex ratio, Mean, Standard deviation.

**Introduction:**

  Traditionally, Geography has been concerned with man-environment relationship. Population Geography is one of the modern branches of Geography. Although, geographers have long been interested in population, as part of their general enquiries into regional studies with a focus on spatial distribution.' According to John I. Clarke (1965), geography of population was concerned with demonstrating how spatial variations in distribution, composition, migration and growth are related to the spatial variation in the nature of places. Sex ratio is an important aspect of geography. Sex ratio is the just ratio of male and female in total population. The concept of sex ratio is not in uniform all over the world and calculated differently in different countries the sex ratio is expressed in terms of number of males per hundred females, in U.S.A. the sex ratio is expressed in terms of number of females per hundred males in New Zealand. In India, however, the sex ratio is expressed in terms of number of females per thousand males (Roy, 2015). The sex ratio is a function of three basic factors, i.e. sex ratio at birth, differentials in mortality between sexes at different stages of life and sex selective migration (Clarke, 1960). The migration rate and occupational structure exerts influence on sex ratio, in its own turn, sex ratio has a profound effect on other demographic element like growth of population, marriage rates, occupational structure, etc. (Shyrock, 1976).Many socio-economic relationships intimately related to the balance between the number of males and females (Trewartha, 1969). In view of the partly contrasting and partly complementary roles of the two sexes in the economy and society. Sex ratio is an important demographic indicator reflecting the socio-economic structure of any society. It is one of the best indicators of status of women in the society. Sex ratio is an index of the socio-economic conditions prevailing in an area and is a useful tool for regional analysis (Faranklin, 1956). Sex ratio of human population is one of the basic demographic characteristic, which is extremely vital for any Meaningful demographic analysis. It is an index of existing socio-economic conditions of a female in any region.The knowledge of sex ratio is essential for understanding the employment and consumption patterns and social needs of a community (Trewartha, 1953). The separate data for male and female are important for various types of planning and for the analysis of other demographic characteristics, such as natality, mortality, migration, marital status and economic etc. The balance between the two sexes affects the social and economic relationship within a community (Nandihalli and Hurakadli, 2014).The proportions of men and women in total of a society have essential bearings in as far as it affects the labour provides through marriage and fecundity. The ratio of male and female of the study region play very important role of economic development therefore an attempt is made here to analyse the spatio-temporal pattern of sex ratio in Maharashtra state.

**The Study Area:**

  The Maharashtra lies in Southern part of India, which is a one of the advance States in the country. Absolute location of State is $17^0$ 45' to $21^0$ 6' North Latitude and $72^0$ 16' to $72^0$ 36' East longitudes.

  The adjoining States are Gujarat and Madhya Pradesh to it's North, Chhattishgarh to it's East, Andra Pradesh , Karnataka and Goa to it's south, Arebian sea to it's Weast. The State is divided into 35 districts for administrative purpose. The geographical area of State is 307762 square Kilo meters, and it ranks fifth in area

in the country. Out of total geographical area 92 per cent is under cultivation. The Maharashtra state has three brad physical divisions i.e. The Konkan Coast land, Westwrn Ghat and Plateau region. The Kokan coast land is characterized by rocky headlines and small crescent- shaped beaches. It is intersected by creeks and rivers. Western ghat runs a long chain of lofty hills for a stretch of 400 Kilometers. These have average elevation of about 800 to 1300 meters above Mean sea level. The Plateau region has average height about 900 meters. The elevation of central portion is in between 300 to 400 meters (Sharama, 2004). The State has wet and warm climate in western part, hot and dry climate in remaining part with an average annual rainfall ranging from 400 to 6000 mm. The population of state is 115997674. The occupational structure of state indicates that the agriculture is the main occupation of people in the State.          **Figure-1**


LOCATION MAP OF MAHARASHTRA STATE
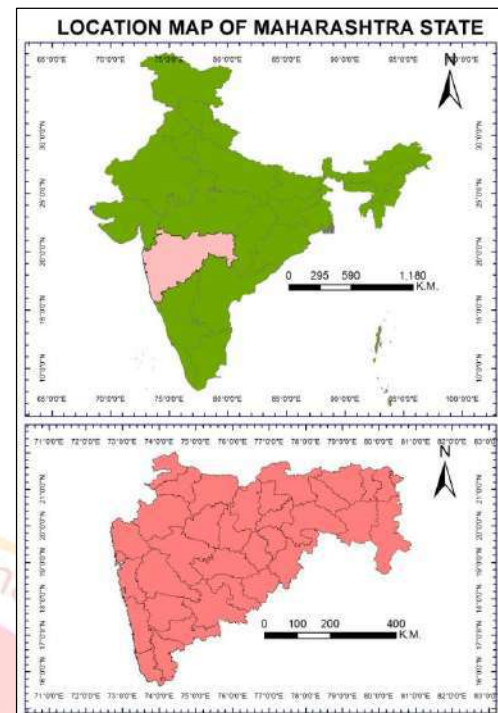
## Objectives:

The main objective of this paper is to analyse spatio-temporal pattern of sex ratio in Maharashtra state.

## Data collection and Methodology:

In order to meet these objectives the relevant information and data regarding male and female collected and used for the year of 1991 to 2011 are based on the secondary Sources. Information and data was collected from census of India 2011 and SRS Bulletin Register General of India, Vital statistical Division, West Block 1, 2nd floor, R. k. Puram, New Delhi-110066 ISSN 0971-3549

Collected rough data are processed. To calculate sex ratio the following formula is used.

$$\text{Sex ratio} = \frac{\text{Number of females}}{\text{Number of males}} \times 1000$$

To analyse spatio-temporal pattern of sex ratio in Maharashtra, the districts of Maharashtra are grouped into four categories on the basis of Mean and Standard deviation. On the basis of above quantitative techniques the result and conclusions are drawn

## Discussion:

### Spatial Pattern of Sex Ratio 1991

The table no 1 indicates that the state as a whole has 960 sex ratio in 1991 but spatial distribution varies from district to district ranging from 818 to 1205 female per 1000 males.

### District with Very High Sex Ratio:

Districts which have above Mean plus two Standard deviation sex ratio i.e. > 1096 are included in very high sex ratio category. The table no 1 indicates that the very high sex ratio is found in the districts of Ratanagiri, Sindhudurg and Satara in 1991due to the selective male emigration because of adverse geographical factors i.e. rugged topography, heavy rainfall, more area under dense forest, lower percentage of fertile soil leads to lower development of human activities and problem of unemployment.

### Districts with High Sex ratio:

Districts which have above Mean to Mean plus one Standard deviation sex ratio i.e. ranging from 960 to 1028 are included in high sex ratio category and it is recorded in the district of Kolhpur, Gadchiroli Bhandara and Raigarh in 1991. It is high in Kolhapur district because of western part of Kolhapur district and Easten part of Raigarh district lies in Western Ghat which have very uneven topography, high rainfall, dense forest leads to emigration of males, while it is high in Gadchiroli mainly due to dense forest, hilly area in eastern part, inferior soil, lower development of irrigation facility leads to lower literacy and traditional society having gender equity resulted into emigration of males in search of job.

### Districts with Moderate Sex ratio:

Districts which have Mean minus one Standard deviation to Mean sex ratio i.e. ranging from > 892 to 960 are included in moderate sex ratio region. The moderate sex ratio is found in the districts of Nagpur, Aurangabad, Pune, Solapur, Amravati, Osmanabad, Akola, Wardha, Jalagaon, Nashik, Lature, Beed, Naded, Chandrapure, Yavatmal, Buldhana, Parbhani, Dhule, Jalana and Sangli in 1991.

### Districts with Low Sex ratio:

Districts which have below Mean minus 1 Standard deviation sex ratio value i.e. < 892 are included in this category. The table No.1 exhibits that the low sex ratio

## Table No. 1 Sex Ratio in Maharashtra during in 991 and 2011.

| Districts | Sex Ratio 1991 | Sex Ratio 2011 | Change in sex ratio 1991-2011 |
|---|---|---|---|
| Nandurbar | NA | 978 | - |
| Dhule | 958 | 946 | -12 |
| Jalgaon | 940 | 925 | -15 |
| Buldana | 953 | 934 | -19 |
| Akola | 939 | 946 | 7 |
| Washim | NA | 930 | - |
| Amravati | 936 | 951 | 15 |
| Wardha | 939 | 946 | 7 |
| Nagpur | 922 | 951 | 29 |
| Bhandara | 988 | 982 | -6 |
| Gondiya | NA | 999 | - |
| Gadchiroli | 976 | 982 | 6 |
| Chandrapur | 948 | 961 | 13 |
| Yavatmal | 951 | 952 | 1 |
| Nanded | 945 | 943 | -2 |
| Hingoli | NA | 942 | - |
| Parbhani | 953 | 947 | -6 |
| Jalna | 958 | 937 | -21 |
| Aurangabad | 922 | 923 | 1 |
| Nashik | 940 | 934 | -6 |
| Thane | 879 | 886 | 7 |
| Mumbai Suburban | NA | 860 | - |
| Mumbai | 818 | 832 | 14 |
| Raigarh | 1010 | 959 | -51 |
| Pune | 933 | 915 | -18 |
| Ahmadnagar | 949 | 939 | -10 |
| Beed | 944 | 916 | -28 |
| Latur | 942 | 928 | -14 |
| Osmanabad | 937 | 924 | -13 |
| Solapur | 934 | 938 | 4 |
| Satara | 1029 | 988 | -41 |
| Ratnagiri | 1205 | 1122 | -83 |
| Sindhudurg | 1137 | 1036 | -101 |
| Kolhapur | 961 | 957 | -4 |
| Sangli | 958 | 966 | 8 |
| Mean | 960.13 | 946.97 | -13.16 |
| SD | 68.16 | 47.87 | - |

*Source: Compiled by authors on the basis of census of India1991, 2011 and SRS Bulletin Register General of India, Vital statistical Division.*

is found in Thane and Mumbai due to the selective male immigration for job because high industrial development, higher education facility, transportation development, communication and trade development, which act as pull factors of immigration.

**Spatial Pattern of Sex Ratio In 2011**

The table no 1 indicates that the state as a whole has 947 sex ratio in 2011 but spatial distribution varies from district to district ranging from 832 to 1122 female per 1000 males.

**District with Very High Sex ratio:**

Districts which have above Mean plus two Standard deviation sex ratio i.e. > 995 femels per thousand males are included in very high sex ratio category. The table 1 indicates that the very high sex ratio is found in the District of Ratanagiri, Sindhudurg and Gondia in 2011. It is very high in Ratnagiri, Sindhudurg district mainly due to the male selective emigration because of adverse geographical factors i.e. rugged topography, heavy rainfall, more area under dense forest, inferior soil leads to lower development of human activities leads to the problem of unemployment.

**Districts with High Sex ratio:**

Districts which have above Mean to Mean plus one Standard deviation sex ratio value i.e. ranging from 947 to 995 females per thousand male are included in high sex ratio category. The table No.1 exhibits that the high sex ratio is recorded in the district of Kolhpur, Gadchiroli, Bhandara, Raigarh, Amravati, Nagpur, Yavatmal, Chandrapur, Sangali, Nandurbar and Satara in 2011. It is high in Kolhapur, Sangli, Satara, Amrawati and Raigad district because of western part of Kolhapur, Sangli, Satara, district and Easten part of Raigarh lies in Western Ghat, Northern part of Amravati lies in Satpurha mountain, which have very uneven

topography, high rainfall, dense forest leads to males emigration, while it is high in Gadchiroli, Nandurbar, Chandrapur, Bhandara, Yevatmal mainly due to dense forest, hilly area in Eastern part of these district, inferior soil, lower development of irrigation facility leads to lower literacy, lower development of medical facilities and traditional society having gender equity and non negligence of female child.

## Districts with Moderate Sex ratio:

Districts which have Mean minus one Standard deviation to Mean sex ratio i.e. ranging from > 899 to 947 females per thousand males are included in moderate sex ratio category. The table No. 1 indicates that the moderate sex ratio is found in the districts of Pune , beed, Aurangabad, Osmanabad, Jalgaon, Lature, Washim, Buldhana, Nashik, Jalana, Solapur, Ahamadnagar, Hingoli, Naded, Dhule, Akola, Wardha and Parbhani in 2011.

## Districts with Low Sex ratio:

Districts which have below Mean minus 1 Standard deviation sex ratio value i.e. < 899 females per thousand males are included in this category. The low sex ratio is found in Mumbai, Mumbai-Suburban, and Thane in 2011. The causes of low sex ratio in these districts are same as mentioned earlier.

## Changes in Sex Ratio during 1991 to 2011:

The state as a whole has negative change in sex ratio i.e. -13, but district wise distribution exhibits both positive and negative change in sex ratio ranging from +29 to -101 during the period of investigation. The positive change is recorded only in 12 districts ranging from 1 to 29. The high positive change is recorded Chandrapur, Mumbai, Amaravati and Nagpur Districts i.e. < 8 females per 1000 males mainly due to the increase in literacy and government policies. The moderate positive change in sex ratio is found in Solapur, Gadchiroli, Akola, Wardha, Thane and Sangli districts ranging from 4-8, while it is low in Yawatmal and Aurangabad district i.e. < 4. The negative change in sex ratio is recorded in 18 districts of Maharashtra ranging from -2 to -101. The high negative change is recorded Sindhudurg and Ratnagiri Districts i.e. < 66 females per 1000 males mainly due to the negligence of female child, male dominancy and dowry method. The moderate negative change in sex ratio is found in 33-66 Raigarh and Satara district ranging from -33 to -66, while it is low in <33 Beed, Jalana, Buldhana, Pune, Jaigaon, Latur, Osmanabad, Dhule, Aurangabad, Bhuldhana, Parbhani, Nashik, Kolhapur and Nanded districts i.e. < -33.

## Conclusions:

The Forgoing analysis reveals that the very high sex ratio in Ratnagiri, Sindhudurg district is mainly due to the male selective emigration because of adverse geographical factors i.e. rugged topography, heavy rainfall, more area under dense forest, inferior soil leads to lower development of human activities and problem of unemployment. The high sex ratio in the Kolhapur, Sangli, Satara, Amrawati and Raigad district is mainly because of western part of Kolhapur, Sangli, Satara, district and Eastern part of Raigarh lies in Western Ghat, Northern part of Amravati lies in Satpurha mountain, which have very uneven topography, high rainfall, dense forest leads to males emigration. The low sex ratio in Mumbai, Mumbai-Suburban and Thane is the result of the selective male immigration for job because high industrial development, higher education facility, transportation development, communication and trade development, which act as pull factors of immigration.

The study also indicates that the state as a whole has negative change in sex ratio i.e. -13. The positive change sex ratio only in 12 districts i.e. Chandrapur, Mumbai, Amaravati, Nagpur, Gadchiroli, Akola, Wardha, Thane, Sangli, Yawatmal and Aurangabad Districts mainly due to the increase in literacy and Government policies. The negative change is recorded in 18 districts. The high negative change is recorded Sindhudurg and Ratnagiri Districts is a result of negligence of female child, male dominance and dowry method.

## References:

1. *Clarke J.I. (1960): Rural and Urban Sex Ratio in England and Wales, Tij Descriptor, Economic and Social Geographic, p. 29.*
2. *Clarke, J. I. (1965): Population Geography, Pergamon Press, Oxford, pp. 1-6.*
3. *Franklin S.H. (1956): The Pattern of Sex Ratio in New Zealand, Economic Geography, 32, Pp.162-176.*
4. *Nandihalli S.S and Hurakadli S.M. (2014): Spatio-Temporal Analysis of Sex Ratio: A Case Study of Haveri District, Karnataka,The Konkan Geographer, Vol.No.08 p.66*
5. *Roy D. (2015): Population Geography, Books and Allied (P) Ltd., Kolkata, Pp. 109-110.*
6. *Shyrock H.S. (1976): The method and Meterials of Demography, Academic press, New York,p.105*
7. *Trewartha G.T. (1953): A Case for Population Geography, Annals of the Association of American Geographers, p.43.*

# Use of Remote Sensing and GIS Techniques to Detect Land Use and Land Cover Change

**Dr. Irshad Mohiuddin Hashmi**
Assistant Professor, Azad College, Ausa, (MS), India.

**Abstract:**

Fast urbanization is a pattern seen over the developing world. Quite a bit of this is because of provincial to urban movement of individuals looking for employments, education and the higher expectation for everyday life. Over the most recent 25 years, real change is found in land use, an increment in population, natural forest cover, ecological degradation and impact on the atmosphere and so on. The assessment in this study included land use and land cover change analysis, land surface temperature change analysis and vegetation change analysis (from normalized difference vegetation index (NDVI). The accuracy in change detection on the earth's surface layer is important for understanding the relationships and interactions between human and natural phenomena. Geographic Information Systems (GIS) and Remote Sensing have the potential to provide accurate information about land use and land cover changes. In this research paper, investigation for the major techniques that are used to detect land use and land cover changes. An analysis of the related work shows that the most used techniques are post-classification comparison and principle component analysis. Image differencing and image rationing are easy to implement, but at times they do not provide accurate results. Hybrid change detection is a useful technique that makes full use of the benefits of many techniques, but it is complex and depends on the characteristics of the other techniques such as supervised and unsupervised class. Change vector analysis is complex to implement, but it is useful for providing the direction and magnitude of change. Recently, artificial neural networks, decision tree and image fusion have been frequently used in change detection. The study on integrating of remote sensing data and GIS into change detection has also increased.

**Keywords:** Change Detection Techniques; Remote Sensing; GIS; Land Use and Land Cover Change

## Introduction:

Change detection is the process of establishing differences in the state of an object or phenomenon by observing it at different times. The time and accuracy of change detection on the earth's surface can provide a better understanding of the relationships and interactions between human and natural phenomena and can provide information in the management of the use of resources. In change detection applications, it is necessary to use multi-temporal datasets to analyze the temporal effects of the object or phenomenon. Currently, with increased computer capability and data availability, Remote Sensing and Geographic Information Systems (GIS) have become effective tools for detecting objects and phenomena change. Remote Sensing gives the ability to detect change on the earth's surface through space-borne sensors. The repetitive coverage of satellite images and the improvement of image quality can provide valuable assistance in the identification of changes. Temporal and spatial resolutions allow scientists to monitor and detect changes over a broad scale and help planners to obtain or maintain information on various phenomena, such as shifting agricultural fluctuation patterns, crop stress, disaster monitoring, land use and land cover changes. Geographic Information System is a useful technique for measuring the change between two or more time periods. It has the capacity to incorporate multi-sources of data into a change detection platform. It is used to study use of multiple layers, topographical maps, such as classified images, hydrological maps, and soil maps provides a greater ability to extract useful information about the changes over a particular area. Moreover, GIS can measure the trends in these changes by modeling the available data and using statistical and analytical functions. The importance of GIS is the provision of different outputs in different formats (e.g. maps or tables), which allows users to select the appropriate output for extracting the desired information. Remotely sensed data and GIS are widely used for detecting land use and land cover changes. Many studies have attempted to use remotely sensed data and GIS to address land use change detection. A variety of procedures or methods of Remote Sensing technologies are used to detect land use and land cover changes. Some studies have actually utilized Remote Sensing techniques; others have integrated remotely sensed data with GIS data e.g. In addition, many studies have reviewed and summarized the various change detection techniques. The articles reviewed here consider these change detection techniques in many applications, including land use and land cover changes, vegetation and forest changes, urban changes, environmental changes, crop monitoring, forest fires, deforestation and other applications. Table 1 shows applications that are investigated using change detection techniques. In this paper, reviews the major land use and land cover change detection techniques, including image rationing, image differencing, change vector analysis (CVA), principal component analysis (PCA), post-classification comparison, decision trees, image fusion, hybrid change detection and Geographic Information Systems (GIS), by giving overview about the characteristics, strengths and weaknesses of each technique. The importance and benefits of accuracy assessment in change detection and the use of different matrices in previous studies. Finally, it evaluate the change detection techniques according to the analysis of related literature.

**Land Use and Land Cover Change Techniques:**

**Image Differencing:**

Image differencing, also referred to as image delta, is a simple, easy-to-use technique for implementing and interpreting change detection. It classify the image pixels into two results: change or no change. In this process by which these results are obtained involves subtracting a pixel's digital number on the image for date one from the corresponding pixel's digital number on the image for date two. The common process for detecting the change in two dates in image differencing is extracting the change of the image of date 2 from the image of date 1 (e.g. image of date 1—image of date 2). In this technique, it is essential to select thresholds for determining the changed area. The image differencing Atmospheric and other non-surface radiance characteristics can affect the results of image differencing. Image differencing is widely utilized for change detection in the geographical environment. Ridd and Liu compared four techniques for change detection in an urban environment; image differencing, image regression, tasseled cap transformation and chi-square were used. The results showed that the most accurate technique for detecting change was the regression of TM band 3, whereas the image differencing of TM 4 was found to be the least accurate. In arid and semi-arid environments, red band image differencing is more effective than using the Normalized Difference Vegetation Index (NDVI) for vegetation change detection.

Table 1. Examples of the applications that can be investigated using change detection techniques.

| Application | Most Commonly Used Techniques |
|---|---|
| Land use/Land cover change | Image differencing, image ratioing, post-classification, hybrid change detection, GIS |
| Urban change | Image differencing, post-classification, hybrid change detection, PCA, GIS, image fusion |
| Environmental change | post-classification, image differencing |
| Vegetation change | image differencing, post-classification |
| Landscape change | Post-classification, GIS |
| Deforestation | Post-classification, image differencing |
| Wetland change | Post-classification, GIS |

**Image Ratioing:**

Image ratioing is taking the information between two or more different images by using the same bands of two or more images. To calculate changes between two times using band 2, the simple process of image ratioing could be: (Band 2 of t1 divided by Band 2 of t2). It is used to draw special attention to subtle variations between the pixels of the various land covers. The changed pixel takes a different value and is displayed at a lighter or darker level. To display the different changes between two or more images, selecting the appropriate threshold value is important in image ratioing. The image ratioing technique is beneficial for extracting vegetation cover information. The benefit of this technique is that the effect of shadows, the radiation change, image noise and the sun angle can be reduced.

**Image Fusion:**

Image fusion is a technology that merges two or more images from the same area in different sensors and wavelengths. In general, different spectral and spatial resolutions are helpful when high spectral resolution is used in discriminating land use and land cover type, whereas high spatial resolution holds advantages in identifying terrain features and the earth's structure. The reason of using image fusion is to provide additional information to help users detect and detect targets on the earth's surface. \The advantage of using image fusion in change detection is that fusion techniques can provide high spatial and spectral resolution, which can easily and effectively allow users to extract land use and land cover information. However, it is obvious that resized and registered images, which are obtained from different sensors, may be difficult to implement. For example, in a fusion image from Landsat In a change detection context, image fusion has been used to detect land use and land cover change over urban areas.

**Geographic Information Systems (GIS):**

The techniques discussed above are pixel by pixel change detection analysis of satellite images as well as being based on images only. It is important to use the benefit of collateral information, such as digital elevation models, hydrology and soil maps, which can be provided with the extracted information from remotely sensed images into GIS platforms. Thecombination of remotely sensed data with GIS data has the potential to improve the accuracy of results. The main advantage of GIS is that changes can be detected clearly than with other techniques using multi-source data. The different source data with different formats and accuracies may affect the change detection results. In recent decade, remote sensing and GIS have been commonly integrated for analyzing and mapping land use and land cover changes. Land use and land cover change maps into GIS applications has been done using guided classification algorithms through remotely sensed software. Utilizing ancillary data with satellite imagery such as digital elevation models and soil maps which provides more accuracy in the detection of change. The use of GIS has also been recognized for

detecting and mapping land use and land cover changes. Spatial statistical analysis and advanced functions such as hotspots have been used for change detection. Screen digitizing of satellite images and previous land use and land cover maps have been used to detect land use and land cover change.

## Summary:

By studying the related literature, it is concluded that no one technique is suitable for all cases. Selection of an appropriate method for detecting change in an object or a phenomenon on the earth's surface depends on a number of elements, including the characteristics of the study area, the spatial resolution of the sensor, atmospheric effects and sun angle, which should be taken into account before applying a suitable technique for the detector. Post-classification comparison is useful in two ways. It provides details of changes, and avoids selecting appropriate thresholds. The accuracy of change detection results can be affected by these elements, as well as the resolution of spatial and spectral images.

## References:

1. A. Singh, "Review Article Digital Change Detection Techniques Using Remotely-Sensed Data," International Journal of Remote Sensing, Vol. 10, No. 6, 1989, pp. 989- 1003. doi:10.1080/01431168908903939
2. D. Lu, et al., "Change Detection Techniques," International Journal of Remote Sensing, Vol. 25, No. 12, 2004, pp. 2365-2401. doi:10.1080/0143116031000139863
3. T. Ramachandra and U. Kumar, "Geographic Resources Decision Support System for Land Use, Land Cover Dynamics Analysis," Proceedings of the FOSS/GRASS Users Conference, Bangkok, September 2004.
4. J. R. E. Jensen, "Urban/Suburban Land Use Analysis," American Society of Photogrammetry, Falls Church, Virginia, Vol. 2, 1983, pp. 1571-1666.
5. J. Rogan and D. M. Chen, "Remote Sensing Technology for Mapping and Monitoring Land-Cover and Land-Use Change," Progress in Planning, Vol. 61, No. 4, 2004, pp. 301-325. doi:10.1016/S0305-9006(03)00066-7
6. E. Brondizio, et al., "Land Use Change in the Amazon Estuary: Patterns of Caboclo Settlement and Landscape Management," Human Ecology, Vol. 22, No. 3, 1994, pp. 249-278. doi:10.1007/BF02168853
7. T. Kuemmerle, et al., "Cross-Border Comparison of Land Cover and Landscape Pattern in Eastern Europe Using a Hybrid Classification Technique," Remote Sensing of Environment, Vol. 103, No. 4, 2006, pp. 449-464. doi:10.1016/j.rse.2006.04.015
8. R. Pelorosso, et al., "Land Cover and Land Use Change in the Italian Central Apennines: A Comparison of Assessment Methods," Applied Geography, Vol. 29, No. 1, 2009, pp. 35-48. doi:10.1016/j.apgeog.2008.07.003
9. R. B. Thapa and Y. Murayama, "Urban Mapping, Accuracy, & Image Classification: A Comparison of Multiple Approaches in Tsukuba City, Japan," Applied Geography, Vol. 29, No. 1, 2009, pp. 135-144. doi:10.1016/j.apgeog.2008.08.001 [10] W. Z. Michalak, "GIS in Land Use Change Analysis: Integration of Remotely Sensed Data into GIS," Applied Geography, Vol. 13, No. 1, 1993, pp. 28-44. doi:10.1016/0143-6228(93)90078-F
10. Q. Weng, "A Remote Sensing GIS Evaluation of Urban Expansion and Its Impact on Surface Temperature in the Zhujiang Delta, China," International Journal of Remote Sensing, Vol. 22, No. 10, 2001, pp. 1999-2014.

# Agricultural Land Use Efficiency of Latur and Nilanga Taluka for the Regional Planning

**Dr. Ompraksh Wamanrao Jadhav**
Shivneri Mahavidyalaya, Shirur Anantpal, Latur
Maharashtra, India

**Abstract :**

*Today finding valuable land for agricultural is major challenge but with the help of agricultural land use efficiency level it is very easy. Other side improving the land use efficiency is chief goal of every government to increase production and productivity of region. Agricultural land use efficiency play major role in agricultural development and management. In this study an attempt has been made to find out circle wise Agricultural use efficiency. In this study Jasbir Singh's Method of Land Use Efficiency is used to measure the land use efficiency. Latur and Nilanga Taluka of Marathwada region ore chosen as study area. The regional variations in spatial pattern of land use efficiency arc examined from 1993-96 to 2010-2013.The emphasis is on highlighting the basis of agriculture which influences agricultural efficiency. Agricultural efficiency is the levels of existing performance of unit at land which differentiate from one area to another. This study also helps for agricultural planning for sustainable development of this area.*

**Introduction:**

Agricultural land use efficiency is indictors of land utilization for agriculture. Agricultural land use efficiency represents the degree of optimum use and performance of cultivated as well as cultivable land. It is a dynamic but complex phenomenon. The efficiency of land use in a study region is determined by the interaction of physical, socio-economic and technological factors. A combination of natural and manmade factors makes land use efficiency a complex device. Agricultural land use efficiency is not new concept in the field of Geography. M. G. Kenall (1939) was the first to develop a measure for agriculture' land use efficiency on the basis of output per unit area and he devised the system of ranking coefficient method. Previously this method was applied in different countries of the world by L. D. Stamp (I960). In Indian region Shaft (I960), Sapre and Deshpande (1964), Bhatia (1967), Gupta (1968) and M. AM (1972) geographers paid attention to the study of land use efficiency. Jasbir Singh (1972) explained intensity of cropping level with help of ratio between net sown area and cropped area here the total area cropped as a percentage of the net sown and it indicates the intensity of cropping (Land use efficiency level).

**Study Region:**

Study region is part of Latur district. Latur district is included ten tahsils. This study area consist current Latur tahsil and area of Nilanga tahsil before 23 June 1999. These are important talisilj^ofjLatur district. Latur tahsil is divided into following five revenue circles. These are Kasarkhcda. Latur. Gategaon. Tandulja and Murud. Nilanga tahsil is divided into following eight revenue circles. These are Nilanga, Shirur Anantpal, Hisamabad, Ambulga, Kssarshirshi, Kasar Balkunda, Madansuri and Aurad Shahajani. Latur tahsil is located in the north western part of Latur district. Nilanga tahsil is located in the southern pan of latur district. Study area North side is bounded by Renapur and Chakur tahsil. East side is bounded by Udgir and Deoni tahsil. South and West side is bounded by Ausa tahsil and Osmanabad district. Study area lies between $17^0$ 52' north to $18^0$32' north latitudes and $76^0$ 12' east to $76^0$ 41' east longitudes. The area of study is 2577.35sq.km.

The height of study region is in-between 510 to 700 meters from sea level. The main river is the Manjara flowing in the northern and eastern part of study area. Other important rivers are the Terna and Tawarja. Both rivers flow west to east direction through the study region. Study region is covered by deep black soil and medium black soil. The average normal rainfall of study region is 714 millimeters. There is lot of variation in temporal and spatial distribution of rainfall in study area.

**Objectives:**

1) To find out circlewise land use efficiency in Latur 1993-96 to2010-2013.
2) To evaluate spatial and temporal change in land use efficiency.

**Methodology:**

This study is depended on past 20 Years data of agriculture. As per availability of data and its format Jasbir Singh's Index of intensity of cropping method is very useful hence here this method is applied to calculate level of agriculture land use efficiency. The land use efficiency is refer to the number of crops grown on the area in any agriculture year (Singh, 1976) . The Index of Land use efficiency is calculated by using the following formula.

$$Index of Land use Efficiency = \frac{Gross Cropped Area}{Net Sown Area} x100$$

Here, The higher the index of the efficiency means higher the agriculture land use efficiency and the lower the index of the efficiency means the lower the agriculture land use efficiency and less utilized of net area sown area for cropping.

## Result and Conclusion:
### Agriculture Land use Efficiency

As per the index of land use efficiency the land use efficiency of study area has been changed in into major three groups.

### Circles of Low Agriculture Land Use Efficiency (50% to 130%)

It ranges from 50% to 130% in thr study region. Low agricultural land use efficiency was observed in Murud, Nilanga, Shirur Anantpal , Kasar Balkunda ,Aurad Shahajani and Ambulga cirles during the period of 1993 -96. Low Agricultural land use efficiency were observed in Murud , Gategaon, Tandulja Shirur Anantpal , Latur , Hismabad, Ambulga and Nilanga circles during the period of 2010-13

### Circles of Medium Agriculture Land use Efficiency (130 % to 160% )

It ranges from 130% to 160% in the study region. Medium agricultural land use efficiency was observed in Latur. Gategona and Kasarshirshi circles during the period in 1993-94 Medium agriculture land use efficiency was observed in Kasarkheda, Madansuri and Aurad shajani circles during the period of 2010-13.

### Circles of high Agricultural Land Use Efficiency (130% to 160 %)

It ranges from 160% to 190% in the study region. High agriculture land use efficiency was observed in Kasr kheda and Hismabad and Tanjulja circles during the period of 1993-94. High agriculture land use efficiency was not observed during the period of 2010-13.

Table No.1: Land Use efficiency in Latur and Nilanga Taluka

| Name of circle | 1993-94 to 1995-96 | | | 2010-11 to 2012-13 | | | Change in Land Use efficiency in % |
|---|---|---|---|---|---|---|---|
| | Gross cropped Area | Net sown Area | Index of Land use Efficiency in % | Gross cropped Area | Net sown Area | Index of Land Efficiency in % | |
| Latur | 31416 | 23118 | 135.89 | 20394 | 23486.68 | 86.83 | -49.06 |
| Kasrkheda | 24373 | 14129 | 172.50 | 20491 | 14821.11 | 138.26 | -34.24 |
| Murud | 22214 | 20247 | 119.44 | 20372 | 21908.17 | 92.99 | -26.45 |
| Gategaon | 24346 | 15338 | 158.73 | 19902 | 16246.33 | 122.50 | -36.23 |
| Tandulja | 24772 | 14168 | 166.61 | 20411 | 16529.15 | 123.48 | -43.13 |
| Nilanga | 16788 | 30532 | 54.98 | 20067 | 29962.7 | 66.97 | 11.99 |
| Shirur A | 17085 | 19122 | 89.35 | 20308 | 18184 | 111.68 | 22.33 |
| Hisambad | 16920 | 9826 | 172.20 | 20224 | 9534 | 112.12 | -60.04 |
| Ambulga | 16909 | 16034 | 105.45 | 20073 | 15621.63 | 128.49 | 23.04 |
| Kasarshirshi | 16748 | 12715 | 131.72 | 20070 | 12555.7 | 159.84 | 28.12 |
| Kasar Balkunda | 16923 | 14998 | 112.84 | 20147 | 14825.29 | 135.90 | 23.06 |
| Madansuri | 16886 | 12548 | 108.61 | 20212 | 12284.95 | 141.12 | 35.58 |
| Aurad sha. | 16785 | 14345 | 117.0 | 20097 | 14322.76 | 140.31 | 23.31 |
| Study Region | 127121 | 87300 | 150.63 | 101070 | 92991.44 | 112.80 | -37.82 |

*Source: Computed by the researcher (2017).*

## Changes in agricultural Land use efficiency:

The index of agricultural Land use efficiency has been decreased in Latur taluka and increased in Nilanga taluka excepted Hismabad circle. Agricultural land use efficiency increase due to the decrease of non cultivable land in nilanga taluka. Overall the cropped area was 127121 hectares in 1993-96 and it was 101570 hectares in2010-13. The gross cropped area has been increased 6116 hectares. Net sown area was 217800 hectares in 1993-96 and it was 220682 hectares in 2010-13. During the period of twenty years the index of land use efficiency has been increased by only 1.23%.

The highest agricultural land use efficiency has been recorded in Kasar kheda (172.50%) circle and the lowest index of agricultural land efficiency has been observed in Nilanga (54.98%) circle during the period 1993-96. During the period 2010-13 the lowest index of land use efficiency was again recorded in Nilanga (66.97%) and the highest index of land use efficiency has been noticed in Kasashirshi circle

The positive change in agricultural land use efficiency was observed in Nilanga (11.99%), Shirur Anatpal(22.33 %) Ambulga (23.04%) ,Kasarshirshi (28.12 %) Kasrbalkunda (23.06%) ,Madansuri ( 35.58%) and Aurad shajani(23.31%) circles. The highestpositive change in the index of agricultural land use efficiency has been recorded in Nilanga (11.99%) circle during the period under study.

The highest negative change in agricultural land use efficiency has been observed in Hismabad(60.04%) circle and the lowest negative change in index of agricultural land use efficiency has

been recorded in Murud (26.45%) circle during the period under study. The negative change in agricultural land efficiency was observed in Latur(46.06%)Kasrkheda (34.24 %) , Murrud(26.45%) , Gategaon(35.23%) , Tandulja(43.13) and Hismabad(60.04%). Due to urbanization , Physiography,soil types, nature of rainfall and irrigation land use efficiency has been changed in different circles in Latur tahsil.

**References :**

1. *Census of india (1991, 2001 and 2011): District cencus handbook of Latur district.*
2. *Das, M. M , " Land Use Pattern in Asam", Geographical Review of India, Vol.43, No.3, Pub by  Calcutta, Geographical society of india , 1981, Pp 243-244.*
3. *Gathde ,D.G and et.al ,"Agricultural Land use efficieny  of Ratnagiri District, Maharashtra , Research Front journal, ISSN -2320-8341 special Issue No.1, Feb,2017 Pp.139-142.*
4. *Government of Maharashtra Gazetteer of Latur District.*
5. *Jasbir Singh & Dhillon , S.S ," Agricultural Atlas of India", Vishal publication Kurukshetra, India 1976,p.l.*
6. *Majid Hussain ," Systematic Agricultural Geography", Pub. By Rawat Publications Jaipur,2007,Pp.1 to 430.*
7. *Rayamane ,A.S.," A Spatio-Temporal Analysis of crop combinations in sedawgyi Region, Myanmar(Burma), The Deccan Geographer, Vol.41,No-1,2003, Pp.55-63.*

# New Trends in Human Geography

**Mr. B. R. Gurude**
Head, Dept. of Geography,
Sant Tukaram College of Arts & Science, Parbhani.

**Abstract:**

The basic theories of contemporary human geography refer to space, globalization, urbanization, population, migration, culture, landscape, development, geopolitics etc. Thus from the aspects of research contents and approaches new trends of progress in contemporary human geography are discussed.

India's reforms as well as entering the WTO need human geographers to move forward to identify the problem of human geography and challenges from globalization of human development. With the new theories and approaches to human geography that accorded the normal condition of nation's as well as the international research mainstream. The subject nature of human geography from the analysis of its development and points out that human geography is branch subject of geography. That has always rooted in the physical Geography and various thoughts from other science have brought new growth points to human geography. The basic theory of contemporary human geography refers to space, globalization, population, urbanization culture, migration, landscape, development, geopolitics etc. Its main content include the relation between globalization and regional differences the relation between human and environment, the politics and economic evolution different scale space and the social culture feature factor relating to nationality, race, gender, age class and their effects on spatial development.

**Key words:** Human, Space, Gender, Environment and Regional.

**Introduction:**

Human Geography is a wide ranging discipline that draws together many of the strands important for understanding the world today. It examines human societies and how they develop, their culture, economy and politics all willing context of this environment.

The need of human geography to more forwards to cope challenges for globalization and develop new theories and approaches of human geography that studied the national condition of India's as well as the international research mainstream. The research paper discussed the subject nature of human geography from the analysis of its development and points out that human geography to a branch of geography refers to space, globalization and regional differences the relation between human and environment, the political and economic evolution of different scale space and the social culture feature of factories relating to nationality, race, gender, age class and their effects on special development. The research summarize the main research contents of several human geography branches including economic geography, urban geography, social geography, population geography, behavioral geography. Besides some research approaches such as positivity's approach empirical approach, behavior approach, feminist approach, etc. are also analyzed. These from the aspect of research contents are approaches are a new trends of human geography.

**Review of Literature:**

**G.U.Chadin, CHEN L.V. (2010);** He has explained the geography on the new trends of progress in contemporary human geography. He has explained the human geography various aspects that like globalization, urbanization, population, migration, culture, there are compared to world level geography. The author comparatively studied the relationship between human and environment, political and economic development there are all studied the author.

**Michcale Chisholm( 1977);** He has also explained the geographical studied. How to relation the human race in daily routing work. The relation between geography human race in very important. The theory says the human geography evolution or revolution. He has stated before and shall continue to proclaim, 'Geography is no study of abstract space: it is the study of places, real earth, inhabited and above. The theories were explained.

**Objectives:**

01. To study the human geography branches.

02. To study the human geography of political and economic development.

**Research Methodology:**

The study is based on secondary data it is collected through government offices, journals, articles, books, websites, internet, Newspapers etc. However some primary data is procured from concerned authorities in the study.

**Significance of the Study:**

Geography is the study of places and the relationship between people and their environments. Geographers explained both the physical properties of earth's surface and the human societies spread across it. They also examine how human culture interact with the natural environment and the way that location and places can have impact on people. Geography seeks to understand where things are found. Why they are there and how they develop and change over time of geography.

**Emergence of Modern Geography:**

Some people have trouble understanding the complete scope of the discipline of geography because unlike most other disciplines, geography is not defined by one particular topic. Instead geography is concerned with many different topics, people, culture, politics, human race, age, gender, economic development places, settlements, plants, landforms and much more.

What distinguisher geography is that it approaches the study of diverse topic in particular way? Geography asks special questions how and why on earth surface is. It looks at their different distribution and arrangements at many different scales. It also asks questions about how the interact of different human and natural activities on earth's surface shape the characteristics of the world in which we live.

Geography seeks to understand where things are found and why they are present in those places how things that are located in the same or distant places influence one another over a time and why place and the people who live in then develop and change in particular ways raising these questions is at the heart of geographic perspective.

Exploration has long been an important part of geography. But exploration no longer simply means going to places that have not been visited before. It means documenting and trying to explain the variations that exist across the surface of earth, as well as figures out what those variations means for the future.

The age-old practice of mapping still plays an important role in this type of exploration, but explanation can also be done by using image from satellites or gathering information from interviews. Discoveries can came by using computers to map and analysis the relationship among things in geographic space or from placing together the multiple forces near and for that shape the way individual places develop rise to the idea that earth's surface is comprised large slowly moving plates. Plate tectonic studying of the geographic distribution of human settlements has shown how economic forces and modes of transport influence the location of towns and cities. For example, geographic analysis has pointed to role of US interstate highway system and rapid growth of car ownership in creating a boom in US; Suburban growth after world war-II. The geographic perspective helped show where Americans, were moving, why they were moving there and how their new living places affected their lives, their relationships with others and their interactions with the environment.

Geographic analysis of the spread of diseases have pointed to the condition that allow particular diseases to develop and spread Dr. John Snow's cholera map stand out as a classic example; when cholera break out in Landon (England 854). Snow represented the deaths per thousand on street map. Using the map he was able to track the source of outbreak to a water pumps on the corner of broad street and Cambridge Street. The geographic perspective helped identify the source of the problem and allowed people to avoid the disease.

Investigations of the geographic impact of human activities have advanced understanding of the role of humans in transforming the surface of earth exposing the special extent of threats such as water pollution by manmade waste. For example, geographical study.

The insight that, have come from geographic research; how the importance of asking? The why or where questions? Geographic studies comparing physical characteristics of contents on either side of the Atlantic Ocean for instance grove has show that a large mass of tiny piece of plastic currently floating in Pacific Ocean is approximately the size of Texas. Satellite images and other geographic technology identified the so called great pacific Garbage Patch. The geographic perspective help explain why geographic study and research is important as we confront many 21$^{st}$ century challenges, including environmental pollution, poverty, hunger and ethnic on political conflict.

Because the study of Geography is so broad the discipline is typically divided into specialties. At the broadest level, geography is divided in physical, human geography techniques and regional geography.

**Human Geography:**

Human Geography is concerned with the distribution and new work of people and cultures on earth's surface. A human geographer might investigate the local, regional and global impact of living economic powers China and India, Which represent 37% of the world people. They also might look at how consumers in China and India adjust to new technology and markets and how markets respond to such a huge consumer people.

Human geographers also study how people use and alter their environments. When for example, people allow their animal to over grazing on the landscape as well as agricultural production is an area of study for human geographers.

Finally human geographers study how political, social and economic systems are organized across geographical space. These include government's religious organizations and trade partnerships. The main divisions within human geography reflect a concern with different types of human activities or ways of living. Some examples of human geography include urban geography, social geography and population geography.

Human Geography who studies geographic pattern and process in past times is part of the sub discipline of historical geography. Those who study how people understand maps and geographic space belong to a sub discipline known as behavioral geography.

Cultural geography study the natural environment influences the development of human culture. Such as how the climate affects the agricultural practices of a region. Political geographer studies the important of political circumstances on interactions between people and environment as well as environment contacts such as disputes over water rights.

Some human geographer focus on the connection between health and geography for examples, health geographers creates maps that track the location and spread of specific diseases. They are very interest in the impact of the environment on human health especially the effects of environmental hazards such as radiation lead poisoning or water pollution. Some example of human Geography include urban Geography include urban Geography, Economic geography, Cultural Geography, Social Geography and population geography.

Some of the phenomena studied to physical and Human Geography

| Physical Geography | Human Geography |
|---|---|
| Rocks, Minerals, Landforms, Soil, water, Atmosphere, River & other water bodies, Environment Climatic & Weather, Oceans | Population, Settlement, Eco-activities, Transportation, Recreational activities, region, Political System, Social Tradition, Human migration, Agricultural System, Urban Settlement. |

| Geography | |
|---|---|
| 01. Physical Geography focus on natural environment | 01. Human Geography focus on people |
| 02. The earth natural phenomena like soil, plants, climatic and topography | 02. Processes and locations of the earth human creation and their interactions. |

**Human V/S Physical Geography**:

This theme is divided into 02 components

**Human Characteristics**: Human characteristics describe manmade object like building or bridge

**Physical Characteristics:** There are natural things that are UNIQE/ONE OF A KINO to an area.

**Human Geography**: Human Geography holds that there are three types or regions

**1) Formal:** There is one common elements (cultural and Physical) that uniforms the region- I) the Bible Belt II) Rust Belt.

**2) Functional**: is an interdependent region that is uniformed based on its connectivity- Financial or Political districts?

**3) Perceptional-** an area that reflect that feelings rather than precise data.

Physical characteristics included land, reforms climate, soil and natural vegetation for example, the peaks and valleys of the Rocky Mountains from a physical region some regions are distinguished by human characteristics. These many include economic, social, political and cultural characteristics.

**Find out about the Main division in Modern Geography:**

Its not easy studying an entire planet lucky geography is split is to two main area that make it easier to wrap your head around.

01) Physical Geography: looks at the natural processes of the earth, such as climatic and plate tectonics.

02) Human Geography: looks at the impact and behavior of people and how they relate to the physical world. However, it is important to remember that all areas of geography are inter connected for example. The way human CO2 emission affect the climate is part of both physical and human geography. The main that books at the connection between physical and human geography is called environmental geography.

Area of human geography include-

- Cultural geography- how things like religion, long ways and government very across the world
- Development Geography- standards of living of the life across the world.
- Historical Geography- how people have studied and thought about geography is the past.
- Population Geography- how population grows in different place and people migrate.
- Urban Geography- much of human geography examines the relationship of other fields to geography such as eco.

**Some suggestions and policy measures:** are here the Human Geography and Physical Geography

In This research paper should also examine the conclusion on taking individual and collective responsibility for strengthening the discipline of geography in order to indentify additional actions that could strengthen the discipline from within.

- ✓ Define location, places, interaction movement and regions.
- ✓ Differentiate location, from interaction.
- ✓ compare and constant types of technique in location
- ✓ Identity different physical and human characteristics of place in the India

✓ Investigate the relationship between places.
✓ Use a map scale to determine distance between two places.
✓ Identify the relationship between people and the environment.

**Conclusion:**

The need of human Geography to move towards to cope challenges for globalization and develop new theories and approaches of human geography that studied the national condition of India as well as the international research mainstream. The research paper discussed the subject nature of human geography from the analysis of its development and points out that human geography to a branch of geography. The basic theories of conternprary human geography refers to space, globalization, urbanization, population, migration, culture, landscape, development, geopolitics etc.

Its main contents include the relation between globalization and regional differences the relation between human and environment the political and economic evolution of different scale apace and the social culture feature of factories relating to nationality, race, gender, age, class and their effects on special development.

**Reference:**

1. *Encyclopedic Entry- Geography is the study of places and the relationship between people and Environment.*
2. *Lyn V. Gile (15 Nov. 2014): The Physical and Human geography.*
3. *National Academic of science Engineering Medicine (1997) : NAP New Relevance for science and Society. Chapter-8 Rediscovering Geography.*
4. *Baldwin W.A.(2008): Whiteness nature and Canadian conservation politics, Ottawa, international council of Canadian student Binomial Conference.*
5. *Springer link (July 1997): The Psychological Record Human Geography and behavior analysis an application of behavior analysis to the explanation of the evolution of human landscapes.*
6. *Problems of Geography (01 Feb.2016): The human Geography and its impact Indian Earths.*
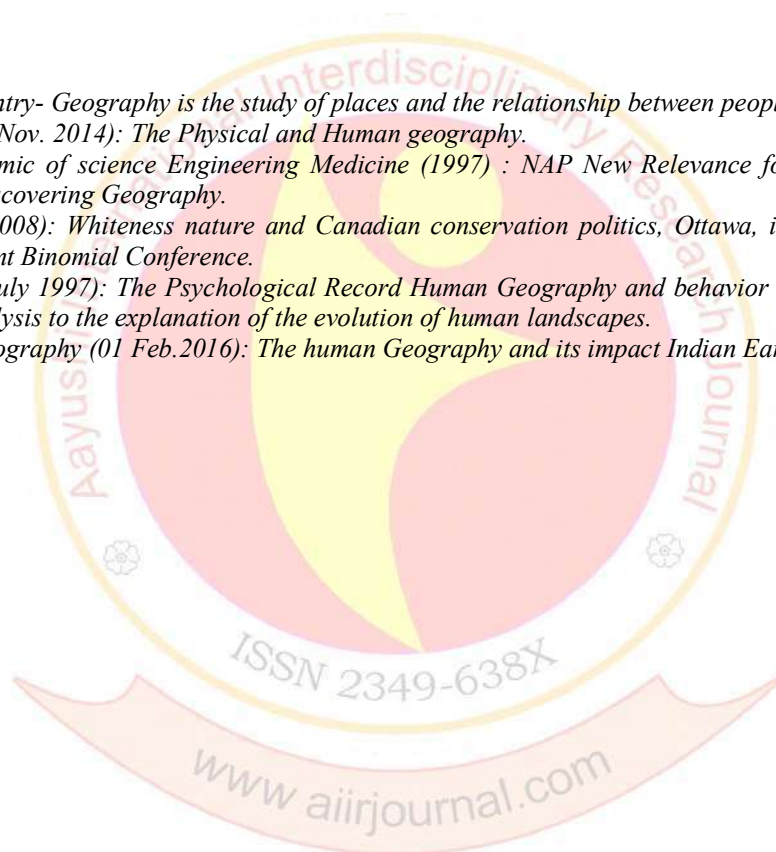
# A Study of Fruit Farming in Beed District of Maharashtra: A Geographical Study

**Dr. N. J. Patil**
Associate professor,
Department of Geography,
D.S.G. College, Mohol (MS).

**Abstract:**

Agriculture is main activities in India; it is main source of food supply. Agriculture is the backbone of Indian economy (Pandey, 2009). Horticulture is important factor in Indian agriculture. Horticulture is defined as an expensive art or science of cultivating fruits, flowers, vegetables plant. Fruits occupy prime position not only in human diet and nutrition but in the economy of as well because plantation of fruit crops much more remunerative than cereals and pulses cultivation.

In Maharashtra produces about 17.54 m. MT of horticultural produce from an area of 2.49 m. ha. Accounting for 7.30% of horticulture production in the country. Major share of production is from fruits (54.24%), the main fruits being Sapota, Banana, Citrus, and Grapes. Other fruits grown are Mango, Pomegranate and Guava. The vegetable produce forms about 42.78 % of the horticultural production in the state.

In this paper attempt to made find out area under fruit crop and status in the Beed district. The paper is based on secondary data. To find out trends of area under different fruit crops. Beed district is mostly situated in the western part of marathwada region and Deccan fruit farming zone. It is partly humid and dry climatic condition.

**Key words:** Fruit, horticulture, Agriculture, plantation.

## Introduction:

Agriculture is main practice of Indian peoples. Indian economy is mostly depends upon agricultural activities. Agriculture also play a grand role as it is essential to meet not only the food and nutritional security to the people and overall economic welfare, but also to meet the requirement of raw material for the agro based industries and other sectors in the development of India,

Fruits occupy prime position not only in human diet and nutrition but in the economy of as well because plantation of fruit crops much more remunerative than cereals and pulses cultivation. However agriculture is a mainstay of live hood of the people in this region. Which area have river basin and irrigation facilities farmers adopt irrigated crops. Despite of limited irrigation facilities, coarser shallow, poor quality soil and precarious, erratic rainfall, farmer have tried to adopt verity of cropping patterns to adjust with prevailing natural conditions. Most of the farmers of this region have adopted fruit farming as best possible alternative cropping against the existing farming. Trend is increasing in fruit farming in this study area.

## Study Region:

The Beed district is one of the 8 districts of Marathwada region of Maharashtra state in western India. The district covers an area of 10440.35 sq.km. It is 3.39% area of Maharashtra state, out of which 41.24 sq.km. is urban area and 10399.11 sq.km. is rural area. Beed district is located between the latitude 18º 28' to 19º 28' N. and longitude between 74º 54' to 76º 57' E.The average rainfall of Beed district is 675 mm. and temperature range is about 7º C. to 45º C.

The district comprises 11 tehsils Beed, Ashti, Georai, Patoda, Majalgaon, Shirur, Wadwani, Kej, Dharur, Parali and Ambajogai. It is bounded in the north by Aurnagabad and Jalna district, south by Osmanabad and Ahamadnagar district, in the east Parbhani and Latur and West Ahamadnagar district. According to 2011 census, Beed district has a population of 2585962, out of which 1352468 male populations and 1233494 female populations.



LOCATION MAP OF BID DISTRICT

Geomorphologically, the district comprises of varied topographic features and landscape consisting of high hills and plains and low lying hill ranges are located in the western part of the district. Balaghat mountain range is main range of Beed district; it is extended from western boundary of Ahamadnagar district to eastern boundary of this district. Beed district is situated on Deccan black layer and Godavari river is main river of this district, it flow on boundary of Georai and Majalgaon tehsil of northern part of this district. Manjara, Sindphana, Bindusara and Wan are important rivers in this district also.

## Objectives:
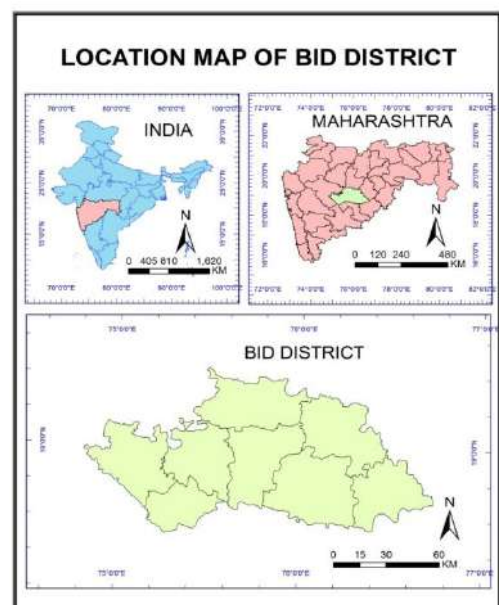
The present paper objectives are as following.

➢ To study the ranking of fruit crops in the study area.

➢ To find out variation of fruit crops in the study area.

**Database and Methodology:**

This study is based on secondary data, which is collected from secondary sources, namely Socio-economic review, statistical abstract of Maharashtra state and handbook of basic statistics Maharashtra state. In the present study tahsil has taken as a basic unit of investigations for study.Tahasilwise secondary data of fruit farming are used for present-study. It is collected from District Horticulture department of Beed district.

Main fruit crops have been selected to their area of cultivation for present study. The period 2012-13 is considered for present investigation. The collected data processed and presented through tables and maps.

**Fruit farming in Beed district:**

In Beed district area under fruit farming is 10131.72 hectare with total production of 417461.88 MT in 2012-13. Varies fruits are grown, where in Mango, Orange, Pomegranate, Banana, Guava, Sapota, Custurd apple and Tamrind are the major one. Mango is one of the commercial fruit grown in this area.

**Table No.1: Tashilwise area under fruit crop in Beed district 2012-13**

| No. | Name of Tehsil | Fruit crop Area in hectare. | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | Man go | Oran ge | Pome gran te | Gua va | Lime | Sapo ta | C.ap ple | Tam rind | Ban ana | Coc unat | Gra Pe |
| 1 | Ashti | 296.90 | 65.50 | 630.85 | 45.90 | 615.67 | 195.56 | 74.50 | 137.41 | 29.00 | 00 | 00 |
| 2 | Georai | 159.09 | 897.29 | 160.77 | 27.00 | 8.05 | 72.05 | 10.60 | 39.60 | 73.20 | 9.35 | 00 |
| 3 | Patoda | 354.10 | 15.45 | 50.64 | 10.68 | 15.62 | 64.37 | 9.45 | 31.99 | 5.16 | 0.75 | 00 |
| 4 | M,gaon | 118.15 | 65.95 | 65.25 | 14.86 | 14.23 | 28.91 | 6.18 | 0.00 | 32.20 | 5.78 | 00 |
| 5 | Shirur | 190.08 | 26.10 | 34.27 | 5.05 | 5.10 | 80.53 | 2.50 | 56.40 | 14.61 | 00 | 00 |
| 6 | W, wni | 134.73 | 17.75 | 22.55 | 10.75 | 35.25 | 8.71 | 129.83 | 11.09 | 19.60 | 2.85 | 00 |
| 7 | Beed | 480.00 | 73.90 | 91.40 | 14.70 | 14.20 | 80.90 | 111.00 | 59.35 | 42.80 | 2.93 | 15.80 |
| 8 | Kej | 530.77 | 27.35 | 305.52 | 23.20 | 22.60 | 5.35 | 225.59 | 68.52 | 30.75 | 22.24 | 25.70 |
| 9 | Dharur | 208.86 | 19.70 | 126.59 | 14.24 | 2.52 | 10.28 | 70.61 | 10.82 | 0.60 | 2.15 | 00 |
| 10 | Parali | 154.35 | 4.90 | 13.75 | 15.04 | 143.23 | 6.56 | 34.41 | 13.82 | 11.70 | 5.73 | 27.40 |
| 11 | A.gai | 683.20 | 15.10 | 38.50 | 22.50 | 18.80 | 31.06 | 14.60 | 112.70 | 8.30 | 21.40 | 39.80 |
| 12 | Total | 3310.23 | 1228.99 | 1540.09 | 203.92 | 895.27 | 584.28 | 689.27 | 541.70 | 267.92 | 73.18 | 108.70 |

*Source: Horticulture department of Beed district.*

Above table reveals that the area under fruit crops in the Beed district in 2012-13. The area under each crop is considered for the calculation of rank in the area. It is observed that there are first ranking fruit crop is Mango which area is 3310.23 hectares in the region, in 9 tehasil. It is also observed that the second ranking four fruits are Orange, Pomegranate, Sapota and C.apple are every two tehsils except Ashti tehsil. Pomegranate fruit first in Ashti tehsil, Orange in Georai tehsil. mango is occupied highest under fruit cultivated area 3310.23 (35%) hectares in the region. The second and third ranking fruit crop is Pomegranate (16.30%) and Orange (13.01%) respectively, followed by Lime (9.47%), C. apple (7.29%), Tamrind (5.73%) and Banana (2.83%).

**Ranking of fruit crops in Beed district:**

First eleven fruit crops have been considered for ranking and there are prepared first three ranks. The ranking provides individual crops and land utilization (Bharadwaj, 1971). Crops are ranked in order of their relative a real strength so as to assess their regional dominance (Sharma, 1972). Crops ranking help to understanding the geographical characteristics of the area (More, 1995).

It is observed that, there are first ranking fruit is Mango, which are holds the first place in



Aera under fruit crop in Beed Dstrict
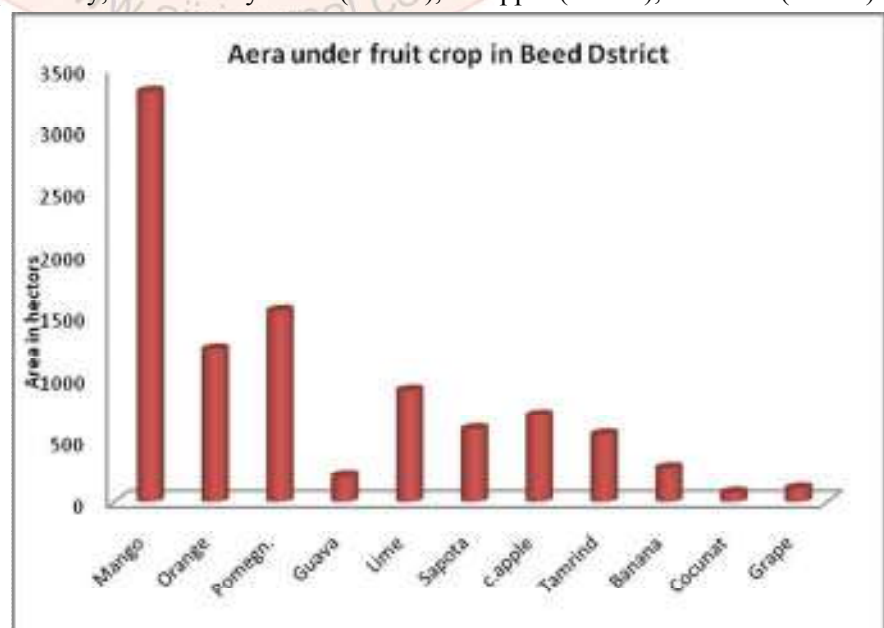
Ambajogai, Beed, Kej, Patoda, Dharur, Shirur, Parali, Wadwani and Majalgaon tahsil. The second ranks fruit pomegranate is hold the first rank in Ashati, Kej and Dharur tahsils, followed by Orange, Lime, C.apple, Sapota and Tamrind are respectively grown in the study area.

**Table No. 2:Ranking of Fruit Crops**

| Sr. No. | Ashti | Georai | Patoda | Majalgaon | Shirur | Wadwani | Beed | Kej | Dharur | Parali | Ambajogai |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Pomeg. | Orange | Mango | Mang. | Mang. | Mang. | Mang | Mang | Mano | Mang | Mango |
| 2 | Lime | Pomeg. | Sapota | Orang. | Sapot. | C.app. | C.app | Pome | Pome | Lime | Tamri |
| 3 | Mango | Mango | Pome | Pome. | Tamr. | Lime | Pome | C.app | C.appl | C.app | Grape |
| 4 | Sapota | Banana | Tamri. | Banan | Pome. | Pome. | Sapo. | Tamr | Orang | Grap | Pomeg |
| 5 | Tarmin. | Sapota | Lime | Sapot. | Orarn | Bana. | Oran. | Bana | Guav | Guav | Sapota |
| 6 | C.apple | Tamri. | Orarn. | Guav. | Bana | Orang | Tamri | Oran | Tamir | Tamr | Guava |
| 7 | Orange | Guava | Guava | Lime | Lime | Tamri | Bana | Grape | Sapot | Pome | Cocun |
| 8 | Guava | C.appl | C,appl | C.app. | Guav. | Guava | Grape | Guav | Lime | Banan | Lime |
| 9 | Banana | Cocun | Banan | Cocu. | C.app. | Sapot | Guav | Lime | Cocu. | Sapot | Orang |
| 10 | - | Lime | Cocu. | - | - | Cocu. | Lime | Cocu. | Banan | Cocu. | C.appl |
| 11 | - | - | - | - | - | - | Cocu. | Sapot | - | Orang | Banan |

***Source:*** *Compiled by researcher.*

**First ranking fruit crops:**

The analysis of ranking of fruit crop reveals that namely mango, Orange and Pomegranate, Mango hold first in Patoda, Majalgaon, Shirur, Wadwani, Beed, Kej, Dharur, Parali and Ambajogai tahsil. Pomegranate is hold in the first rank in Ashti and Orange recorded as first ranking fruit crop in Georai tahsil.

**Second ranking fruit crops:**

Pomegranate, Lime, Sapota and C. apple are observed as the second ranking crops each fruit crops hold in two tahsils i.g. Pomegranate in Georai, Kej and Dhrur tahsils, Lime in Ashti and Parali tahsil, Sapota in Patoda and Shirur tahsil, C. apple in Wadwani and Beed tahsil, Orange and Tamrind in Majalgaon and Ambajogai tahsil respectively.

**Third ranking fruit crop:**

In the third ranking Mango, Pomegranate, C. apple, Lime, Tamrind and Grapes fruit crops observed. Mango are observed third rank in Ashti and Georai tahsil, whereas Pomegranate in Patoda, Majalgaon and Beed tahsil, C. apple is dominant in Kej, Dharur and Parali tahsil. Tamrind and Lime observed third rank in Shirur and Wadwani respectively and Grape are observed third ranking in Ambajogai tahsil only.

**Conclusion:**

The analysis reveals that there are tremendous variations in level of fruit farming throughout the region. Fruit farming is largely controlled by the physical and economical conditions prevailing in the district. Regional disparity in the proportion of fruit farming area is mainly related to the climatic condition and availability of consistent supply of water. Beed district has been in the forefront in the production of Mango.

16.67% percent area of district having dynamic fruit farming region in which tahsils all fruit crops highly cultivated. Active fruit farming region of district is also large in district. Mango cultivation mainly concentrated in the western part of Beed district. As such Patoda, Majalgaon, Shirur, Wadwani, Beed, Kej, Dharur, Parali and Ambajogai tahsil and Pomegranate and Orange are leading in Ashti and Georai tahsil respectively. Modern agri-tecnology must be used for fruit farming in the Beed district.

**References:**
1) *Govt. of India Planning Commission (2007) Horticulture, Plan-tation crops and Organic farming. 160- 180.*
2) *Radhawa G.S. (1987) Fruit Crop- Handbook of Agriculture 1060-70.*
3) *Bharadwaj, B.K.(1971): Spatial pattern of ranking of land utilization categories and land use combination region in Gurgaon development block Haryana.*
4) *Dehmukh, P.P.(1986): Cultivation of fruit trees in India, pp- 12-20.*
5) *More, K.S. (1995): Studies in Agricultural land use, pp.- 61-66.*
6) *Horticulture department of Beed district 2012-13.*
7) *Socio-economic review of Beed district 2013*

# Statistical Method in Research

**Dr. S. P. Khandare**
HOD, Dept. of Geography,
P. A. H. College, Ranisawargaon.

**Introduction:**

The research methodology is now considered as on effective aid towards solving social and economic problems. The English word 'Research' is derived from the French word 'research' which means to 'seek again'. Research is an intellectual work undertaken with the object of advancing the frontiers of human knowledge and abilities, research as an activity is directed at "the systematic search for pertinent information on a topic. "Research in common means search for better knowledge." Research is a systematic attempt to find answer to meaningful questions through the application of scientific procedures. Buta statistical survey or research means the search for better knowledge through modern statistical methods. Research is scientific and as such is not satisfied with isolated facts, but seeks to the integrate and systematize its results and findings. In fact research is an art of scientific investigation. Research is also defined as the systematic and objective analysis and recording of controlled observations that may lead to the development of generalizations, principles or theories, resulting in prediction and possibly ultimate control of events. In other words, research refers to the systematic method consisting of enunciating the problem, collecting facts, analyzing these facts critically and researching conclusions based on them.

**Definition of Research:**
1. Charls E. Wilson: "Research is when you do not know what you are doing."
2. Prof. N.K. Sharma:"Research is a scientific method of solving unsolved problems of our economy and society."
3. Dr. Albert S. Gyorgi: "Research is to what everybody also has seen and to think what nobodies has thought."

**Characteristics of Research:** since many definitions of research are abstract, its characteristics can better clarity the spirit and its meaning. The major characteristics of research as follow.

➢ Research is based upon observations, experiences or empirical evidence, knowledge of the field of study is an essential prerequisite for research.
➢ Research is patient and unhurried job, it requires complete devotion and whole time commitment to the cause by the researcher.
➢ Research is directed towards the solution of a social and business problem. It many attempt to answer a question or to determine the relation between two or more variables.
➢ Research aims at investigating the facts in depth and comes out with a formal result.
➢ Research demands accurate observations, experimentation, and description of the social or commercial phenomena.
➢ Research needs use of scientific methods and logical reasoning to probe deeper and deeper and reach at the truth or as near to reality as possible.
➢ Research findings are systematically recorded and reported without involving value judgment.
➢ Research aims at quantification of the social or commercial facts.

**Important methods for modern research:**

Research methods are basically related with observation of reality, defining the problem and its dimensions, a planned approach towards analysis of the research problem, interpretation of information and drawing conclusions. Through this process a researcher attempts to acquire knowledge and understanding of the research problem and make concrete suggestions towards the better solution. The success depends upon sensitivity, power of observation, logical thinking process and ability to draw conclusions assimilating large mass of research information. The following important modern methods for research.

1. Historical Method 2.Descriptive method 3.Experimental method 4.Field study method 5.Case study method 6.Statistical method.

In these methods are in research. We can study about statistical method in research.

This method involves drawing statistical inferences and generalizations about population through mathematical values. Statistical inference is based on probability theory. In modern time a wide variety of statistical techniques are available to test sample data and determining probable degree of accuracy of generalizations about the population from which the sample is drawn. Generalizations based on this method are never statements of absolute certainty.

**Use of statistics in Research:**

Statistics is concerned with scientific methods for collecting, organizing, summarizing, presenting and

analyzing data, as well as drawing valid conclusions and making reasonable decisions based on such analyzing.

**Application of statistics to business and industry:**

With the gradual industrialization and expansion of the business world, businessmen find statistics as an indispensable tool. Now a days, the success of a particular business or industry very much depends on the accuracy and precision of statistical analysis. Statistical methods are now used for exploring possibilities for advertising campaigns, for adjustment of production methods as an aid to establish standards. Statistical techniques help in for, casting future markets. Market research and market surveys by statistical sampling methods are now extremely useful for any businessman. In industry, statistics is widely used in quality control. Wide applications of statistics can be found in insurance, where the premium rates are fixed on the basis of mortality, average length of life, possibilities of investments etc.

**Commonly used terms in statistics:**

➢ Data - A collection of observations expressed in numerical figures, obtained by measuring or counting.

➢ Population - A population or an universe consists of the totality of the set objects, with which we are concerned, eg. All workers working in a plant, all items produced by a machine in a particular period etc.

➢ A sample - A sample is a sub set of the population, i.e. it is a selected number of individuals each of which is a member of the population.

➢ Characteristics - A quality possessed by an individual person, object or item of population, e.g. height of individuals, nationality of group of passengers on a flight.

➢ Variable and attribute - A measurable characteristics is called a variable or a veriate. A non-measurable characteristic is called and attribute, it may be noted here that by measurable characteristics we mean those characteristics which are expressible in terms of some numerical units, eg. Age, height, income etc.

**Methods of drawing of each graph:**

➢ Line charts or graphs: we choose a rectangular system of axis. Along the abscissa we take the independent variable (X) and along the ordinate the dependent variable (Y). the points plotted are joined by broken lines or continuous curve which gives the graphical representation of two sets of data. The figure obtained is a line chart or graph.

➢ Bar charts or bar graphs: This is another most frequently employed diagrammatic representation of statistical data. They are particularly useful for comparing the values of a variables classified qualitatively, i.e. classified according to some non-measurable characteristics possessed by them.

➢ Component bar charts: In these each bar is subdivided into certain parts represent such a component bar chart. There are two bars one of them represents the total cost and its component parts for the year. And the other depicting the same items for the next year. The components parts are indicated by different hatchlings and the total cost by the complete bar.

➢ Horizontal bar charts or graphs - like the column charts, they are also very simple to draw. Instead of vertical bar in case of simple column charts, here they are horizontal bars.

➢ Pie-charts - Pie charts is a very useful pictorial device for visualizing the weight of different items in a composite quantity. It can be used to compare between various components or between part and the whole. This charts consists of a circle sub-divided into sectors by radi in such a way that the area of the sectors are proportional to the values of component items under investigation, the whole circle, representing the whole data under investigation.

**References:**

1. Dr. G. B. Singh - 'Research Methodology' Paradise publication, Jaipur.
2. A. K. Phophalia - 'Modern Research Methodology.' Paradise Publication, Jaipur.
3. D. D. Chaturvedi - ' Research in Geography.' Anmol Publication, Delhi.
4. MajidHussain - 'Methodology of Geography.' Anmol Publication, Delhi.
5. Dr. ShrikantKarlekar, Dr. Mohankale - 'Statistical analysis of Geographical Data.' Diamond Publication, Pune.

# Bio-Diversity in India

**Dr. Nagnath Madhavrao Phad**
Head, Department of Geography,
I. B. P. College, Hingoli.

**Introduction:**

The term biodiversity was coined as a contraction of biological diversity by E.O. Wilson in 1985. Biodiversity may be defined as the variety and variability of living organisms and the ecological complexes in which they exist. In other words, biodiversity is the occurrence of different types of ecosystems, different species of organisms with the whole range of their variants and genes adapted to different climates, environments along with their interactions and processes.

Present Paper studius is connected with the types of Biodiversity in India, the Importance of Biodiversity, Future Potential, threats to Biodiversity & its conservation.

**Objective of the Study:**

1. To study of the Indian Biodiversity
2. To study of Importance of Biodiversity.
3. To find out loss of Biodiversity
4. To study the role of conservation of Biodiversity.

**Types of Biodiversity:**

**1. Genetic diversity:** It describes the variation in the number and types of genes as well as chromosomes present in different species. The magnitude of variation in genes of a species increases with an increase in size and environmental parameters of the habitat. The genetic variation arises by gene and chromosome mutation in individuals and in sexually reproducing organisms and it is spread in the population by recombination of genetic materials during cell division after sexual reproduction.

**2. Species diversity:** It describes the variety in the number and richness of the spices within a region. The species richness may be defined as the number of species per unit area. The richness of a species tells about the extent of biodiversity of a site and provides a means for comparing different sites.

**3. Ecosystem diversity:** It describes the assemblage and Interaction of species living together and the physical environment in a given area. It relates varieties of habitats, biotic communities ecological processes in biosphere. It also tells about the diversity within the ecosystem.

**Study Area and Data Sources:**

India is geographically located at 8°4'N and 37°6 N latitudes and from and permits a wide Range of variations in temperature. The topographical diversity marked by Mountainous region covering and area close to 100 Million hectares, arid and semi-arid zones spreading over 30 million hectare and the long coast line over 700 kms, coupled with varied precipitation constitute a rich landscape diversity.

The present investigation is based on secondary source of data. India forest cover map as a percentage of the geographical area of respective States and Union Territories, in 2010.



**Biodiversity of India:** As per available data, the varieties of species living on the earth are 1753739. Out of the above species, 134781 are residing in India although surface area of India is 2% of the earth's surface. Wild life Institute of India has divided it into ten biogeographical regions and twenty five biotic provinces.

**Importance of Biodiversity:**

**1. Productive values:**

Biodiversity produces a number of products harvested from nature and sold in commercial markets. Indirectly it provides economic benefits to people which include water quality soil protection, equalisation of climate, environmental monitoring, scientific research, recreation etc.

**2. Consumptive value:** The consumptive value can be assigned to goods such as fuel woods, leaves, forest products etc. which may be consumed locally and do not figure in national and international market.

**3. Social value:** The loss of biodiversity directly influences the social life of the country possibly through influencing ecosystem functions (energy flow and biogeochemical cycle). This be easily understood by observing detrimental effects of global warming and acid rain which cause an unfavorable alteration in logical processes.
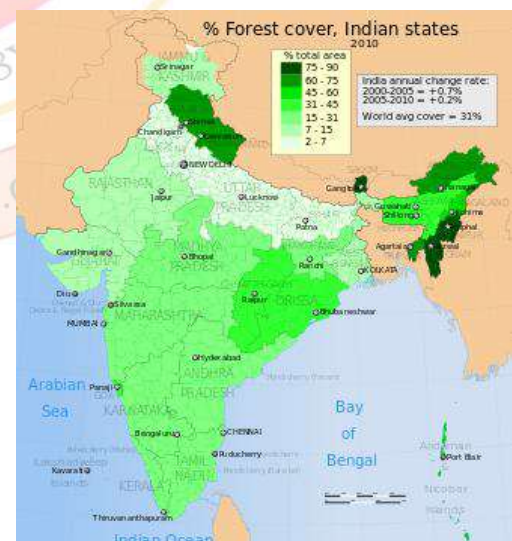
**4. Aesthetic value:**

Aesthetic values such as refreshing fragrance of the flowers, taste of berries, softness of mossed, melodious songs of birds, etc. compel the human beings to preserve them.

**5. Legal values:**

Since earth is homeland of all living organisms, all have equal right to coexist on the surface of earth with all benefits. Unless some legal value is attached to biodiversity, it will not be possible to protect the rapid extinction of species.

**6. Ethical value:**

Biodiversity must be seen in the light of holding ethical value. Since man is the most intelligent amongst the living organisms, it should be prime responsibility and moral obligation of man to preserve and conserve other organisms which will directly or indirectly favour the existence of the man.

**7. Ecological value:**

Biodiversity holds great ecological value because it is indispensable to maintain the ecological balance. Any disturbance in the delicately fabricated ecological balance maintained by different organisms, will lead to severe problems, which may threaten the survival of human beings.

**8. Economic value:**

Biodiversity has great economic value because economic development depends upon efficient and economic management of biotic resources. In the day to day life, human beings are maintaining their lifestyle at the sacrifice of surrounding species which come from diversity of plants and animals struggling for their existence.

**The different factors responsible for causing threat to biodiversity are as follows:**

1. Habitat destruction:
2. Habitat fragmentation
3. Pollution:
4. Over exploitation:
5. Introduction of exotic species:
6. Diseases:.
7. Shifting or Jhum cultivation:
8. Poaching of wild life:
Conservation Methods:
(a) In situ conservation:
1. Protected areas:
2. National parks:
3. Sanctuaries:
4. Biosphere reserves:.
(b) Ex-situ conservation:

**Some important areas under these conservation are:**

(i) Seed gene bank,
(ii) Field gene bank;
(iii) Botanical gardens;
(iv) Zoos.

**The strategies for ex-situ conservations are:**

(i) Identification of species to be conserved.
(ii) Adoption of Different ex-situ methods of conservation.
(i) Long-term captive breeding and propagation for the species which have lost their habitats permanently.
(ii) Short-term propagation and release of the animals in their natural habitat
(iii) Animal translocation
(iv) Animal reintroduction
(v) Advanced technology in the service of endangered species.

**Hot Spots:** Hot spots are the areas with high density of biodiversity or mega diversity which are most threatened at present. There are 16 hot spots in world, out of which two are located in India namely North-East Himalayas and Western Ghats.

**The hot spots are determined considering four factors:**

(i) Degrees of endemism;
(ii) Degree of expectation
(iii) Degrees of threat to habitat due to its degradation and fragmentation and
(iv) Number of Species diversity.

**Conclusion:**

The present study deals with the Biodiversity existing in India. At the same line the focus is on studying the importance of Biodiversity & its conservation. A wide variety of Biodiversity exist because of longitudes spread & variation in the temperature. The Due consideration of secondary data concerning the study has given elaborative results. The study provided that various types of Biodiversity like genetic diversity, species diversity, Eco-system diversity exist in India. These diversities in the world has various components & its maintenance is necessary to for the human Life on the Earth. Conservation of biodiversity is very essential so as to protect ourselves from natural hazards.Indian government must take it as a key issue and should provide adequate measures for the conservation of bio-diversity spots .

**References:**

1. *Environment and Ecology-Nitesh Yadav, Shweta Phul*
2. *Introduction to geography- Edward F. Bergman, William H, T. Vasanthna*
3. *Environment and Ecology- Majid Husain*
4. *http/wekipedia.com*

# Geographical Research: Use of Quantitative Techniques

**Dr. M. P. Manakari**
Assoc. Prof. and Head,
Dept. of Geography,
Maharashtra Udayagiri College, UDGIR- 413517, Dist. Latur (MS).

**Abstract:**

Traditionally, geography was considered to be a description of the earth surface, but in due course of time its definition and nature has changed. Now, it is concerned with providing accurate, orderly, and rational descriptions and interpretations of the variable characters of the earth surface. In the words of Yeats, "geography can be regarded as a science concerned with the rational development, and testing of theories that explain and predict the spatial distribution and location of various characteristics on the surface of the earth". In order to achieve this objective and to obtain the real picture of a region, geographers began to use and apply quantitative tools and techniques to which qualitative geography was opposed, especially till the 1960s.

**Keywords:** Quantitative Technique, Quantitative Revolution, Model

**Introduction:**

In all other physical and social sciences theory-building has a long tradition. After the Second World War, geographers, especially those of the developed countries, realized the significance of using mathematical language rather than the language of literature in the study of geography.

Consequently, empirical descriptive geography was discarded and greater stress was laid on the formulation of abstract models. Mathematical and abstract models need rigorous thinking and use of sophisticated statistical techniques. The diffusion of statistical techniques in geography to make the subject and its theories more precise is known as the 'quantitative revolution' in geography. The application of statistical and mathematical techniques, theorems and proofs in understanding geographical systems is known as the 'quantitative revolution' in geography. Statistical methods were first introduced into geography in the early 1950s (Burton, 1963). Consisting mainly of descriptive statistics, there was also some attempt at hypotheses testing using, for example, chi-square. Bivariate Regression Analysis followed shortly but it was not until the 1960s that the General Linear Model was fully explored. The statistical methods are employed in geography for the generating and testing hypotheses using empirical data, whereas the mathematical techniques and theorems are used for deriving models from a set of initial abstract assumptions. In other words, statistical methods are used to estimate, and test the significance of, various parameters associated with a given mathematical model such as the distance decay and gravity models.

**Objective:**

1.  Relevance of quantitative techniques in geographical research.

**Discussion and Analysis:**

The quantitative techniques in geography are a recent development. To understand and interpret the complex phenomena properly, the statistical methods have been introduced in the field of geography. The quantitative techniques are firmly based on empirical observations and are readily verifiable. The statistical techniques help in reducing a multitude observations, data and facts to a manageable number of facts. These techniques help in the estimation, interpolation and simulation of data which are necessary for forecasting. Quantitative techniques are the techniques that are concerned with collection, organization, presentation, analysis and interpretation of data.

These five stages are summed up as follows:

1. Collection of data, 2. Organization, 3. Presentation, 4. Analysis, 5. Interpretation

**1. Collection of data:**

This is the first stage and involves the collection of data. In collection of data one has to be very careful because they form the foundation of statistical analysis. Geographers use both primary as well secondary data. For collections of primary data, field surveys are conducted. Secondary data is obtained from different offices, libraries, websites, portals, etc.

**2. Organization:**

A large mass of figure collected from survey often needs organization. This is the second stage and involves arrangements of raw data in a well organized manner i.e. editing of the data through which the omission, irrelevant answers and wrong computations in the survey may be corrected or adjusted. The edited data then are arranged according to some common characteristics of the items of data. Then after the arrangement of the data the final step is tabulation of the data. In this, final step data is arranged in columns and rows.

**3**. **Presentation:**

The organized data is presented in an orderly manner to facilitate statistical analysis. In this stage data is represented in the form of maps, graphs and diagrams.

 **4. Analysis:**

The purpose of analyzing of data is only to get some information for making decision. In this stage the various characteristics of data are carried out by using different statistical methods like

(a) Measures of central tendency (mean, mode, median, quartiles, percentiles etc).

(b) Measures of dispersion (mean deviation, quartile deviation, standard deviation etc).

(c) Correlation, (d) Regression, (e) Relationship measures and (f) Measure of spatial pattern etc.

**5. Interpretation:**

This is the last stage of statistical investigation. It is difficult task and requires a high degree of skill and experience. This stage involves drawing conclusions from the analyzed data.

**Development of Quantitative Revolution in Geography:**

Geography is one of the oldest earth sciences and its roots date back in the works of early Greek scholars like Thales and Anaximander during sixth and seventh century B.C. There is consensus that all civilizations contributed to the development of geographical concepts. In fact geographical knowledge had been a concomitant of civilization.

Geography for more than two hundred years was confronted with the problems of generalization and theory building. Traditionally, geography was considered to be a description of the earth surface, but in due course of time its definition and nature changed. Now, it is concerned with providing accurate, orderly and rational descriptions and interpretations variable character of the earth surface.

After the second world war, greater emphasis was laid on the formulation of abstract models and use of statistical techniques to make geography and its theories more precise in order to have better knowledge of geographical systems and that process is known to be "Quantitative Revolution" in Geography. Quantitative revolution began in USA in mid-1950 in a few selected centers and was led by geographers who had studied natural sciences such as physics and statistics. Quantitative revolution led to the development of location theory, focus of which was on location of economic activities. Central place theory focus of which on size and distribution of settlements within urban systems. Locational analysis it focus the study of spatial arrangement of phenomena of spatial science. In the words of Yeates, "Geography can be regarded as a science concerned with rational development and testing of theories that explain and predict the spatial distribution and location of various characteristics on the surface of the earth".

**Main Features of Quantitative Revolution:**

Displacement of the old Idiographic geography (which emphasis on areal differentiation and regional geography) by a new Nomothetic geography (Spatial Science) seeking to establish laws, models and theories of spatial structure. Quantitative revolution thus involved a paradigm shift (a super model about the growth and development of science) given by S.T. Kuhn which provides deductive and inductive rules about the kind of phenomena in geography which focus on application of scientific laws in geography problem and theory building.

**Objectives of Quantitative Revolution:**

1. To change a descriptive character of geography and make it a scientific discipline.
2. To explain and interpret the spatial patterns of geographical phenomena in a rational, objective & cogent manner.
3. To use mathematical language instead of the language of literature like 'Af' in the Koeppen's classification of climate this stands for 'tropical rainforest climate'.
4. To test hypothesis and formulate models, theories and laws.
5. To identify the ideal locations for the various economic activities so that profit may be maximized.
6. To provide geography a sound philosophical and theoretical base.

**Relevance of Quantitative Techniques in Geography**:

With the introduction and diffusion of quantitative revolution in the field of geography led the major theoretical and methodological development in the subject geography and made the subject more accurate, orderly and rational description in the interpretation of variable characters of earth's surface. There is no exaggeration to say that quantitative techniques play an important role in the discipline of geography:

1. Quantitative techniques are essential tools for analysis and synthesis of data.

2. Quantitative techniques are used to measure phenomenon with highest degree of accuracy.

3. It is with the help of quantitative techniques geographers had been in a position to collect a data over a large area by the method of sampling in such a manner that the analysis with the sample become unit of universe.

4. It was after the quantitative revolution, there was a turning point in the discipline of geography. Because geographers started making models, theories and laws.

**Advantage of Quantitative Techniques in Geographical Studies:**

1) The quantitative techniques are firmly based on empirical observations and readily verifiable.

2) The quantitative techniques help in the estimation, interpolation and simulation of data which are necessary for forecasting.

3) They also help in describing, analyzing and simplifying a geographical system.

4) Locational theories of industries, agriculture land use, intensity and stages of development of landforms can be easily understood and predicted with the help of quantitative techniques.

5) Finally, quantitative revolution based on positivism distinguishes science from metaphysics and religion thus provides the subject of geography a sound philosophical, scientific and methodological base.

**Conclusion:**

"Geographers require skills in the presentation, interpretation, analysis and communication of quantitative data. They are familiar with a range of statistical techniques including simple descriptive statistics, inferential tests and relational statistics such as correlation and regression; principles of research design and ways to collect data; the retrieval and manipulation of secondary datasets; and geospatial technologies such as digital cartography, Geographic Information Systems (GIS) and remote sensing. Attention is given to spatial statistics, to issues of spatial dependency, to spatial difference and to the effects of scale." New data and new technologies are helping to invigorate what we can do with quantitative information, enhancing geographical understandings of the world in creative and imaginative ways. It is about using data to enhance our geographical understanding of the world in fresh and often challenging ways. The hope is that geography students will be 'hands on' in their use of data and data handling tools not just to enhance their numeracy employability and research skills but because the use and critical evaluation of quantitative data is central to geographical debate and enquiry – it is an important part of what geographers do.

**References:**

1. Haggett, P. (1965), *Locational Analysis in Human Geography*, Edward Arnold, London
2. Hussain, Majid (1998): *"Evolution of Geographical Thought"* Rawat Publication, Jaipur
3. Richard Harris (2016): *"Quantitative Geography: the basics*, published by Sage, London
4. Yeates M. H. (1968): *An Introduction to Quantitative Analysis in Economic Geography*, McGraw Hill, New York
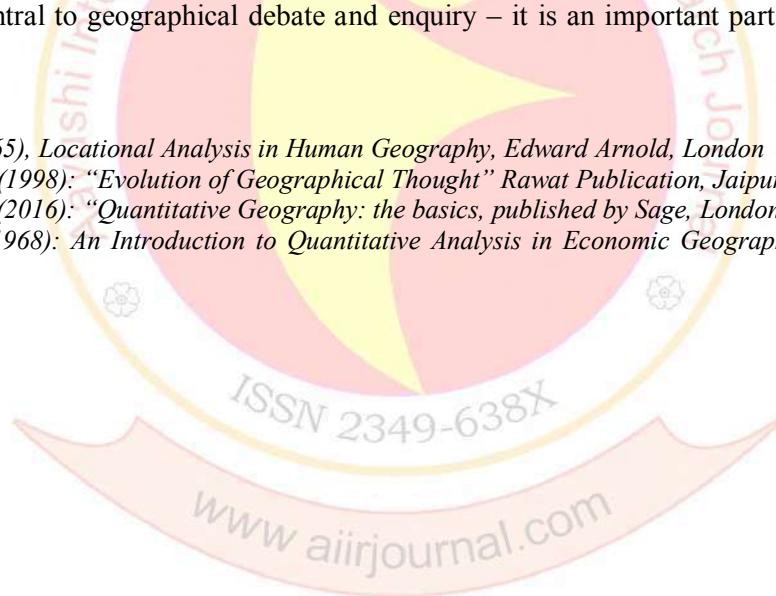
# Disaster Management: The Indian Scenario

**S. N. Kamble**
Department of Geography
Shivneri Mahavidyalaya, Shirur Anantpal Dist.Latur.

**Abstract:**

*Disaster is defined as 'Catastrophic situation in which the normal pattern of life or ecosystem has been disrupted and extraordinary emergency interventions are required to save ad preserve lives and or the environment'. The Disaster Management Act has included man-made disasters also and defines disaster as a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or manmade causes or by accident or negligence which result in substantial loss of life human sufferings or damage to, and destruction of, property or damage to, degradation of environment and is of such a nature or magnitude as to be beyond the coping capacity of the community of an affected area.*

**Keyword:** Catastrophic, Disaster, Ecosystem, Man-made, Degradation,

**Introduction:**

India is one of the most disasters prone countries of the world, almost 80% of India's geographical area is considered at risk to one or more type of natural disaster. Every year between 2000-2009, 65 million people on average in India were affected by disaster, of these; 3.25 million were pregnant and lactating mothers, Every year, 8.45 million children under 5 year of age affected by natural disaster, of these, 1.25 million were malnourished. (UNICEF).

Floods and droughts significantly impact the majority of India though they are most prevalent in the north and northeastern Himalayan region in the north and northern portion of the country where they rank in high deciles for mortality and lower deciles for GDP impact. Cyclones influence a relatively small area of the country but have high-ranking mortality of entire country is significantly impacted by at least one hazard and mortality impacts are particularly concentrated in the northeastern regions. India has also become much more vulnerable to tsunamis since the 2004 Indian Ocean tsunami.

**The Indian Scenario:**

The Indian subcontinent is highly vulnerable to cyclones, droughts, earthquakes, and floods. Avalanches, forest fire and landslides occur frequently in the Himalayan region of northern India. Among the 35 total states/Union Territories in the country, 25 are disaster prone.

**Table 1: People affected. Lives lost & economic damage due to Disasters in India during 1998-2010**

| Year | Type of Disaster | People affected | Life lost | Economic damage (USD x1000) |
|------|------------------|-----------------|-----------|------------------------------|
| 1980 | Flood | 30,000,023 | | |
| 1982 | Drought | 100,000,,000 | | |
| | Flood | 33,500,000 | | |
| 1984 | Epidemic | | 3290 | |
| 1987 | Drought | 300,000,000 | 3000 | |
| 1988 | Epidemic | | | |
| 1990 | Storm | | | 2,200,000 |
| 1993 | Flood | 32,704,000 | | 7,000,000 |
| | Earthquake | | 9,748 | |
| 1994 | Flood | | 2001 | |
| 1995 | Flood | 32,704,000 | | |
| 1996 | Storm | | | 1,500,300 |
| 1998 | Storm | | 2871 | |
| | Extreme Temp | | 2541 | |
| | Flood | | 1811 | |
| 1999 | Storm | | 9,843 | 2500,000 |
| 2000 | Drought | 50,000,000 | | |
| 2001 | Earthquake | | 20,005 | 2,263,000 |
| 2002 | Drought | 300,000,000 | | |
| | Flood | 42,000,000 | | |
| 2004 | Flood | 33,000,000 | | 2,500,000 |
| | Earthquake | | 16,389 | |
| 2005 | Flood | | | 3,330,000 |
| | Flood | | | 2,3000,000 |
| 2006 | Flood | | | 3,390,000 |
| 2009 | Flood | | | 2,150,000 |

*Source*: *"EM-DAT. The OFDA/CRED International Disaster Database.*

On an average, about 50 million people in the country are affected by one or the other disaster every year, besides loss of property worth several million (table 1).

In the 1970s and the 80s droughts and famines were the biggest killers in India, the situation stands alerted today. Its is probably a combination of factors like better resources management and food security measures that has greatly reduced the deaths caused by droughts and famines. Floods, high winds and earthquakes dominate (98%) the reported injuries, with ever increase numbers in the last ten years. The period from 2001 to 2011 has been associated with a large number of earthquakes in Asia that have a relatively high injury to death ratio. Floods, droughts, cyclone, earthquakes landslides and avalanches are some of the major natural disasters that repeatedly and increasingly affect India (table 2).

| *Table-2 : Year-wise damage caused due to floods, cyclonic storms, landslides, etc. during ten years in India.* | | | |
|---|---|---|---|
| **Year** | **Live Lost human (in No.)** | **Cattle Lost (in No.)** | **House damaged (in No.)** | **Cropped areas affected (in Lakh hectares)** |
| 2001-02 | 834 | 21,269 | 3,46,878 | 18.72 |
| 2002-03 | 898 | 3,729 | 4,62,700 | 21.00 |
| 2003-04 | 1,992 | 25,393 | 6,82,209 | 31.98 |
| 2004-05 | 1,992 | 12,389 | 16,03,300 | 32.53 |
| 2005-06 | 2,698 | 1,10,997 | 21,20,022 | 35.52 |
| 2006-07 | 2,402 | 4,55,619 | 19,34,680 | 70.87 |
| 2007-08 | 3,764 | 1,19,218 | 35,27,041 | 85.13 |
| 2008-09 | 3,405 | 53,833 | 16,46,905 | 35.56 |
| 2009-10 | 1,677 | 1,28,452 | 13,59,726 | 47.13 |
| 2010-11 | 2,310 | 48,778 | 13,38,619 | 46.25 |

***Source:*** *Ministry of Home Affairs (MHA).*

The natural disasters directly impact economies, agriculture, food security, water, sanitation, the environment and health each year. Therefore it is one of the single largest concerns for most of the developing nations. Different natural hazards because varying levels of physical damage to infrastructure and agriculture with implications for their indirect and secondary impacts. Drought causes heavy Crop and Livestock loses over wide areas of lad ut typically level infrastructure and productive capacity largely unaffected. Floods and Cyclones cause extensive whereas damage t both infrastructure and agriculture, depending on their timing relative to the agricultural cyclone. While earthquakes have little impact on standing crops excluding localized losses but can cause wide spread devastation of infrastructure and other productive large areas.

The precise cost of the disaster in terms of loss of lives, property, loss of development opportunities, etc. cannot be clearly assessed, counted or scaled. The costs of disaster are clearly inequitable, falling heavily only on the few. Disasters result not only in loss of shelter but also create hardships, lack of food availability, temporary loss of livelihood and disrupt socio-economic activities. Some of the losses may redeemable and compensated for though disaster relief and insurance. However, a part from economic dimension such disturbances have their psychological and social dimensions as well, which need to be studied, and documented besides developing appropriate mitigation strategies.

**Conclusion:**

The preparedness and response phase in the Disaster management cycle are critical in reducing the impact of disasters. The involvement of multi-various stakeholders, therefore, need to ensure efficient inter-departmental coordination and need to constantly review and improve the systems in place it has to be kept in mind o ensure that the focus on these two arrears help in tangible improvement in handling the disasters**.**

**Reference:**

1. *Natural hazards and Disaster management (Vulnerability and mitigation), Rawat Publication, Jaipur.*
2. *Disaster management – G.K.Ghosh, new Delhi.*
3. *Disaster management –Vinod K.Sharma, new Delhi.*
4. *http:/www.ndma.gov.in*
5. *http:/www.aidmi.org*
6. *http:/www.ndmindia.nic.in*

# Quantum GIS - A New Technology in Geographical Research

**Dr. Virbhadra C. Dande**
Assistant Professor,
Dept. of Geography,
D.B.F. Dayanand College of Arts and Science, Solapur.

**Introduction:**

Geographic Information System (GIS) is a computer system build to capture, store, manipulate, analyze, manage and display all kinds of Geospatial or geographical data. GIS application are tools that allow end users to perform spatial query, analysis, edit spatial data and create hard copy maps. In simple way GIS can be define as an image that is referenced to the earth or has x and y coordinate and it's attribute values are stored in the table. These x and y coordinates are based on different projection system and there are various types of projection system. Most of the time GIS is used to create maps and to print. To perform the basic task in GIS, layers are combined, edited and designed.

**Objectives :**

1. To study the new and free Technology in Geographical Research.
2. To study the advantages and applications of QGIS.

**What is QGIS**

QGIS (previously known as Quantum GIS) is a free and open-source cross-platform desktop geographic information system (GIS) application that supports viewing, editing, and analysis of Geographical data.

QGIS can supports shapefiles, personal geodatabases, coverages, dxf, MapInfo, PostGIS, and other formats. Web services, including Web Map Service and Web Feature Service, are also supported to allow use of data from external Geospatial sources.

QGIS integrates with other open-source and Free GIS packages, including PostGIS, GRASS GIS, and MapServer. Plugins written in Python or C++ extend QGIS's capabilities. Plugins can geocode using the Google Geocoding API, perform geoprocessing functions similar to those of the standard tools found in ArcGIS, and interface with PostgreSQL/PostGIS, SpatiaLite and MySQL databases. It is overall a very rich open source geospatial tool.

**QGIS Functions :**

QGIS functions as geographic information system (GIS) software, allowing users to analyze and edit spatial information, in addition to composing and exporting graphical maps. QGIS supports both raster and vector layers; vector data is stored as either point, line, or polygon features. Multiple formats of raster images are supported, and the software can georeference images.

**Advantages of QGIS Software :**

QGIS which was formally known as Quantum GIS is an open- source cross-platform and free desktop geographical information system (GIS) application which helps in viewing, editing and assessing of geospatial data. This software (QGIS) enables users to assess and edit special information, in addition to creating and making available graphical maps. Below are some of the advantages of QGIS software.

**1. Free Software:** QGIS is free software to acquire and less expensive to maintain as compared to other software's like ArcGIS.

**2. Several options present:** QGIS gives its users a world of different options for special processing right from the start and it is free. There are endless tools in respect to the license you acquired.

**3. QGIS has multiple languages:** QGIS is user-friendly the latest versions come in English and different other languages such as Italian, Spanish or French; all this is possible because of their effective translating system. This feature makes it easier for new user to operate.

**4. Greater speed and performance:** QGIS is very fast compared to other software such as ArcGIS or ArcMap etc. It uses a small amount of time to carry out task this is because of the internal structure.

**5. QGIS presents a better documentation:** the official documentation for QGIS are really good. It gives a detailed expiation of how the software is used with examples it also makes available QGIS tutorials.

**6. QGIS is created by very good people:** QGIS has a community made mostly of people who support, write code and are very passionate about it. They have blogs and social accounts, where you can go to find out about new tools they are creating, even to ask questions for free.

**7. Access and Freedom:** one of the biggest advantages of QGIS is that it has the ability to reach and the ability to bring valid tools to many users in all computers.

**8. Compatible:** QGIS is compatible with windows, Linux, android, mac OS. This makes it easier for users to install and use on their personal computers.

**9. Quick study and faster update with QGIS:** the old users of QGIS have worked with a lot of different version in the past and each one of them had a new feature, the evolution of QGIS is very rapid. Each time there is a new version of the software available, it indicates with a pop up window which gives you the option to download, it shows all new feature and you can learn to use them within a day.

**10. Clean conscience:** QGIS users have a clear conscience when using the software since they are not doing anything illegal, QGIS does not use licensed software they are against piracy.

**Important Applications and Uses of QGIS in Geographical Research:**

1. QGIS in Mapping is a central function of Geographic Information System, which provides a visual interpretation of data. Choropleth Map, Research map, Bing map, are the best example for web based QGIS mapping solution it can be free.

2. QGIS can be used as a key tool to minimize accident hazard on roads, the existing road network has to be optimized and also the road safety measures have to be improved.

3. QGIS technology is used to analyze the urban growth and its direction of expansion, and to find suitable sites for further urban development.

4. QGIS can be used in managing transportation and logistical problems.

5. QGIS can be used Environmental Impact Analysis.

6. QGIS can be used to create more effective and efficient farming techniques.

7. QGIS can be used to Disaster Management and Mitigation.

8. Landslide Hazard Zonation using QGIS.

9. QGIS can be used to Determine land use/land cover changes.

10. QGIS can be used to Natural Resources Management and it is also used in afforestation.

11. QGIS can be used to Soil Mapping**.**

12. QGIS based land acquisition management system will provide complete information about the land.

13. QGIS for Planning and Community Development.

14. QGIS provides a valuable toolbox of techniques and technologies of wide applicability to the achievement of sustainable tourism development.

15. QGIS can be used to Worldwide Earthquake Information System:

16. QGIS can be used to Volcanic Hazard Identification**.**

17. QGIS for Drainage Problems in Tea Plantation Areas

18. QGIS can be used to GIS for Public Health:

19. QGIS can be used to Coastal Development and Management:

20. QGIS can be used to River Crossing Site Selection for Bridges.

21. QGIS can be used to Land Use Changes Associated with Open Cast Strip Mining:

22. QGIS can be used to GIS for Wildlife Management.

**Conclusion :**

QGIS can be used to solve the location based question such as "What is located here" or Where to find particular features? QGIS User can retrieve the value from the map, such as how much is the forest area on the land use map. This is done using the query builder tool. Next important features of the QGIS is the capability to combine different layers to show new information. For example, you can combine elevation data, river data, land use data and many more to show information about the landscape of the area. From map you can tell where is high lands or where is the best place to build house, which has the river view. QGIS helps to find new information. It means QGIS is a very important new technique in the field of geographical research.

**References :**

1. ^ *Jump up to:* *ᵃ ᵇ* *"QGIS Official Website". QGIS. Retrieved 16 October 2013.*
2. *Gray, James (2008-03-26). "Getting Started With Quantum GIS". Linux Journal.*
3. *^ Jump up to: **a b c** Cavallini, Paolo (August 2007). "Free GIS desktop and analyses: Quantum GIS, the easy way". The Global Geospatial Magazine.*
4. *https://grindgis.com/geography/11-applications-of-gis-in-geography.*
5. *https://www.omicsonline.org/open-access/application-of-geographic-information-system-gis-in-forest-management-2167-0587-1000145.pdf.*

# Biggest Scenario of Malnutrition in Nandurbar District

**Prof. Satish D. Gavit**
Head, Dept. of Geography,
Shri Chhatrapati Shivaji College Omerga.

**Abstract:**

*The study area is Nandurbar district for malnutrition Nandurbar district is a tribal district of the Maharashtra. Malnutrition is a world problem that can's environmental, economic and medical conditions. While more than two billion adults and children are overweight or obese. Preventing and treating malnutrition involves the under nutrient causes. Government agencies, independent organizations and schools can play a role in preventing malnutrition.*

**Key word:** Malnutrition, SAM, MAM, deficiency, protein, Overconsumption

**Introduction:**

Today Malnutrition affects people in every country. Around 1.9 billion adults worldwide are overweight, while 462 million are underweight. An estimated 41 million children under the age of 5 years are overweight or obese, while some 159 million are stunted and 50 million are wasted. Adding to this burden are the 528 million or 29% of women of reproductive age around the world affected by anaemia, for which approximately half would be amenable to iron supplementation. Malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients. The term malnutrition covers 2 broad groups of conditions. One is 'under nutrition', which includes stunting (low height for age), wasting (low weight for height), underweight (low weight for age) and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals). The other is overweight, obesity and diet-related no communicable diseases (such as heart disease, stroke, diabetes and cancer).

Malnutrition is very dangerous for the mental & physical Development of human being. The area where people get nutritional diet do not suffer from problem of malnutrition, but area known as backward, hilly, educationally and industrially underdeveloped suffer from malnutrition. Of course the factors responsible for the malnutrition need to be identified and addressed. Central government as well state government both have under taken various programmes for the eradication of malnutrition all over India. "Malnutrition is state of physical body which does not get required diets containing necessary vitamins, minerals and proteins essential for brain and physical development". Earlier malnutrition was determined on the weight according to the age. Later on the same normal of weight was connected with height. As per this criterion malnourished children are divided into two types. They are SAM (severe cute malnutrition) & MAM (Moderate acute malnutrition). According to data provided by WHO. In Nandurbar, of the 1.13 lakh children aged less than six years registered with the state women and child development (WCD) department, over a lakh were screened. The survey found 16,900 (16.8 per cent) of the children malnourished. Among them, 3,455 were severely acute malnourished (SAM). This was four times higher than the 821 SAM children recorded in anganwadis across the district in April 2015. The Less food consumption, increased energy expenditure and illness result in poor nutritional state is known as malnutrition. Malnutrition is associated with illness and death. Poor economic condition is one of the principal mechanisms behind the transmission of poverty and inequality from one generation to another. Malnutrition manifests itself in the form of micronutrient deficiencies.

**Study region:**

The study area is Nandurbar district for malnutrition. Nandurbar district is a tribal district of the Maharashtra state and 65% population adiwasi community lived in district. In include District entire part of Navapur, Nandurbar, Taloda, Shahada, Akkalkuva, Akrani (Dhadgaon). Northern boundary of study area is surrounded by Narmada River, passing through M.P. and Gujarat state. The geographical Study area extent is latitudinal extent 21º 30' to 22º0' North and longitudinal extent 73º45' east to 74º35'east. Climate on the whole is hot and dry. Light soil is common. The average rainfall of the area is 792.75mm. The highest temperature recorded is 43ºC. According to 2011 census. The total the population of the study area is 720433. There are 58 PHCS & 290 SPHCS. Other health Institutions like rural hospitals and other hospitals 78 and 40 dispensary are respectively. In the year of 2014-15 situations become grave. Number of children falling in the category of MAM (Moderate acute Malnutrition) rose to 38890. But there is an improvement in the category of SAM (severe acute malnutrition) become the reduced to 8581.

**Objective:**

The study is based on the following objective.
1. To examine the distribution of malnutrition among the children of study area.
2. To detect geographical, social and cultural factors causing malnutrition in tribal of Nandurbar district.

**Materials and Method:**

For the study of malnutrition prevailing among the children of Nandurbar district. The information regarding primary and secondary data has been collected from Zilha parishads and health department of district. The data has been analysis on the basis of statistical method and making tables and maps with help of cartographic technique.

**Results and discussion:**

Malnutrition is a biggest problem in a tribal area in Nandurbar district. Geographically setup has between a satpura and sahyadari mountain.  Malnutrition is a nutrient deficiency or overconsumption. Malnutrition includes under nutrition and over nutrition, both of which can lead to health problems and nutrient deficiencies if not addressed. Under nutrition: This type of malnutrition results from not getting enough protein, calories or micronutrients. It leads to low weight-for-height (wasting), height-for-age (stunting) and weight-for-age (underweight). Over nutrition: Overconsumption of certain nutrients, such as protein, calories or fat, can also lead to malnutrition. This usually results in overweight or obesity. People who are undernourished often have deficiencies in vitamins and minerals, especially iron, zinc, vitamin A and iodine .However, micronutrient deficiencies can also occur with over nutrition. It's possible to be overweight or obese from excessive calorie consumption but not get enough vitamins and minerals at the same time. That's because foods that contribute to over nutrition, such as fried and sugary foods, tend to be high in calories and fat but low in other nutrients. Acute malnutrition is a divasting public health problem of epidemic proportions worldwide, some 50 million Children under the age 5 suffer from acute malnutrition and 19 million of this are most serious type. It means severe acute malnutrition is very serious problem in the entire world. Every year 5 million children die of malnutrition. The scenario of Nandurbar district of Maharashtra is not different.

**Distribution of malnutrition 2014-2015**

| Sr. No. | Area | SAM % | MAM % | Ave % |
|---------|------|-------|-------|-------|
| 1 | Akkalkuva | 4.14 | 26.49 | 15.31 |
| 2 | Akrani ( Dhadgaon ) | 8.49 | 31.37 | 19.93 |
| 3 | Taloda | 4.21 | 25.77 | 14.99 |
| 4 | Shahada | 6.24 | 22.58 | 14.41 |
| 5 | Nandurbar | 4.35 | 17.50 | 10.92 |
| 6 | Navapur | 1.54 | 13.05 | 7.29 |
| | *Source: socio- economic review and District statistical Abstract Nandurbar* | | | |
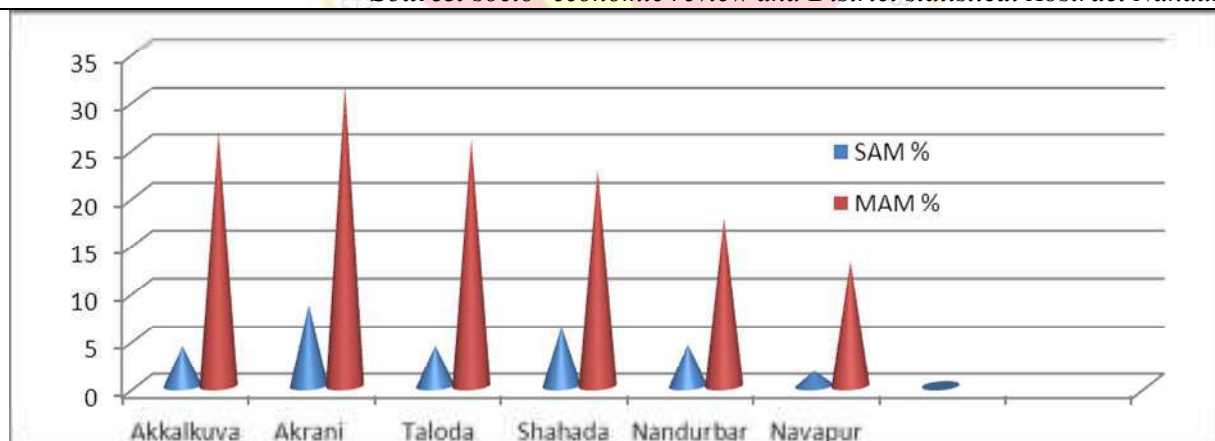


**Severe acute malnutrition (SAM)**

SAM is an important type of malnutrition as per the medical terminology severe acute malnutrition has been defined as a weight for height measurement of 70% prevalence of severe acute malnutrition is estimated at 2 % in the least developed countries and 1 % in other developing countries. This translated to about 20 million severely malnourished children in the world at time.

Table shows the most of the children, indicated belong to SAM category are more than percentage in Akrani (Dhadgaon). There are 8.49 % children affected with SAM. Akrani (Dhadgaon) tahsil is needed more attention for the eradication of malnutrition as compared to other villages. It is severely affected by SAM because it is situated in satpuda mountain remote area and it does not have proper transportation facilities as well as medical facilities. Most of the population of this region belongs to shedual tribe (ST). There are Geographical social and economical factors responsible for SAM., like tradition of early marriage, non-availability of nutritional food, lack of education and orthodox beliefs.

In the other tahsil affected with SAM. Shahada 6.24%, Nandurbar 4.35, Taloda 4.21 Akkalkuva 4.14, Navapur 1.54 severe acute malnutrition.

## Moderate acute malnutrition (MAM):

MAM affects a greater number of children than SAM. While children suffering from both moderate acute malnutrition and sever acute malnutrition are susceptible to illness, severely malnourished children are at greater risk of medical complications and death from illness, infection and micronutrient deficiencies.

As per table it is observed that Akrani tahsil is severely affected by MAM in Nandurbar district of Satpura region around 37.37% children are under the category of MAM. Akrani tahsil is found to be more affected by MAM, it is because Akrani (Dhadgaon) is situated in remote area and because of it agriculture has also become difficult to be undertaken, transportation and medical facilities are also not fully available which ultimately results in malnutrition.

In other tahsil affected with like Akkalkuva 26.49%, Taloda 25.77%, Shahada 22.28%, Nandurbar17.50%, Navapur 13.05%, are also affected by Moderate acute Malnutrition (MAM) same problems to large extent. Lack of nutritional food backwardness among the children of all the above mentioned villages and tahsil are common causes.

## Average malnutrition:

The human body needs energy and nutrients to function if food intake is inadequate the body begins to break down, body fats and muscles, the metabolism begin to show down. Thermal regulation is disturbed, the immune system is weakened & kidney function is impaired.

So far as the average malnutrition is concerned Akrani tahsil is the village where both the type of malnutrition is maximum i.e. 19.93% so this tahsil needs to be looked after. Seriously and proper remedies should be undertaken. Like creation of awareness among the people and making medical facilities available. Shahada, Akkalkuva, Taloda, are also having malnutrition of both types but they are not at the severe stage as Akrani is because their villages are within the range of 7.29% to 19.93% of course they should also be provided with necessary remedies in order to remove the malnutrition. The other villages like Taloda, Akkalkuva, Nandurbar, Shahada, are also not left out of malnutrition in these villages is very low. It is within the range of 7.29% to 19.93.

## Conclusions:

From the above study following conclusion have been drawn.
1. Geographical, social, economical factors have large impact on creating malnutrition among the children.
2. Akrani tahsil is very susceptible village to the malnutrition of the categories viz. SAM and MAM.
3. So far as the SAM is very concerned and navapur tahsil is less affected.
4. Regarding MAM Navapur is less affective.
5. Parents of the children are totally unaware of the existence of malnutrition among their children.

## Suggestion:

1. People of the said region should be made aware of problem of malnutrition.
2. Medical facilities all over the region should be provided.
3. Transportation facilities and nutritional food should be made available.
4. Some organizations on the principle of NGO Should are established for the eradication of malnutrition.

## References:

1. *Z.P. Nandurbar- women and Children Health Department's booklet 2014-15*
2. *Suryawanshi D.S., (2005) Geographical epidemiology. Raj publication jaipur.*
3. *Park K. (2007) textbook of preventive and Social medicine/S banarasidas bhanot publisher,1167,pream Nagar , Jabalpur*
4. *Akhtar Rais, and Learmonth A.T.A., (1986): Geographical aspects of health and Disease in India. Naurang Rai concept. Publishing company, New Delhi (India).*

# Geographical Study of the Public Transportation Problems of Nanded City

**Mr. M. U. Deshmukh**
Research Scholar, School Of Earth Sciences,
Swami Ramanand Teerth Marathwada University, Nanded,
Maharashtra, India, 431606.

**Abstract:**

In the study reason, the important city bus transport problems are as follows: There are other problems in which the rickshaws drivers owners and ST bus contribute much more. The higher increasing road tax by RTO and more competition and the occupation of the rickshaws is the very different to service the occupation to owner and rickshaws drivers, the licensing problem made easy to conduct occupation to owners. In Nanded city there are more rickshaws than the actual licensing because the rickshaws are without licensing found on the road. The ST bus service are satisfactory, so people are found traveling from share rickshaws to all directions from S.T.bus stand, railway station ,old Mondha, S.P. office stops. The transport problems, which are discussed above, are the main problem besides there are also many problems, which disturbs the traffic of Nanded city. The rapidly growing function and size of the city have ultimately resulted in problems of transport and traffic. The roads of the central area have failed to cope with the increasing traffic flow of the city. In order to understand problems of traffic such as regional urban circulation patterns, transport system, road capacities, road geometries, and inaccessibility, so that solution is found out. Such analytical study including the systematic traffic surveys, identification of points of traffic generation etc.

**Keyword: Public Transport**

## Introduction:

The rapidly growing function and size of the city have ultimately resulted in problems of transport and traffic. The roads of the central area have failed to cope with the increasing traffic flow of the city. In order to understand problems of traffic such as regional urban circulation patterns, transport system, road capacities, road geometries, and inaccessibility, so that solution be found out. Such analytical study including the systematic traffic surveys, identification of points of traffic generation etc. In the study reason, the important city bus transport problems are as follows: There are other problems in which the rickshaws drivers owners and ST bus contribute much more. The higher increasing road tax by RTO and more competition and the occupation of the rickshaws is the very different to service the occupation to owner and rickshaws drivers, the licensing problem made easy to conduct occupation to owners .In Nanded city there are more rickshaws than the actual licensing because the rickshaws are without licensing found on the road. The ST bus service are satisfactory, so people are found traveling from share rickshaws to all directions from S.T.bus stand, railway station ,old Mondha, S.P. office stops. The transport problems, which are discussed above, are the main problem besides there are also many problems, which disturbs the traffic of Nanded city.

## Study Area:

Nanded is one of the historical places in Marathwada region of Maharashtra State. It lies in Godavari basin. It is situated between $18^0$ 15' to $19^0$ 55' N latitude and $77^0$ 7' to $78^0$ 15' E longitude. The total area under Nanded-waghala municipal corporation jurisdiction is 61.74 sq.k.m. Nanded is the second largest city in Marathwada after Aurangabad. The state of Andhra Pradesh lies to the east and Karnataka state to the south. The river Godavari flows through the city. Deep Black Soils have limited distribution along the bank of Godawari. The entire study region receives rainfall from June to November. As per provisional reports of Census of India, population of Nanded-Waghala in 2011 is 550539 of which male and female are 286152 and 264412 respectively. **Figure 1.**



LOCATION OF STUDY AREA

## Objective:

❖ To Study The Public Transportation Problems Of Nanded City
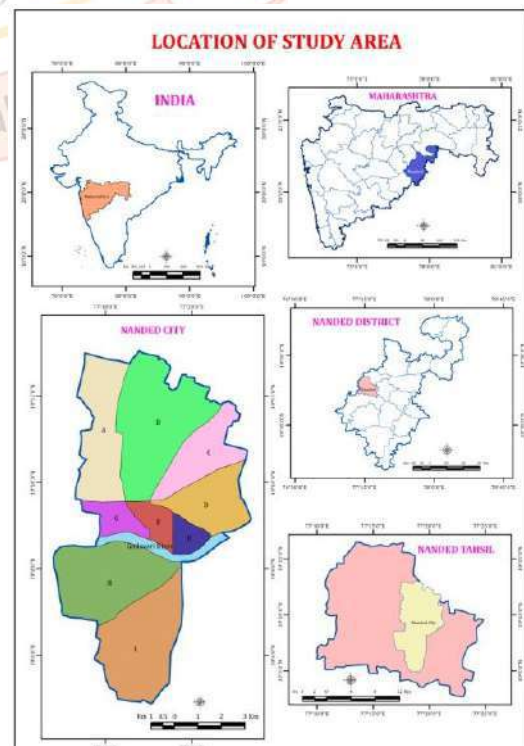
**Brief Review of Methods:**

The required data present study has collected from primary andSecondary Data Collection by various government departments.District Census Hand Book of Nanded District 2001 and 2011.Various branch offices of Nanded Zilla Parishad. Various Municipal Corporation Offices of the Nanded District, Town planning Department Nanded, Nanded Municipal Reports. Data collected data has tabulated, classified, presented, compared and  interpreted with help of various appropriate statistical methods.Tables, Diagrams and maps have used at appropriate place andtheir interpretation has realized the present study.

**Table 1.1: M.S.R.T.C Nanded Division Nanded City Bus Transport Processes**

| Sr. No | Name City Travelling | Distance | Number of Travelling |
|--------|---------------------|----------|----------------------|
| 01 | Ardhapur- Sonkhed via workshop | 39.4 | 24 |
| 02 | Ardhapur-old mondha via workshop | 20.0 | 24 |
| 03 | Alegaon-old mondha via workshop | 23.3 | 10 |
| 04 | Asna bridge-Hudco via Dairy | 16.2 | 14 |
| 05 | Asna bridge- Hudco via Sambhaji chowk | 14.8 | 14 |
| 06 | Ardhapur-Railway station  via workshop | 19.1 | 08 |
| 07 | Alegaon-railway station via workshop | 21.5 | 02 |
| 08 | Asna bridge- Railway station via workshop | 07.2 | 04 |
| 09 | Chudawa- Railway station via workshop | 23.3 | 02 |
| 10 | Chudawa-Old mondha via workshop | 24.7 | 10 |
| 11 | Chimegaon- Old mondha via workshop | 12.8 | 14 |
| 12 | Chimegaon- Railway station via workshop | 11.0 | 02 |
| 13 | Chikala-- Railway station | 16.9 | 16 |
| 14 | Hudco- Railway station via Sambhaji chowk | 08.6 | 48 |
| 15 | Hudco- Railway station via Dairy | 10.0 | 42 |
| 16 | Hudco- Railway station via Degloor naka | 10.1 | 40 |
| 17 | Hudco-kabra nagar via Anand nagar | 14.0 | 28 |
| 18 | Hudco-kabra nagar via Sambhaji chowk | 13.7 | 14 |
| 19 | Hudco-kabra nagar via Degloor naka | 16.2 | 28 |
| 20 | Hudco-kabra nagar via ITI | 14.2 | 28 |
| 21 | Hudco-Matasab via Maltekadi | 21.1 | 10 |
| 22 | Hudco-Shobhanagar via workshop | 13.7 | 03 |
| 23 | Jaitapur- Railway station via Naleshwar | 18.5 | 04 |
| 24 | Jaitapur- Martala via Degloor naka | 35.8 | 12 |
| 25 | Koutha-old mondha via workshop | 20.3 | 12 |
| 26 | Kabra nagar- railway station via workshop | 06.1 | 16 |
| 27 | Mudkhed- Railway station via Degloor naka | 22.9 | 24 |
| 28 | Mlegaon- railway station via workshop | 22.8 | 08 |
| 29 | Mlegaon-Sonkhed via university | 40.3 | 24 |
| 30 | Martala-Railway station | 17.8 | 04 |
| 31 | Matasab-Railway station | 14.9 | 02 |
| 32 | MGM-Railway station | 04.6 | 02 |
| 33 | MGM-University via Ambedkar Chowk | 10.8 | 22 |
| 34 | MGM-University via Asarjan | 11.6 | 20 |
| 35 | Old mondha- Railway station | 01.9 | 20 |
| 36 | Old mondha-Pawde wadi | 07.6 | 24 |
| 37 | Railway station-Shobha nagar | 06.1 | 01 |
| 38 | Railway station-sonkhed | 18.7 | 16 |
| 39 | Railway station -Shiradhone | 27.8 | 24 |
| 40 | Railway station –RTO | 08.8 | 02 |
| 41 | Railway station- Pawde wadi | 06.7 | 02 |
| 42 | Railway station- Tuppa | 09.2 | 24 |
| 43 | Railway station-University via Ambedkar chowk | 08.6 | 02 |
| 44 | Railway station-University via Asarjan | 09.4 | 04 |
| 45 | RTO-Shobha nagar | 13.9 | 12 |
|  | **TOTAL** | **682.5** | **982** |

*Source: M.S.R.T.C.*

### Table No. 1.2: Avalable City Buses: October 2010 To October 2011

| S.R | Month | M.S.R.T.C | Jnnanu R. S. Buses | Total Buses |
|---|---|---|---|---|
| 1 | Oct 2010 | 10 | 15 | 25 |
| 2 | Nov 2010 | 10 | 15 | 25 |
| 3 | Dec 2010 | 10 | 15 | 25 |
| 4 | Jan 2011 | 0 | 25 | 25 |
| 5 | Feb 2011 | 0 | 30 | 30 |
| 6 | Mar 2011 | 0 | 30 | 30 |
| 7 | April 2011 | 0 | 30 | 30 |
| 8 | May 2011 | 0 | 30 | 30 |
| 9 | Jun 2011 | 0 | 30 | 30 |
| 10 | Jully 2011 | 0 | 30 | 30 |
| 11 | Aug 2011 | 0 | 30 | 30 |
| 12 | Sep 2011 | 0 | 30 | 30 |
| 13 | Oct 2011 | 0 | 30 | 30 |

*Source : M.S.R.T.C.*

### Table 1.3: M.S.R.T. Corporation Nanded Division, Nanded City Buses Transport Information

| Sr. No | Goshwara | K.M/Number | | |
|---|---|---|---|---|
| 01 | Buses | 40 | | |
| 02 | Number Of Road | 45 | | |
| 03 | Number Of Travels | 681 | | |
| 04 | K.M | 10682.4 | | |
| 05 | Total Number Of Customer | 28000 | | |
| 06 | Pairs Of Workers Average | 83 | | |
| 07 | To Use Average Vehicles' | 267.1 | | |
| 08 | Use Of Worker | 128.7 | | |
| 09 | Average Of Working Hours | 7.23 | | |
| 10 | Average Of Working Cycle Time | 6.55 | | |
| 11 | Time Of Travelling | 04 :30 To 00:30 | | |
| 12 | No Of Buses And No Of Seals<br>A] M.S.R.T.C.BUSES<br>B]SEM LOW FLOWER<br>C]MINI BUSES | Number<br>10<br>20<br>30 | Set Capacity<br>42<br>46<br>26 | |
| 13 | Length Of Road In Meter<br>A] MINIMUM<br>B] MAXIMUM | 1.9<br>40.3 | | |
| 14 | Average Length Direction Travels | 19.3 | | |

*Source: M.S.R.T.C.*

Public transport of Nanded city is not efficient and major portion of public transportation share by city bus transportation and auto rickshaws. Actually, city buses are not follows proper timetable where as auto rickshaws do not have timetable.

Total number of city bus travelling on per day is 982 including both ways where as total distance in km 682 km per day. By the observation of the city bus transportation found that Hudco are having highs travelling and second largest travelling towards via. Vishnupuri to University i.e. 48 travling of city buses. City buses travelling in Nanded are distributed.

**Suggestions and Concussion:**
1. To improve the quality of road so that the traffic of vehicles will be continued as smoothly and fairly.
2. The location of ST bus stop must have favorable site , because these stops are not found proper place. Now the city bus stops are properly placed with occur the difficulties to the other vehicles
3. The S.T bus must to properly maintain as the serve better to the people. the quality of buses are too poor and they cause more pollution.
4. The rickshaws stops may be properly arranged to make travel to all places of the city. Now there are some difficulties to travel from one place to another place directly.
5. The taxes of vehicles, particularly of rickshaws must be reduced, so that they can service the business.

6. The more no's licenses should not be used for the rickshaws owners, which make more competition, which results in the decline of the no. of the rickshaws.

7. All above are the main suggestion to the improve the transport system of Nanded city.

**References:**

1. *A Survey of Research In Geography, (1972-75), Sponsored by ICSSR, Concept Publishing Company, New Delhi.*

2. *Abercrombie, Sir P., 'Town and Country Planning',(Second Edition)*

3. *Abrams (1953) Urban Land problems and policies: Housing, Town and country planning, Bulletin No. 7, UNO, 1953.*

4. *Alam, S. M., (1965), 'Hyderabad - Secunderabad Twin Cities: A Study in Urban Geography', Allied Publishers Pvt. Ltd., Mumbai, P. 82.*

5. *Annual Report of Govt. Meteorological Observatory, Mamurabad (Nanded) (2003).*

6. *Bhagawat Rimal (2011) Urban Growth and land use / land cover change of Pokhara Sub-Metropolitan City, Nepal. Journal of Theoretical and Applied Information Technology, vol. 26 (2), pp. 118-129.*

7. *Bhende A. A. and Kanitakar T., (1988), 'Principles of Population Studies', Himalaya Publishing, Bombay, P. 151.*

8. *Bijlani, H. U., (1977), 'Urban Problems', Indian Institute of Public Administration, New Delhi, P. P. 122-140.*

9. *Bikram kumar Datta and Sanhita Bandyopadhyay (2011), Management of Delhi's urban growth and shrinkage. Proceedings REAL CORP 2011, Tagungsband, 18-20 May 2011, 581-590.*

10. *Census of India, (1971), Series II, Maharashtra, Part - I, A General Population Table (1971), Director of Census Operation, Maharashtra.*

11. *Census of India, 1971 Series II, Maharashtra, Part I- A, general Population Table (1971), Directorate of Census Operations, Maharashtra.*

12. *Census of India, District Census Handbook, Nanded District, (1991), P.P. 17, 18.*

13. *Census of India, District Cenus Handbook, Nanded District, 2001.*

14. *Chandana R. C. and Sidhu M. S. (1980), 'Introduction to Population Geography', Kalyani Publishers, New Delhi, P.56*

15. *Chapin F. S., (1957) 'Urban Landuse Planning', Harper and Brothers, New York, Vol.XIV, PP. 102.*

16. *Chatterjee, A. B., (1965), 'Ecological Structure of Calcutta Twin City', The National Geographical Journal of India, Vol. 11, P.P. 59-62.*

17. *Cherunilam Francis, (1984), 'Urbanisation in Developing Countries' A Socio-economic and Demographic Analysis, Himalaya Publishing House, Mumbai, P. 112.*

18. *Clarie W. H., (Ed.), (1969), 'Urban Planning Guide' - ASCEM & R, 49, New York.*

19. *Corey, K. E. and Staffard, H. A., (1969), 'Planning for Location change in the Delivery of Medical Care : A Selected Bibliography', Minticello, Illonois.*

20. *De, N. K. and Bose A. K., (1989), 'Urbanization and Environmental Problems', Ed. by S. D. Maurya, Chaugh Publication, Allahabad (India), P.P. 214, 215.*

21. *Development Plan Report of Nanded City (2002), Town Planning Department, Nanded City.*

# Water Management

**Dr. Sangita Ghar**
Department of Geography,
Jaikranti Sr. College, Latur.

## Introduction:

Water resources management approaches around the world are changing dramatically. This "changing water paradigm" has many components, including a shift away from sole, or even primary, reliance on finding new sources of supply to address perceived new demands, a growing emphasis on incorporating ecological values into water policy, a re-emphasis on meeting basic human needs for water services, and a conscious breaking of the ties between economic growth and water use. A reliance on physical solutions continues to dominate traditional planning approaches, but these solutions are facing increasing opposition. At the same time, new methods are being developed to meet the demands of growing populations without requiring major new construction or new large-scale water transfers from one region to another. More and more water suppliers and planning agencies are beginning to explore efficiency improvements, implement options for managing demand, and reallocating water among users to reduce projected gaps and meet future needs. The connections between water and food are receiving increasing attention as the concerns of food experts begin to encompass the realities of water availability. These shifts have not come easily; they have met strong internal opposition. They are still not universally accepted, and they may not be permanent. Nevertheless, these changes represent a real shift in the way humans think about water use. This paper summarizes the components of this ongoing shift and looks at the new paths being explored. It evaluates the major reasons for the change in approach and discusses the applicability of these new concepts in different parts of the world

## Water resources

Sources of water that is potentially useful. Uses of water include agricultural, industrial, household, recreational and environmental activities. The majority of human uses require fresh water. 97% of the water on the Earth is salt water and only three percent is fresh water; slightly over two thirds of this is frozen in glaciers and polar ice caps.[1] The remaining unfrozen fresh water is found mainly as groundwater, with only a small fraction present above ground or in the air.[2]

Fresh water is a renewable resource, yet the world's supply of groundwater is steadily decreasing, with depletion occurring most prominently in Asia, South America and North America, although it is still unclear how much natural renewal balances this usage, and whether ecosystems are threatened.[3] The framework for allocating water resources to water users

## Surface water

Surface water is water in a river, lake or fresh water wetland. Surface water is naturally replenished by precipitation and naturally lost through discharge to the oceans, evaporation, evapo transpiration and groundwater recharge.

## Groundwater

Groundwater is fresh water located in the subsurface pore space of soil and rocks. It is also water that is flowing within aquifers below the water table. Sometimes it is useful to make a distinction between groundwater that is closely associated with surface water and deep groundwater in an aquifer (sometimes called "fossil water").

## Economic Activities Based On Water:

It is estimated that 22% of worldwide water is used in industry.[6] Major industrial users include hydroelectric dams, thermo electric power plants, which use water for cooling, ore and oil refineries, which use water in chemical processes, and manufacturing plants, which use water as a solvent. Water withdrawal can be very high for certain industries, but consumption is generally much lower than that of agriculture.

Water is used in renewable power generation. Hydroelectric power derives energy from the force of water flowing downhill, driving a turbine connected to a generator. This hydroelectricity is a low-cost, non-polluting, renewable energy source. Significantly, hydroelectric power can also be used for load following unlike most renewable energy sources which are intermittent. Ultimately, the energy in a hydroelectric power plant is supplied by the sun. Heat from the sun evaporates water, which condenses as rain in higher altitudes and flows downhill. Pumped-storage hydroelectric plants also exist, which use grid electricity to pump water uphill when demand is low, and use the stored water to produce electricity when demand is high.

Hydroelectric power plants generally require the creation of a large artificial lake. Evaporation from this lake is higher than evaporation from a river due to the larger surface area exposed to the elements, resulting in much higher water consumption. The process of driving water through the turbine and tunnels or

pipes also briefly removes this water from the natural environment, creating water withdrawal. The impact of this withdrawal on wildlife varies greatly depending on the design of the power plant.

Pressurized water is used in water blasting and water jet cutters. Also, very high pressure water guns are used for precise cutting. It works very well, is relatively safe, and is not harmful to the environment. It is also used in the cooling of machinery to prevent overheating, or prevent saw blades from overheating. This is generally a very small source of water consumption relative to other uses.

Water is also used in many large scale industrial processes, such as thermoelectric power production, oil refining, fertilizer production and other chemical plant use, and natural gas extraction from shale rock. Discharge of untreated water from industrial uses is pollution. Pollution includes discharged solutes (chemical pollution) and increased water temperature (thermal pollution). Industry requires pure water for many applications and utilizes a variety of purification techniques both in water supply and discharge. Most of this pure water is generated on site, either from natural freshwater or from municipal grey water. Industrial consumption of water is generally much lower than withdrawal, due to laws requiring industrial grey water to be treated and returned to the environment. Thermoelectric power plants using cooling towers have high consumption, nearly equal to their withdrawal, as most of the withdrawn water is evaporated as part of the cooling process. The withdrawal, however, is lower than in once-through cooling systems.

## Water Use by Industry

Agriculture is the largest user of water in India. 90% of India's water is used by agriculture and livestock. Municipalities use 7%, and industry uses 3%. (Food and Agriculture Organization) The worldwide average of water use by industry is 19%. (Nexus Learning) The United States only uses 5% of its water for industry. (National Atlas)

Coca-Cola is one industry that has caused major water contamination and depletion problems in India. The Plachimada Solidarity Committee has presented research that shows that Coca-Cola was negligent and their actions between the years of 1999-2004 contaminated the ground water which contributed to making individuals in the community ill. They are also responsible for contaminated the soil and causing problems with agriculture. (PBS) (Global Research) Issues with Coca-Cola in India were briefly highlighted in the movie Flow: For Love of Water. The following video is a short news story about the accusations toward Coca-Cola and the demands for $47 million in compensation.

## Agricultural

It is estimated that 70% of worldwide water is used for irrigation, with 15-35% of irrigation withdrawals being unsustainable.[6] It takes around 2,000 - 3,000 litres of water to produce enough food to satisfy one person's daily dietary need.[7] This is a considerable amount, when compared to that required for drinking, which is between two and five litres. To produce food for the now over 7

## Energy and Mining

Coal is the largest energy source used in India and accounts for 68%. Gas and hydro power both account 12% each. (World Nuclear Association) Hydro power is discussed later in this post. Coal mining has created toxic environments for its residents and has polluted groundwater. (News Security Beat) Extensive coal mining in China has placed serious stress on its water resources, and it is expected that the same issues will surface in India. (Gigaom)

India has used nuclear power since the 1960s. (India's Atomic Energy Program) 3.7% of India's electricity use comes from nuclear power. Political ramifications of nuclear energy have hampered India's nuclear program. (World Nuclear Association) Nuclear power plants use a large amount of water and have to be situated near a reliable water source. The fact that the majority of their rainfall comes during the monsoon season makes reliable water sources scarce in India.

Smaller scale renewable energy sources such as bioenergy and solar power are becoming more popular in India. The government's Ministry of New and Renewable Energy is pushing for the implementation of these renewable energy sources in small communities. It takes time and money to get the infrastructure in place. These sources are clean energy have the potential to decrease dependence on more environmentally taxing energy sources and could also help the water resources by removing the sources of contamination. (Government of India)

## References:

1. "Earth's water distribution". United States Geological Survey. Retrieved 2009-05-13.
2. "Scientific Facts on Water: State of the Resource". GreenFacts Website. Retrieved2008-01-31.
3. Gleeson, Tom; Wada, Yoshihide; Bierkens, Marc F. P.; van Beek, Ludovicus P. H. (9 August 2012). "Water balance of global aquifers revealed by groundwater footprint".Nature. 488 (7410): 197–200. doi:10.1038/nature11295. Retrieved 2013-05-29.
4. "The World's Water 2006-2007 Tables, Pacific Institute". Worldwater.org. Retrieved2009-03-12.
5. Pulitzer Center on Crisis Reporting Archived July 23, 2009, at the Wayback Machine.

# Rural Settlement Pattern of Shrigonda Tahsil: A Geographical Study

**Vijay J. Dalvi**
Assistant Professor, Department of Geography,
Rajarshi Shahu Mahavidyalaya, (Autonomous) Latur.

**Abstract:**

As a rural settlement is primarily an agricultural workshop, any change in the agricultural landscape is bound to radiate modifications in the character and distribution of settlements. The shape and arrangement are often in conformity with the nature of work and agricultural techniques. The evolution of rural settlements in Shrigonda tahsil can be traced back to the earliest organized settlement of men in the region. But the first settlers have hardly left any actual record of their habitation. The relics of the implements used by them at some places can be helpful in forming rudimentary ideas of their lives. Many villages in Shrigonda tahsil grew up along the network of the communications system. The opening of railway stations and creation of cross roads gave rise to new hamlets, which developed with the advancement of time and needs of the inhabitants. Shops were attracted to such centres and they gradually developed into rural trading centres. Kasti settlement in Kasti circle is fast developing into an important urban center is an example of this type. During recent periods, the caste factor has given rise to some of the villages in Shrigonda tahsil. Initially the persons of one caste settled at a place and accordingly the people of that specific caste are larger in population size. Kolgaon and Mundhekarwadi are the settlements of this type.

**Keywords:** Rural Settlement, Pattern.

**Introduction:**

Wherever in rural areas the land is suitable having adequate water supply, relatively higher and slopy ground free from floods, and a fertile agricultural land surrounding this site, settlements such as a hamlet or village are attracted to it. The origin of several villages in Shrigonda tahsil is due to this reason. These factors also determine the morphometric development of rural settlements in the region.

The present structure and character of a rural settlement can be properly comprehended by knowing the complex cultural background evolved with the origin of settlement. The process of early settling led to the union of families into villages. The fields once cleared laboriously were to be kept cleared. This demarcation of fields from habitation developed a sense of integrated community life comprising several families (Ahmad 1954:33). The idea of collective security and defense against different kinds of adverse and inclement forces further strengthened the process of cohesion among families.

The settling of men in the clearings of dense forests may be regarded as the precursor of rural settlements. These early habitants were constantly exposed to the hazards of life and belongings from the plundering hordes of tribes and from wild animals too. The instinct to combat the danger from surrounding tribes and the need of collectivity and cooperation in the construction of building, village wells, and tanks for irrigation, etc. brought people closer and closer. In the areas where wandering tribes had settled down, the mere tribal instinct of association induced stimulus to form compact settlements (Mandal 1979: 91).

These settlements originated relatively on high sites amid fertile agricultural areas where water supply was plentiful and life could be secure They were, however, unplanned village with poor transport facilities. For this reason, they were often close to river courses. Thus, settlements with the emergence of permanent agriculture were established.

The process of division of labour between different classes of inhabitants according to their capabilities led to the division of the village on the basis of *Varnas*. Thus came into existence the professional settlements as distinct from the ones inhabited by general agricultural communities. As the time went by the *Varnas* were established into castes. The caste system bred intolerance of people gradually came to be settled in separate *wadis* or *vastis*. These *wadis* or *vastis* are the origin of cluster or hamlet type settlements (*Ibid*).

**Study Area:**

Ahmednagar district has 14 Talukas. The district has 1581 villages out of which 2 villages are deserted. In Ahmednagar district Shrigonda tahsil is selected as a study region. Shrigonda is located south west part of district. It lies between $18^0$ 21' 18" N to $18^0$ 54' 07" N latitude and $74^0$ 23' 11" E to $74^0$ 56' 40" E longitude. The total geographical area of tahsil is 1605.61 sq. Km which contributes 9.22 per cent of the district. According to 2011 census, the total population of tahsil was 284841 and it consist 114 villages.

**Aims and Objectives:**

The following are the aims and objectives of the present research work.

i)      To study the pattern of rural settlements.

**Hypothesis:**

The present study proceeds to examine the following hypothesis:

1.      The rural settlements of Shrigonda tahsil depend upon the physical and human factors in respect to pattern.

**Database and Methodology:**

For the present research work data has been collected through both the sources primary and secondary. Primary data has been collected through questionnaires, interview methods, and observations. Secondary data has been collected from district census hand book, district statistical abstract, Gram Panchayat Office, Tahsil, Panchayat Samiti Office, Zilla Parishad Office different books, journals, internet and topographical sheets. The primary and secondary data thus collected has been processed. The processed data has been presented in the form of table, graphs, diagrams and maps.

**Patterns of Rural Settlement:**

Rural Settlements in Shrigonda tahsil are studied with the help of patterns they are shaped with. The settlements are of 11 different patterns. They are – rectangular, square, triangular, pentagonal, hexagonal, linear, starshape, Y shape, L shape, circular and irregular.

**Table No. 1: Patterns of Rural Settlements**

| Sr. No | Patterns of Settlements | No of Settlements | Percentage |
|--------|------------------------|-------------------|------------|
| 1 | Rectangular | 16 | 14.06 |
| 2 | Square | 20 | 17.53 |
| 3 | Triangular | 8 | 7.08 |
| 4 | Pentagonal | 3 | 2.63 |
| 5 | Hexagonal | 7 | 6.14 |
| 6 | Linear | 9 | 7.87 |
| 7 | Starshape | 4 | 3.5 |
| 8 | Y shape | 6 | 5.26 |
| 9 | L Shape | 6 | 5.26 |
| 10 | Circular | 10 | 8.77 |
| 11 | Other/irregular | 25 | 21.9 |
| | **Total** | **114** | **100** |

*Source: Compiled by the Researcher.*

It is observed that in Shrigonda 16 settlements are of rectangular shape, 20 settlements are of square shape. Triangular shape is of 8 settlements. 3 settlements are of pentagonal type. 7 settlements are of hexagonal shape. 9 settlements are of linear shape. Starshape is of 4 settlements. Y shape is of 6 settlements. L shape is of 6 settlements. Circular shape is taken by 10 settlements, and irregular shape is of 25 settlements.
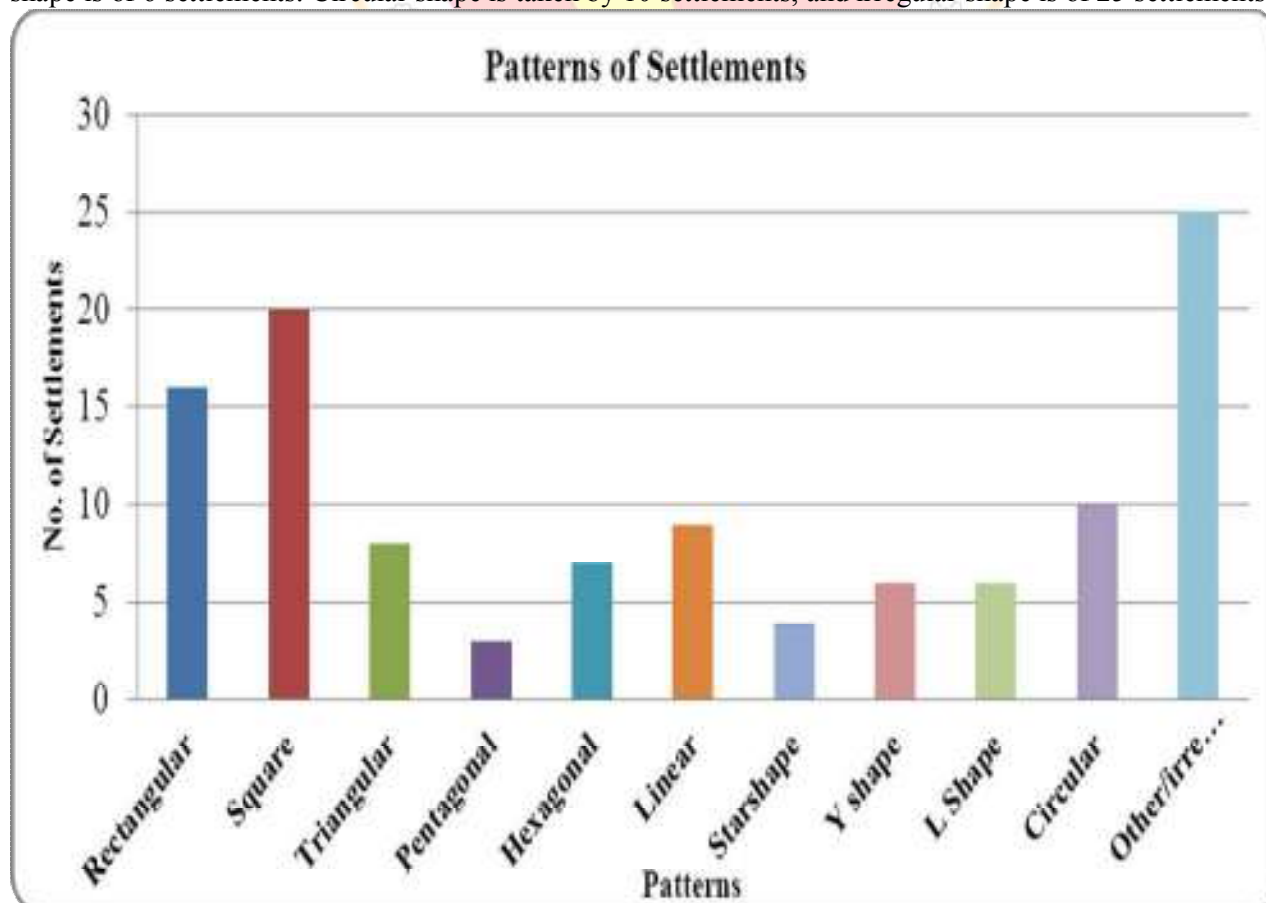
**Circlewise Patterns of Rural Settlements**

There are sixteen patterns of settlements observed in Shrigonda tahsil. Their circlewise distribution is as follows:

**Table No. 2: Circle wise Patterns of Rural Settlements**

| Sr. No | Circle | Patterns of Rural Settlements | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Rect ungu lar | Squ are | Tri ang ular | Pen tago nal | Hex ago nal | Li ne ar | Star sha pe | Y Sha pe | L Sha pe | Circ ular | Irre gula r | |
| 1 | **Shrigonda** | 2 | 4 | 1 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 19 |
| 2 | **Pedgaon** | 2 | 2 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 0 | 3 | 15 |
| 3 | **Kasti** | 1 | 2 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 4 | 12 |
| 4 | **Chimbhale** | 3 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | 12 |
| 5 | **Belwandi** | 0 | 2 | 1 | 0 | 1 | 3 | 0 | 0 | 1 | 2 | 1 | 11 |
| 6 | **Deodaithan** | 7 | 3 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 1 | 16 |
| 7 | **Mandavgan** | 0 | 4 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 2 | 2 | 13 |
| 8 | **Kolgaon** | 1 | 3 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 3 | 5 | 16 |
| **Total** | | **16** | **20** | **8** | **3** | **7** | **9** | **4** | **6** | **6** | **10** | **25** | **114** |

*Source: Compiled by the researcher.*

In Pedgaon circle out of 15 settlements, 2 settlements Kansewadi and Arvi are of rectangular shape. 2 settlements namely Shedgaon and Kavtha are square in its structure. 2 settlements – Pedgaon and Mundhekarwadi are linear shaped. Settlemnts Hiradgaon and Taklikadevalit are of starshaped. Ajnuj and Chikhalthanwadi are of Y shaped. Anandwadi and Angare are of L shaped whereas Shipalkarwadi, Chandgaon and Adhorewadi are of irregular pattern.

Kasti circle has total 12 settlements out of which Janglewadi settlement is of rectangular pattern. 2 settlements Dokraimala and Gar are of square type. Triangular shaped settlements are Wangdari and Nimgaon Khalu. Limpangaon settlement is of circular in its shape and Kasti settlement is hexagonal in its pattern. Domalewadi settlement is of linear in its pattern. 4 settlements – Sangvi Dumala, Masalwadi, Mhatarpimpri and Chormalewadi are of irregular structure.

Chimbhale circle includes 12 settlements. These settlements differ in their pattern. 3 settlements namely Hangewadi, Loni Vyanknath are Yelpane rectangular in its structure. Madhewadgaon is the squareshaped settlement. Mahadeowadi and Poliswadi are triangular shaped settlements. Bori and Shirasgaon Bodkha are of hexagonal and linear shaped settlements respectively. Chimbhale, Parvatwadi, Pisore Bk and Baburdi are the settlements of irregular type.

Belwandi circle has total 11 settlements. Two of them are square in its shape. They are Pimpri Kolandar and Pimpalgaon Pisa. Kondegavhan settlement is triangular in its structure. Ghargaon settlement is of hexagonal type. Erandoli, Kharatwadi and Ghotvi are linear in its shape. Ukkadgaon settlement is L shaped, Belwandi Bk and Pargaon Sudrik are circular in its pattern and Khetmalaswadi is of irregular pattern.

Deodaithan circle has total 16 settlements. 7 of them are rectangular in its shape. They are – Gavhanewadi, Arangaon Dumala, Dhawalgaon, Sarola Somwanshi, Mhase , Wadgaon Shindodi and Deodaithan. 3 settlements Nimbvi, Koregavhan and Raygavhan are square shaped and Math settlement is of triangular in its structure. 2 settlements – Mengalwadi and Yevati are Y shaped. Danewadi and Rajapur settlements are circular in its structure. Hingni Dumala settlement is irregular in its pattern.

Mandavgan circle has 13 settlements. 4 of them namely Taradgavhan, Chavarsangvi, Thitesangvi and Ruikhel are of square shaped. Khandgaon is triangular in its structure. Banpimpri, Ghogargaon, Mandavgan and Wadghul settlements are pentagonal, hexagonal, linear and L shaped in their shape respectively. Mahandulwadi and Kamthi settlements are circular in its structure and 2 settlements – Pisore Khand and Bangarde are irregular in its pattern.

Kolgaon circle has 16 settlements. Suregaon settlement is rectangular in its arrangement. Ukkalgaon, Ghutewadi and Chikhali are of square pattern. Pandharewadi, Kothul, Lagadwadi and Bhapkarwadi are linear, starshaped L shaped, Y shaped settlements respectively. 3 settlements Kolgaon, Chamburdi and Koregaon are circular in their patterns. 5 settlements namely Vithekarwadi, Mungusgaon, Visapur, Bhangaon and Dorje are of irregular pattern.

**Conclusions:**

In Shrigonda circle among 19 settlements, 2 settlements Kokangaon and Velu are of rectangular figure. 4 settlements namely Bhingankhalsa, Bhingan Dumala, Ghugalwadgaon and Takli Lonar are square in its shape. 1 settlement, Mahadeowadi, is of triangular pattern. 2 settlements Wadali and Kosegavan are of

pentagonal in its structure. 3 settlements - Tandli Dumala, Deulgaon, Ghodegaon are of hexagonal type. 2 settlements Dokewadi and Gavhanewadi are of linear shaped. And the settlements Adhalgaon, Mahadeowadi, Bhavadi, Belwandi Kothar and Chorachiwadi are of starshaped, Y shaped, L shaped, circular and irregular pattern respectively.

**Reference:**

1. Fisher, R.A., 1936, Discriminant Function Analysis, Ann. Eugenics, 7, 179.
2. George, P.T. and Raju K.N., 1981, Absorption of Human Resource in command Area; A study in Nagarjunasagar left Bank canal command Area (A.P.), NIRD, Hyderabad.
3. Hanumantha, Rao, C.H., 1966, Alternative Explanation of the Inverse Relation between Farm size and output per acre in India, I.E. Review 1(2), 1-12 pp.
4. Hotelling H. 1931, Multivariate Analysis Ann. Math, Stat. 2; 360
5. Indian Society of Agricultural Economics Annual Proceeding; Techniques of field surveys in Agriculture Economics (1956), 231 pp. – 16th conference.
6. Sastri C.P., 1958, Input – output in Indian farm Economy, 18th Annual conference of I.S.A.E. Note xv, 47 pp.
7. Socio-Economic Abstract and Census of India, 2011.

# Spatio-Temporal Changes in Landuse : A Case Study of Latur Tahsil

**Dr. S. G. Birajdar**
Dept. of Geography,
Indira Gandhi (SR.) Cidco, New Nanded.

**Abstract:**

 The present paper deals with the spatio-temporal analysis of General lauduse Pattern of Latur Tahsil (1990-1995 & 2005- 2010). General landuse pattern of the Latur Tahsil differs more  from the Maharashtra State due to its, location and physical setting.  The land not available for cultivation is move in the western and northern part of the Tahsil occupying the uplands of the  Balaghat and  North, Eastern region with  slightly forest  cover.  Whereas the proportion of agricultural land is move in the  North  East  and  North Western  part  which has relatively  more level area. The  Potential agricultural land, which can be brought  under cultivation is  confined  to the north- western and south- eastern part  of the study area,  having  thus  presented  the  over  all picture  of  general  land use a detailed analysis of the same using quinguennial  averages for  1990- 1995 and 2005- 2010 and the respective  spatio- temporal changes  there  in.

 Form  the spatial  analysis  of  General  land use pattern  it is observed that there is   positive change in Non- Agricultural  land of  latur circle  (7.27%) and   remaining all circle shows negative change. In case of potential agricultural land, positive change observed in Murud circle  (7.19%)  and  in case of agricultural  land positive change in  Murud circle. In  temporal analysis of general landuse Pattern of Latur Tahsil it is   observed that their is a positive change in Non- agricultural land  and   Net  sown area by 0.64 % and  1.24 % respectively.

## Introduction:

 General land use is changing as per space and time in Latur tahsil.  The population of Latur tahsil is increasing very fastly and the changes are taken place in general land use in Latur tahsil.  Land is being used by the peoples for different categories in different circles of Latur tahsil from 1990-95 to 2005-10.

 It is very necessary to examine the general land use time to time for apply of some breaks, either at the administrative level for the beneficiaries of the farmers. The study of spatio temporal changes in general land use will be useful for administrators and planners.

 There are many geographical factors affects on the general land use of Latur tahsil.  Physiographic, geology, climatic conditions, soil and vegetations are the main factors effects on general land use of Latur tahsil.  There are so many cultural factors which include, the duration of the occupancy of the area, population pressure, and socio-economic conditions, industrial, frame work the use of modern technology used by the farmers.  These factors determine the extent to which the land utilization of any region in the ultimate of the interaction between these two groups of variables.  Those variables from man made or cultural factors, which are very dynamic and show a variation through time.  Due to human activities some of the physical factors such as soil, rainfall and forests are also the dependent variables which may go under a change.

 "It is natural that different types of living which are represented by social values and certain industrial controls will create different patterns of land use within the limits imposed by different agro-physical controls"(Jasbir Singh, 1974)

 Here in this paper show general land use has changed in Latur tahsil during the period 1990-95 to 2005-10.

## Study Regions :

Latur tahsil lies between $18^0 17$' north to $18^0 32$' north latitudes and $76^0 12$' east to $76^0 45$' east  longitudes.  The total area of Latur tahsil is 1004 square kms. The Latur tahsils headquarter is latur town.  As per 2001 census the total population of Latur tahsil was 542414 persons.  Latur tahsil is also a sub divisional centre in Latur district. There are 5 circle and 120 villages in Latur tahsil.  The male population was 282329 and female population was 260085 in latur tahsil in 2001.  There are 108 Gram Panchayat in Latur tahsil.

## Objectives :

 Landuse classification is an important tool of land use planning there fore the following are the specific objectives of the present paper :

1]     To study the existing land use pattern  of the regions.

2]     To analyse the Non-agricultural land potential  Agricultural land and Agricultural land.

## Methodology :

 Tahsil for the present study the Latur is considered as an entire region circle and villages in the tahsil are considered as component areal units. Secondary data collected through Tahsildar office, District Socio-Economic Statistical abstract and Gazetteer and Agricultural epitomes.

## Results & Discussion :

## Landuse Pattern :

 General landuse pattern of the tahsil differs more from that of district and Maharashtra state, due to its location and physical setting.  The land not available for cultivation is more in the western part of the tahsil,

occupying the uplands of western ghat, where as the proportion of agricultural land is more in the eastern part. Which has relatively more level area. The potential agricultural land which can be brought under cultivation is confined to the north western and southern part of the study area. Having thus, presented the overall picture of general land use, a detailed analysis of the same using quinquennial averages for 1990-95 and 2005-2010 and the respective spatio-temporal changes there in now follow.

**1] Non- Agricultural land :**

Land not available for cultivation includes the categories of forests, barren and unculturable land and land put to non-agricultural uses. In other words they include the land which cannot be brought under cultivation unless at a very high cost (Shinde 1980).

About 7.27 percent area belongs to this category in the tahsil which is slightly more than that of district average 5.40 percent. The western part of the tahsil is land not available for cultivation, whereas the eastern part has more built up area.

**Table No. 1: Trends in General land use pattern in Latur tahsil**

| Sr. NO. | Land use category | 1990-95 | 2005-10 | Change |
|---|---|---|---|---|
| 1 | Non Agricultural land | 5.72 | 7.27 | 1.55 |
| 2 | Potential Agricultural land | 5.91 | 4.85 | -1.05 |
| 3 | Agricultural land<br>i) Net Sown area<br>ii) Follow land | <br>81.27<br>7.1 | <br>85.89<br>1.99 | <br>4.58<br>-5.08<br>+6.13<br>-6.13 |

Secondly most of the western part of the tahsil is land not available for cultivation of the total geographical area. This region has a barren and unculturable land and land put to non agricultural uses and 0.39 percent (386 hectares) under forest covers. This reflects the high proportions of non-agricultural land in this part. Table NO. 1 shows the spatial pattern and the respective changes in non-agricultural land during the period under review.

The area of high proportion of non agricultural land (over 10 ) is observed in the circle of latur. The moderate proportion i.e. 5 to 10 percent prevails in the circle of Murud. Here the physical limitations appear to responsible for the lower proportion of land surface suitable for agriculture. Else where, the proportions of land under this category are below 5 percent particularly covering densely populated and irrigated part where low-lying relief is the main cause for the lower proportion of non agricultural land and most of this land is under roads settlements and other public projects.

The increase and decrease in the relative positions of strength of non-agricultural land of circle is taken to provide as comparative measure of change that occurred over as period (1990-95 to 2005-2010). It increased from 5682 hectares in 1990-95 to 7227 hectares in 2005-2010 but there is no uniform pattern in the distribution of area involved in change in the regions. The increases (over 4 and 2 to 4%) are found in Latur. Gategaon and Murud Circles record a marginal increase (under 2% ) In contrast the decrease in percentage of total area involved in change under this category is relatively less and confined mostly to the kasarkheda and Tandulja.

**2] Potential Agricultural land :**

The land for purpose of extension of cultivation can be found only in this category which could be used for cultivation but has not been cultivated owing to certial reasons. It generally consist of : (i) Culturable waste (ii) Permanent pastures and grazing land and (iii) Miscellaneous tree crops and groves.

In the ensuing discussion the three are considered together under the heading of potential agricultural land which was about 4.85 % of the total geographical area during 2005-2010. This is much higher than that of district 3.81%.

**Table No. 2 Circle wise percentage of potential Agricultural land Latur tahsil 1990-95 to 2005-2010**

| Sr. No. | Circle | 1990-95 | 2005-2010 | Changes |
|---|---|---|---|---|
| 1 | Latur | 49.76 | 54.38 | 4.62 |
| 2 | Kasar khed | 8.19 | 4.41 | -3.78 |
| 3 | Gategaon | 11.97 | 5.05 | -6.92 |
| 4 | Murud | 25.34 | 32.53 | 7.19 |
| 5 | Tandulja | 4.74 | 3.63 | 1.11 |
| | Total | 100 | 100 | |

The spatial distribution represented in Table No. 2 A varies from under 10 to over 20% significantly very high (over 20%) and high (10 to 20%) proportions of potential agricultural land embrace the Latur and Murud circles. This is mainly due to adverse climatic conditions and physical handicaps. A coverage of 10 to

20 % is observed in the circle of Gategaon. Rest of the circle have meager land (under 10% ) available for future extension under cultivations.

Potential agricultural land slightly decreased from 5864 hectares in 1990-95 to 4827 hectares in 2005-2010. The regional distribution of change in potential agricultural land as depicted in Tabel No. 2. A appears to be very uneven sizeable increase (over 2% and at places over 9%) are confined to Latur and Murud circles. These may be due to the increase in village grazing lands or common lands and area under tree crops or groves and secondly due to physical hazards. While the increase in land in circle Latur and Murud is 2 to 9 % but it is under 2% not found in any circles. Striking decreases (over 5 and 4 to 5% ) are confinded to Gategaon and Tandulja circles. The lowest decrease i.e. under 4 % is observed only in Kasarkhed circles in mainly due to proportion of potential agricultural land which has gone to non agricultuiral land and agricultural land.

**3] Agricultural land:**

It is also called as arable land or cultivated area consisting of two land use categories viz. net sown area and follow land Cultivated area is the land regularly ploughed and include both tillage and follow land (singh 1974) Data pertaining to agricultural land reveals that the study region has the lowest cultivated area amongst the upland districts, with an average of 83.58% of the total geographical area. There is also a significant contrast in the regional distribution of agricultural land in the region.

The proportion of net sown area and fallow land combined together occupying the castern circle of Latur and Kasar khed have over 80 percent of the total area. Gategaon, Murud and Tandulja record 70 to 80 % area. This is partly due to favorable ecological conditions availability of water for irrigation and partly due to high population density and the demand for more food.

Area under agricultural land has witnessed some changes in the tahsil. Murud is the only circle where substantial positive change (1.23%) has occurred. Elsewhere i.e. Gategaon 1.1% increase is noted. This is mainly due to the substantial decrease in potential agricultural land although contribution from non-agricultural land (Particularly from clearing of forests ) is less. The decrease in agricultural land is noated in circle of Latur (-1.01%) and Tandulja and Kasarkhed (0 to 1 % ). Increasing pressure of population on agricultural land development plans and growth of urban centers have bee responsible for the decrease in agricultural land.

Agricultural land happens to be of great significane in landuse studies. Hence a detailed analysis of the areal variation in its two categories is presented.

**Table No. 3 Circle wise percentage of Agricultural Landuse Latur Tahsil**
**1990-95 & 2005-10**

| Sr. No. | Circle | 1990-95 | 2005-10 | Change |
|---------|--------|---------|---------|--------|
| 1 | Latur 23-16 | 23.16 | 22.15 | -1.01 |
| 2 | Kasarkhed | 16.29 | 16.88 | 0.59 |
| 3 | Gategaon | 18.19 | 19.29 | 1.1 |
| 4 | Murud | 23.72 | 22.49 | 1.23 |
| 5 | Tandulja | 18.64 | 19.19 | 0.55 |
| | Total | 100 | 100 | |

**I) Net Sown Area**

Net sown area represents the extent of the cultivated area actually sown during an agricultural year. The environmental factors appear to be decisive in determining the extent of net sown area in the region under study. What is remarkable to note is that half of the total area is just not available for cultivation due to rugged topography. It is the river valleys in the study area. Which constitute the bulk of net sown area. It occupies 85.89% of the study area which is less than that of district average. Table No.4 exhibits the under 10 to over 20 percent the extent of net sown area in the tahsil has also changed over the past 20 years from nearly 80798 hectares during 1990-95 it rose to about 85369 hectares during 2005-2010. The overall increase exceeds by 1.24% and it is mostly widespread in the west-North part of the region.

**Table No. 4 Circle wise percentage of Net sown area Latur Tahsil**
**1990-95 & 2005-2010**

| Sr.No. | Circle | 1990-95 | 2005-10 | Change |
|--------|--------|---------|---------|--------|
| 1 | Latur | 23.20 | 21.94 | -1.26 |
| 2 | Kasarkhed | 16.24 | 17.01 | 0.77 |
| 3 | Gategaon | 18.04 | 19.25 | 1.24 |
| 4 | Murud | 23.79 | 22.45 | -1.34 |
| 5 | Tandulja | 18.73 | 19.35 | 0.64 |
| | Total | 100 | 100 | |

The most direct explanation of the changes in the net sown area can of course be had by reference to the percentage change in the fallow land intensity of irrigation population pressure and the improvement in methods of farming.

## II) Follow land:

The term fallow is applied to the land not under cultivation at the time of reporting but have been sown in the past. |Compared to net sown area the percentage of fallow land is small (1.99%) and compares well with that of state as a whole. The extent of follow is influenced either by the climatic conditions. Limited means, lack of irrigating facilities, land disputes or it is made necessary to rest the soil after the exhaustion due to the cropping pattern of the preceding year. The regional variations in these factors individually or collectively lead to the rage of values.

**Table No. 5 Circle wise percentage of follow land Latur tahsil.1990-95 & 2005-2010**

| Sr.No. | Circle | 1990-95 | 2005-10 | Change |
|---|---|---|---|---|
| 1 | Latur | 22.66 | 31.05 | 8.39 |
| 2 | Kasarkhed | 16.89 | 11.27 | -5.62 |
| 3 | Gategaon | 19.80 | 20.94 | 1.14 |
| 4 | Murud | 22.65 | 24.11 | 1.46 |
| 5 | Tandulja | 18.00 | 12.63 | -5.37 |
|  | Total | 100 | 100 |  |

In the distribution of fallow land from under 10 to over 20 % of the total. The high proportion of fallow land observed in Latur, Murud and Gategaon circles of the tahsil. This area can be intensively used by providing irrigation facilities. The area involved in change in respect of fallow land is shown in the Table No.5 from which it is clear that the study area has undergone considerable changes.

## Conclusion:

The paper studies general land use pattern of latur tahsil The lans use category undertaken for the present study are non agriculture land ,potential agriculture land , agriculture land has been further classified into net sown area and fallow land. In 1990-1995 The share of non agriculture land was 5.72% which increased to 7.27% in 2005-2010. Therby recording a change of 1.55%

In 1990-1995 the share of potential agriculture land was 5.91% which decreased to 4.85% in 2005-2010 recording a change of -1.05 .In 1990-1995 the share of net sown areas was 81.27% which incresed to 85.89% in 2005-2010 thus recording a change of 4.58% .In 1990-1995 the share of fallow land was 7.1% which decreased to 1.99% in 2005-2010 thus recorded in the change of 5.08%

From the above studies in the clear that the area has undergone considerable change with respect to landuse

## Reference :

1. Banerjee, B. (1969) – Essays on Agricultural Geography, Kalkatta.
2. Husain, M. (1979) - 'Agricultural Geography' Inter India Publication, Delhi
3. Indrapal, and shukla, L. (1981)- ' Changing Agricultural landuse in hilly tracts of Rajasthan' Perspectives in Agricultural Geography' concept publishing company, New Delhi.
4. Mandal R.B. (1981) - 'land utilization- Theory and practice' concept publishing co. New Delhi.
5. Mohmod A (1977) -'Statistical Methods in Geographical studies' Rajesh publications, New Delhi.
6. Noor Mahamad (1978) 'Agricultural land use in India – A case study' Inter India Publication, New Delhi
7. Sigh Jasbir (1976) - ' An Agricultural Geography of Haryana'- Vishal Publications, Kurkshetra, India.
8. Stamp L.D. (1948) - 'The land of Britan it's use and misuse' London.

# Regional Disparities in Socio-Economic Transformation: A Case Study of Osmanabad District

**Dr. N. G. Mali**
Research Supervisor & Head,
Dept. of Geography,
Mahatma Basweshwar College, Latur.

**Dr. Shivprasad P. Dharne**
Department of Geography,
Mahatma Basweshwar College,
Latur.

**Abstract:**

Development is a multidimensional phenomenon. Real development upholds the supremacy of man as a member of human community which aims at promoting an individual's welfare. To the geographer, development constraints consist of the measures adopted to deal with the anomalies in the spatial allocation of resources. Development is not merely a question of how much is produced, but what is produced and how it is distributed. The process of development has to be seen in the context of the nature of resource distribution, the level of technology and the distributive systems.

Mankind is facing a problem of growing disparities in socio-economic development both within and between the different geographic scales such as settlements regions and countries. These inequalities create tensions and conflicts in the society. Ameliorative measures have to be taken to minimize the disparities at all levels to the maximum extent possible. One of the basis pre-requisites for moving towards this goal is to acquire a precise knowledge of the spatial disparities in their various dimensions. This is a challenging task which eminently fits into the philosophy and methodology of geography. The geographer's findings with regard to spatial disparities in spheres of social activity or the total development and the causal factors associated therewith, surely lead him to make prescriptive recommendations for future planning.

**Key words:** Social, Economic Transformation, Composite Score, Regional Disparities.

## Introduction:

Regional disparities in socio-economic development have been a myth of reality in Indian context since the British times. That exists even today in spite of implementation of a planned economy for the past 60 years. One of the main objectives of our national planning had been to narrow down regional inequalities at all levels. The task cannot be attained without identifying the comparatively laggard areas and probing into their levels of socio-economic development. In India, all plans are formulated for implementation at the block level and so it is useful to assess the levels of development on the basis of block.

## Study Region:

The district of Osmanabad is the southern most districts in Aurangabad division of Maharashtra state situated between 17°37' to 18°42' North latitudes and 75°17' to 76°47' East longitudes. The district has an area of 7484 square kilo-meters. About 7271 square kilometers area (96.79%) is known as rural area where as only 241.4 square kilometers (3.21%) area comes under urban categories.

## Objectives:

The following are the main objectives of the study:

1. Find out the regional disparities in the village of the study area.
2. To provide the base for planners, administrators and politicians for the developmental planning.

## Database and Methodology:

Various methods have been deployed in the past to measure regional disparities with varying degrees of success. The selection of indices is of paramount significance in this respect. The indicators selected should clearly reflect the social selected should clearly reflect the social picture of the component areal units of the study area. Considering all the facts of the study area twenty one economic and indicators have been selected in the present study which are as below:

## Social Indicators:

1) Density of population per sq.km.
2) Percentage of urban population to the total urban population
3) Percentage of literacy
4) Percentage of male literacy
5) Percentage of female literacy
6) Number of primary school per 10,000 population
7) Number of primary school per 100 sq.km.
8) Number of secondary school per 20,000 population
9) Number of secondary school per 100 sq.km.
10) Number of junior colleges per 50,000 population
11) Number of junior colleges per 100 sq.km.
12) Number of primary health centres per 50,000 population
13) Number of rural hospital centres per 50,000 population

14) Number of medical stores per 50,000 population
15) Number of post offices
16) Number of post offices per 50,000 population
17) Number of public call centres
18) Number of telephone connections per 10,000 population
19) Number of cable connections per 10,000 population
20) Number of bio-gas plants
21) Number of saving groups
22) Number of population per police station
23) Number of street lamp posts
24) Length of roads per 100 sq.km.

The data regarding the indicators have been taken from the secondary sources at tahsil level. The data for the social indicators is collected for the year 2014-15. The tahsils have been awarded proportionate weights on the basis of the data of the indicators.

The lowest value of i indicator in the tahsils $X_1, X_2, X_3$ ------- $X_n$ (say in $X_5$) has been awarded the score of 1. The weights of i indicator in remaining tahsils have been determined on the basis of the following formula.

$$WiX_1 = \frac{iX_1}{iX_5}$$

Where,

$WiX_1$ = Weight of i indicator in tahsil $X_1$

$iX_1$ = Numerical value of i indicator in tahsil $X_1$

$iX_5$ = Numerical value of i indicator in tahsil $X_5$

On the basis of the above formula, the weights of all the indicators in each tahsil have been computed and the composite scores have been obtained for all tahsils on the basis of the following formula:

$CX_1$ = $W_1X_1 + W_2 X_1 + $ ---------- $ + W_n X_1$

Where,

$CX_1$ = Composite score of tahsil $X_1$

**Composite Scores of Economic and Social Indicators (Village Level):**

**Table No. 1.1: Composite Scores of Economic and Social Indicators of the Villages**

| Level of Development | Tahsil | Villages | Composite Scores of Economic Indicators | Composite Scores of Social Indicators | Total Composite Scores | Average Composite Scores |
|---|---|---|---|---|---|---|
| Very High | Osmanabad | Bhandari | 33.46 | 43.06 | 76.52 | 73.25 |
| | | Arni | 47.49 | 16.93 | 64.42 | |
| | | Khed | 67.8 | 11.03 | 78.83 | |
| High | Omerga | Gugalgaon | 40.14 | 33.32 | 73.46 | 51.16 |
| | | Koral | 21.74 | 17.98 | 39.72 | |
| | | Narangwadi | 23.77 | 16.54 | 40.31 | |
| Medium | Tuljapur | Dahiwadi | 40.14 | 28.3 | 68.44 | 48.59 |
| | | Barul | 16.36 | 18.39 | 34.75 | |
| | | Apsinga | 30.7 | 11.89 | 42.59 | |
| Low | Lohara | Mardi | 16.28 | 21.86 | 38.14 | 36.54 |
| | | Holi | 32.14 | 13.68 | 45.82 | |
| | | Makani | 14.2 | 9.04 | 23.24 | |
| | Kalamb | Hingangaon | 21.2 | 20.31 | 41.51 | |
| | | Ekurka | 31.58 | 15.18 | 46.76 | |
| | | Itkur | 15.11 | 8.7 | 23.81 | |
| Very Low | Paranda | Ratnapur | 15.04 | 36.01 | 51.05 | 30.80 |
| | | Khasapuri | 14.29 | 13.17 | 27.46 | |
| | | Wakadi | 20.87 | 8.69 | 29.56 | |
| | Washi | Kanheri | 21.53 | 12.74 | 34.27 | |
| | | Mandva | 20.89 | 7.1 | 27.99 | |
| | | Pargaon | 11..32 | 6.34 | 17.66 | |
| | Bhum | Nipani | 14.51 | 19.18 | 33.69 | |
| | | Ambi | 21.47 | 7.96 | 29.43 | |
| | | Leet | 17.57 | 8.5 | 26.07 | |

*Source: Compiled by the Researcher.*

The Composite scores of economic and social indicators are combined together and total composite scores for each village is calculated. Then average composite scores are calculated for each level of socio-economic development and shown in the table No. 1.1.

A perusal of table No. 1.1 reveals that range of composite score value is very high indicating there by wide regional disparities in socio-economic development in the study region. In fifth chapter Osmanabad tahsil stands at the top with composite score (108.57), where in survey work also average composite score of three villages in the Osmanabad tahsil is 73.25 and stands at the top. In fifth chapter Bhum tahsil stands at the bottom with composite score 46.08, where in survey work average composite score of three villages in Bhum tahsil is 29.73 and stands at the bottom. The average composite scores of the sample villages selected from each tahsil clearly indicate that the levels of socio-economic development determined in the chapter fifth and results arrived from analysis of the survey work match each other.

Table No. 1.2 reveals that descending order of composite scores regarding the levels of socio-economic development and descending order of average composite scores of sample villages match each other. It means that levels of socio-economic development determined on the basis of secondary sources of data and levels of socio-economic development on the basis of primary sources of data match each other with certain level.

**Table No. 1.2: Comparison of Composite Scores of Levels of Socio-Economic Development and Average Composite Scores of Survey Work**

| Level of Development | Tahsil | Total Composite Scores of Socio-economic Development | Average Composite Scores of Survey work |
|---|---|---|---|
| Very High | Osmanabad | 108.57 | 73.25 |
| High | Omerga | 74.04 | 51.16 |
| Medium | Tuljapur | 69.00 | 48.59 |
| Low | Lohara | 54.22 | 36.54 |
| | Kalamb | 51.40 | |
| Very Low | Paranda | 49.78 | 30.80 |
| | Washi | 48.67 | |
| | Bhum | 46.08 | |

*Source: Compiled by the Researcher.*

**Results:**

In survey work it is observed that levels of socio-economic development (very high, high, medium, low, very low) determined in fifth chapter. On the basis of secondary sources of data and results obtained in survey work regarding the levels of socio-economic development on the basis of primary sources of data match each other. It means results of the this research are strengthen by survey work.

**References:**

1. *Amborse, P. (1969): "Analytical Human Geography", Longman, London, PP. 140-142.*
2. *Dehsmukh, P.W. (1979): "The Location of Service Activities – a study of Central Places in Upper Krishna Valley", (Published, Ph.D. Thesis), Ajab Pustakalaya, Kolhapur, PP. 44-64.*
3. *Tripathi, R.S. and Misra, K.P. (1994): "Regional Disparities in Socio-Economic Development of Basti District (U.P.)", Published in Environmental Resources: the Crisis of Development edited by Mathur, H.S., RBSA Publishers, Jaipur, PP. 193-198.*
4. *Government of Maharashtra (2001-2015) Socio-Economic Review and Statistical Abstracts of Osmanabad District.*

# Socio-Economic Transformation in Latur District

**Dr. N. S. Magar**
Head, Dept. of Geography,
Dr. B. Ambedkar College,
Latur (M.S.).

**Dr. M. G. Shendge**
Dept. of Geography,
Nilkantheshwar Jr. College,
Latur (M.S.).

**Abstract:**
Society is a group of human beings about change and is themselves affected by change. Social change or transformation is a dynamic process which being modified continuously. Due to social change various social elements like social laws customs traditions and organizations are constantly, changing. Social change invariably results from interaction of number of factors. Social change in one aspect of life gives rise to chain reaction of changes affecting other aspects.Specific changes may occur in various ways, may be grouped broadly as modification and replacement of material goods in society and social relationship. For example modification in diet and food habits in the Latur district, where basic diet was Jowar now changed to wheat, meat and eggs. Same is the case with a wearing of clothes. Social change also takes place in the form replacement both of materials and views in society. The replacement to an increasing extent of transportation means, from head loads and bullock carts of the rural parts of the Latur district to bicycles, trucks, tempos, scoters, motorcycles, buses and cars, is an illustration of material goods. An outstanding example of social change in the form of replacement in views in the rural area in Latur district is the change of technology in the agriculture to replace the traditional views and techniques of farming. Thinking over the population control or family planning is also another illustration of this change.
**Keywords:** Socio-Economic Transformation.

## Introduction:

Geographers contend that human societies can be fully understood only if their behavior and activities are examined against the background of space they occupy, their situation (Relative location in terms of both natural and cultural patterns) and present prospective resources and resistance facing them.Economic Geography is concerned with the distribution of man's productive activities over the surface of the earth. These activities we commonly divide into three kinds, primary activities are those which obtain simple commodities or raw materials form the soil, sea and rocks. They are agriculture, forestry, fishing, mining etc. These goods are then manufactured processed or fabricated in factories and workshops. This constitutes the secondary group of activities. It rarely happens, however, that a manufacturing process can be completed without making use of transportation services, insurance agents, brokers and dealers. It is a study of patterns and processes in understanding socially defined population in spatial setting. It is a study of areal pattern and functional relations of social groups in the context of their social environment.

## Choice of the Region:

For the study of Geographical Analysis of Socio-Economic Transformation, Latur District is selected as a study region. The district of Latur lies between $17^0 12'$ to $18^0 50'$ north latitudes and $76^0 12'$ to $77^0 18'$ east longitudes. It is surrounded by Beed and Parbhani district in the north, Nanded district in the north-east, Karnataka state in the south-east and Osmanabad district in the west and north-west. The Latur district has an area of 7,157 sq.km. and population 24,55,543 as per 2011 census. Out of the total population of the district 74.53 percent lives in rural areas while 25.47 percent lives in urban areas. There is a spatial variation in the socio-economic development in the study region. Economy of the study region is mainly based on agriculture and agro-based industries.

## Objectives of the Study:

To study the levels of socio-economic development in the study region and causes behind the regional disparity in the development.

## Database and Methodology:

Success of the research work depends upon the methodology adopted for the study. For the present study data is collected through primary and secondary sources. Primary data is obtained by preparing objective based interview schedule and questionnaire. Secondary data is obtained from socio-economic reviews of the district, district census handbook, gazetteer, reports of the Zilla Parishad and Panchayat Samiti, web site etc. The data thus collected through primary and secondary sources are classified, tabulated and analyzed by using various statistical techniques and presented by using appropriate cartographic methods.

In the present study various methods and techniques have been used. However, it is not appropriate here to give all details. The details regarding various methods and techniques are discussed in the thesis at appropriate places. For the purpose of survey work stratified sampling technique is used.

## Composite Scores of Economic Indicators of Tahsils

| Sr. No. | Tahsil | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | Composite Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Latur | 1.08 | 1.08 | 2.85 | 1 | 1.39 | 23.82 | 2.36 | 3.36 | 5.96 | 28.79 | 1 | 1.01 | 1 | 1 | 13.17 | 3.00 | 19.31 | 3.97 | 120.58 | 23.12 | 53.23 | 312.08 |
| 2 | Renapur | 1.16 | 1.01 | 2.10 | 3.30 | 1.22 | 7 | 1.45 | 1.73 | 3.24 | 4.84 | 1.27 | 1.10 | 1.75 | 1.61 | 2.21 | 2.00 | 1.37 | 2.29 | 34.48 | 2.29 | 2.48 | 79.9 |
| 3 | Ahmadpur | 1.09 | 1.22 | 1.42 | 2.23 | 1.68 | 5.13 | 1.18 | 2.76 | 3.65 | 4.06 | 1.19 | 1.04 | 1.65 | 1.81 | 3.49 | 2.59 | 2.68 | 1 | 11.65 | 5.18 | 2.52 | 59.22 |
| 4 | Ausa | 1.11 | 1.06 | 1.40 | 2.72 | 1 | 13.67 | 1 | 3.56 | 6.60 | 5.68 | 1.25 | 1.08 | 1.74 | 2.55 | 4.08 | 2.81 | 2.50 | 1.70 | 51.49 | 5.48 | 3.47 | 115.9 |
| 5 | Nilanga | 1.12 | 1.07 | 2.33 | 2.15 | 1.32 | 11.36 | 1.72 | 3.42 | 9.14 | 30 | 1.24 | 1.09 | 1.69 | 1.98 | 4.76 | 3.70 | 2.32 | 1.44 | 47.04 | 5.41 | 3.67 | 137.97 |
| 6 | Udgir | 1.17 | 1.09 | 1.34 | 1.23 | 1.52 | 11.93 | 2.27 | 2.39 | 3.48 | 3.53 | 1.08 | 1 | 1.34 | 1.53 | 3.91 | 2.25 | 4.44 | 1.32 | 14.48 | 5.53 | 10.73 | 77.56 |
| 7 | Chakur | 1.10 | 1.13 | 1.64 | 2.41 | 1.94 | 3.75 | 1.27 | 2.27 | 1 | 1.45 | 1.28 | 1.08 | 1.83 | 2.28 | 1.87 | 1.59 | 1.67 | 1.20 | 16.96 | 3.12 | 2.30 | 53.14 |
| 8 | Jalkot | 1 | 1 | 1 | 2.06 | 1.36 | | 1 | 1.09 | 1.47 | 1.76 | 1 | 1.17 | 1.04 | 1.56 | 2.51 | 1.14 | 1.33 | 1 | 1.76 | 1 | 1 | 27.25 |
| 9 | Shirur A. | 1.08 | 1.08 | 1.46 | 2.54 | 1.43 | 6.86 | 1.69 | 1 | 1.76 | 1.05 | 1.30 | 1.05 | 1.88 | 2.15 | 1 | 1 | .43 | 3.31 | 27.63 | 1.02 | 2.20 | 63.92 |
| 10 | Deoni | 1.00 | 1.10 | 1.71 | 2.41 | 1.33 | 4.87 | 1.81 | 1.14 | 3.18 | 3.53 | 1.30 | 1.10 | 1.86 | 2.50 | 1.42 | 1.29 | 1.02 | 2.31 | 20.41 | 1.44 | 1.49 | 58.22 |

*Source:* *Compiled by the Researcher.*

## Composite Scores of Social Indicators of Tahsils

| Sr. No. | Tahsil | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | Composite Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Latur | 2.79 | 10.97 | 1.08 | 1.04 | 1.14 | 1 | 2.34 | 1 | 2.74 | 1.43 | 3.93 | 1 | 2.0 | 6.33 | 5.09 | 1 | 19.77 | 3.5 | 15.25 | 1.5 | 6.25 | 1.30 | 14.31 | 1.24 | 108 |
| 2 | Renapur | 1.05 | -- | 1.00 | 1 | 1.01 | 1.38 | 1.17 | 1.12 | 1.11 | 1.33 | 1.31 | 3.01 | 2.05 | 1 | 1.72 | 1.50 | 1 | 1.67 | 1.75 | 1 | 2.93 | 1.76 | 2.75 | 1.08 | 34.7 |
| 3 | Ahmadpur | 1.23 | 1.21 | 1.03 | 1.03 | 1.05 | 1.59 | 1.65 | 1.37 | 1.67 | 1.63 | 2.03 | 1.81 | 1.47 | 3.42 | 2.36 | 1.26 | 1.81 | 1.52 | 4.5 | 1.6 | 4.83 | 1.43 | 6.81 | 1.10 | 49.45 |
| 4 | Ausa | 1 | 1 | 1.01 | 1.00 | 1.03 | 1.17 | 1 | 1 | 1 | 1 | 1 | 1.93 | 2.11 | 1.54 | 4.72 | 1.10 | 3.44 | 3.37 | 3.12 | 1.8 | 3.70 | 1.34 | 5.29 | 1.03 | 43.7 |
| 5 | Nilanga | 1.26 | 1.00 | 1.01 | 1.01 | 1.02 | 1.23 | 1.31 | 1.11 | 1.39 | 1.00 | 1.25 | 2.84 | 1 | 2.48 | 3.90 | 1.75 | 3.09 | 1.32 | 3.68 | 1.7 | 1.50 | 1.37 | 5.09 | 1.01 | 41.32 |
| 6 | Udgir | 1.62 | 3.10 | 1.07 | 1.04 | 1.11 | 1.38 | 1.88 | 1.39 | 2.27 | 1.02 | 2.03 | 1.37 | -- | 6.16 | 3.54 | 1.43 | 4.88 | 2.78 | 10.75 | 1.8 | 1 | 1.27 | 5.02 | 1.00 | 59.1 |
| 7 | Chakur | 1.08 | -- | 1.02 | 1.01 | 1.04 | 1.58 | 1.470 | 1.5 | 1.56 | 1.06 | 1.40 | 1.44 | 1.64 | 2.29 | 2.36 | 1.60 | 1.49 | 1.17 | 3.5 | 1.3 | 1.73 | 2.27 | 4.25 | 1 | 38.39 |
| 8 | Jalkot | 1.02 | -- | 1 | 1.00 | 1 | 1.53 | 1.30 | 1.53 | 1.52 | 1.78 | 1.76 | 1.96 | 3.35 | 1.94 | 1 | 1.54 | 1.28 | 1 | 1 | 1.3 | 1.91 | 1 | 1 | 1.02 | 32.74 |
| 9 | Shirur A. | 1.03 | -- | 1.02 | 1.02 | 1.04 | 1.39 | 1.21 | 1.27 | 1.30 | 2.06 | 2.10 | 2.05 | -- | 2.23 | 1 | 1.43 | 1.27 | 2.23 | 3.0 | 2.0 | 1.24 | 1.07 | 1.31 | 1.20 | 33.47 |
| 10 | Deoni | 1.04 | -- | 1.00 | 1.01 | 1.02 | 1.41 | 1.08 | 1.80 | 1.63 | 2.29 | 2.06 | 1.75 | 3.0 | 2.91 | 1.54 | 1.91 | 1.25 | 1.47 | 1.93 | 1 | 1.05 | 1.24 | 1.5 | 1.17 | 36.06 |

*Source:* *Compiled by the Researcher.*

To determine levels of socio-economic development in the study region indices are selected. The selection of indices is of paramount significance in this respect. The indicators selected should clearly reflect the socio-economic picture of the component areal unit of the study area. The tahsils have been awarded proportionate weights on the basis of the data of the indicators.

The lowest value of $i$ indicator in the tahsils $X_1, X_2, X_3 \ldots X_n$ (say in $X_5$) has been awarded the score of 1. The weights of i indicator in remaining tahsils have been determined on the basis of the following formula:

$$Wi\mathrm{x}_1 = \frac{\mathrm{i\ x}_1}{\mathrm{i\ x}_5}$$

Where,

| | | |
|---|---|---|
| $i\mathrm{x}_1$ | = | weight of i indicator in tahsil $\mathrm{x}_1$ |
| $i\mathrm{x}_1$ | = | numerical value of i indicator in tahsil $\mathrm{x}_1$ |
| $i\mathrm{x}_5$ | = | numerical value of i indicator in tahsil $\mathrm{x}_5$ |

On the basis of the above formula, the weights of all the indicators in each tahsil have been computed and then composite scores have been obtained for all tahsils on the basis of the following formula:

$$C\mathrm{x}_1 = W_1 X_1 + W_2 X_1 + \ldots\ldots\ldots + W_n X_1$$

Where, $CX_1$ = composite score of tahsil $X_1$

**Composite Scores of Socio-Economic Development:**

To determine the levels of socio-economic development in the study region composite scores of economic and social indicators are combined together and total composite score for each tahsil is calculated and shown in the table.

The composite scores of all tahsils in the study region have been arranged in the descending and on the basis of break in the progression of the scores of the tahsils have been grouped into five levels of socio-economic development as follows:

Areas of Very High Development, Areas of High Development, Areas of Medium Development, Areas of Low DevelopmentAreas of Very Low Development.

**Composite Scores of Economic and Social Indicators of the Tahsils**

| Sr. No. | Tahsils | Composite Score of Economic Indicators | Composite Score of Social Indicators | WiX$_1$ |
|---|---|---|---|---|
| 1 | Latur | 312.08 | 108 | 420.08 |
| 2 | Renapur | 79.9 | 34.7 | 114.6 |
| 3 | Ahmadpur | 59.22 | 49.45 | 108.67 |
| 4 | Ausa | 15.9 | 43.7 | 159.6 |
| 5 | Nilanga | 137.97 | 41.32 | 179.29 |
| 6 | Udgir | 77.56 | 59.1 | 136.66 |
| 7 | Chakur | 53.14 | 38.39 | 91.53 |
| 8 | Jalkot | 27.25 | 32.74 | 59.99 |
| 9 | Shirur A. | 63.92 | 33.47 | 97.39 |
| 10 | Deoni | 58.22 | 36.06 | 94.28 |

*Source: Compiled by the Researcher.*

**Descending Order of Composite Scores of the Tahsils**

| Sr. No. | Tahsils | Composite Score |
|---|---|---|
| 1 | Latur | 420.08 |
| 2 | Renapur | 114.6 |
| 3 | Ahmadpur | 108.67 |
| 4 | Ausa | 159.6 |
| 5 | Nilanga | 179.29 |
| 6 | Udgir | 136.66 |
| 7 | Chakur | 91.53 |
| 8 | Jalkot | 59.99 |
| 9 | Shirur A. | 97.39 |
| 10 | Deoni | 94.28 |

*Source: Compiled by the Researcher.*

To distinguish the role of the indicators operating behind the existing status of socio-economic development of the tahsils, the weights of all the indicators have been arranged in descending order and Q1 has been determined. The weights of the indicators in the tahsils above Q1 have been treated as dominant ones responsible for the existing status of socio-economic development.

**Results:**

From the above discussion, it is apparent that the disparities in socio-economic development are very marked within the district. This situation is not conducive to proper development of the district. a majority of tahsils (Jalkot, Shirur Anantpal, Deoni and Chakur) require immediate attention.

Spatial analysis of the levels of socio-economic development clearly indicates that only 14 percent area of the study region comes under relatively very high development area, 32.30 percent area comes under relatively high development area, 29.59 percent area comes under medium development area, 19.28 percent area comes under low development area and 4.83 percent area comes under very low development area. Area under low socio-economic development is about 25 percent. To devoid the spatial disparity in the socio-economic development special attention of govt. and non-govt. agencies is essential. As the economy of the region has agrarian base priority in developmental process should be given to agricultural sector through modern measures. Social development automatically takes place in association with the economic development.

**References:**

1. *Manhas, V.S. and Ruchi Gupta (2011): "Regional Disparities in Jammu Province: A Geographical Analysis", Journal of Research and Development, Vol. I, Issue 7, 2011, PP. 54-60.*
2. *Raj Singh (2008): "New Panchayati Raj and Social Transformations: A Sociological Appraisal", Published in 'Economic Reforms and Social Transformation' edited by Ahlawat S.R. Rawat Publications, Jaipur PP. 198-205.*
3. *Government of Maharashtra (2010-2011) Socio-Economic Review and Statistical Abstracts of Latur District.*
4. *Nayak, T.L. and Narayankar (2010): "Regional Disparities in the Socio-Economic Status of Women in Karnataka", Transactions Inst. Indian Geographers, Vol. 32, No.2, PP. 137-153.*

# A Geographical Study of Sex Ratio in Marathwada Region (M.S.)

**Dr. Suryakant S. Pawar**
Assistant professor and Research Guide,
Shivaji Mahavidyalaya, Renapur.

**Mr. Rahul Anil Salunke**
Junior Research Fellow,
Mahatma Basweshwar College, Latur.

*Abstract:*

*Population Geographyhas study growth of population,its distribution, Density, religious and linguistic composition, Sex ratio, age composition, migration,standard of living and economic structure etc. we also study adaption of various human groups to their respective environment in different parts of the world. The aim of present paper is study of sex ratio in Marathwada Region ofMaharashtra. Thepresent paper based on secondary sources of data. The secondary data obtained from district census handbook, districtgazetteers, district statisticaldepartment, and District Socio-economic Reviewand district statistical abstract of the study regionetc. Collected data is processed and presented in the formsof tabular and graphical method. According to the 2011 census figure the total population of Marathwada region 29,79,341 out of total population 15,28,293 male and 14,51,048 females. Thus the overall sex ratio of Marathwada region is 933 females for thousands of males.*

**Keyword:**Sex composition, Sex ratio, Migration.

**Introduction:**

Sex composition is a major characteristic of population, it is the most basic since influences, the marriage and growth rate of population. Some other important population characteristics,like migration and occupation structure are also influenced by the ratio between the sexes. Since the roles of the two sexes are partly contrasting and partly complementary. The study of their ratio is of considerable interest to the population geographers. 'Sex ratio is an index of socio- economic conditions, revealing in an area and is useful tool for regional analysis". Sex ratio also influences the volume and nature of social need and employment pattern. In India, sex ratio is generally expressed in terms of number of female per 1000 male. sex composition various both in time and space. The variations in sex ratio are to a large extent determined by three factors such as, sex ratio at birth, differentials in mortality rate in two sexes and selectivity among migrants.

**Objectives:**

The main objective of the present paper is to examine and analyze the trends, rural-urban differences and Special pattern of sex ratio in Marathwada Region of Maharashtra State.

**Data Base and Methodology:**

The present paper is based on Secondary Source of data. The data is collected from various sources which includes both published and unpublished books, government publication and private publications. Secondary data has been obtained from district census handbook, Census of India,District gazetteers, district statistical department, socio economic review and district statistical abstract of Study region district. Collected data is processed and presented in the forms of tabular and graphical methods. Sex ratio has been calculated by total number of females divided by total number of males multiply thousands.

Following formula has been used to calculate by sex ratio:

$$\text{Sex ratio} = \frac{\text{Total number of females}}{\text{Total number of males}} \times 1000$$

**Study Area:**

The Aurangabad division is known as Marathwada which was formerly a part of Hyderabad state. This Marathwada region lies in the upper Godavari basin, which extends from 17°35" North latitude to 20°40" North latitude and from 74° 40" East longitude to 78° 19" east longitude. Its shape is roughly triangular, East-West maximum extent is about 394 Kilometers and north-south extent is about 330 Kilometers. It bounded by Nashik region from Northwest & west side, Amravati region from North side, Western Maharashtra from Southwest side, Karnataka & Telangana state from southeast & south side and Telangana from east side. It has a total area about 64,302 Sq. Km. Marathwada is a part of Deccan plateau with general slope in south-east direction from Sahyadris and has many features in common with upland districts of Deccan plateau. Marathwada region has a general elevation of about 500 meters above the sea level, highest and lowest level being 958 meters in Satmala range and 366 meters above sea level. There are three important river basins in region viz. Godavari basin, Marathwada Purna and Penganga basin. The climate of the Marathwada region is generally dry except the during the south-west monsoon. As per 2011 census, the total population of Marathwada region was 1,87,31,872 persons in which about 96,58,962 male persons while about 90,32,910 female persons.

**Temporal change of Sex Ratio:**

Temporal Change of given study explain the movement of sex ratio over period of time. According to the 2011 census figure the total population of Marathwada region 29,79,341out of total population 15,28,293 male and 14,51,048 females. Thus the overall sex ratio ofMarathwada region is 933.Thus suggest the number of female is quiet less as compared to males in other word the sex ratio in the region has always remained unfavorable to female.

**Table No: 1 Temporal Change of Sex Ratio 1901-2011**

| Sr. No. | Census Year | Sex ratio | Change |
|---------|-------------|-----------|--------|
| 1 | 1901 | 992 | - |
| 2 | 1911 | 983 | -9 |
| 3 | 1921 | 970 | -13 |
| 4 | 1931 | 957 | -13 |
| 5 | 1941 | 958 | +1 |
| 6 | 1951 | 969 | +11 |
| 7 | 1961 | 963 | -6 |
| 8 | 1971 | 952 | -11 |
| 9 | 1981 | 960 | +8 |
| 10 | 1991 | 944 | -16 |
| 11 | 2001 | 941 | -3 |
| 12 | 2011 | 933 | -8 |

*Source: Census of India 2011.*

The temporal change of the Sex Ratio in Marathwada region of Maharashtra State from 1901 to 2011 Shownin Table no. 1. The sex ratio at the beginning of the twentieth century was 992 females per thousands of males, thereafter showed continuous declined until 1931.The sex ratio was declined because high mortality of femalesdue to epidemics like plague, cholera, influenza during the period of 1911 to 1931. In 1941 there was a marginal increase of one points,after independentsin 1951 the sex ratio of Marathwada region increased eleven points that was a highest decadal increased sex ratio of last hundred years.But in the last Three decades 1991 to 2011 they are continuously decreased 944, 941 and 933 females per thousand males due to sex selective migration of the Marathwada region.

**Temporal Change of Sex Ratio in Marathwada Region 1901-2001**
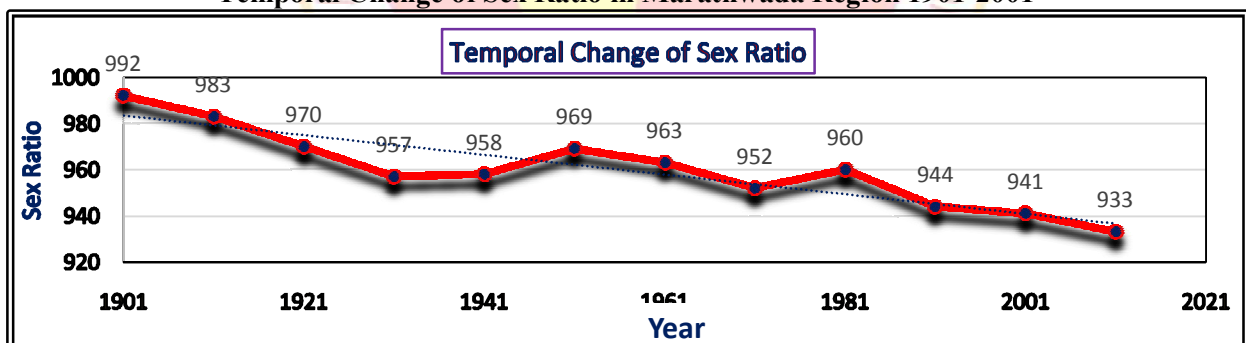


**Fig No.1**

**Spatial Pattern of Sex Ratio:**

According to census figure 2011 there were933 females for thousands of male in Marathwada region. According toDistrictwise variation of the total sex ratio is given by table no-2. It is observing that highest sex ratio found in Parbhani Districtwas 977females for thousands of males. Followed by Nanded (943) Hingoli (942) and Jalna (937) respectively. But the lowest the lowest sex ratio found in Beed district there were only 916 females for thousands of male, after that Aurangabad 223, Osmanabad 924, and Latur 928 respectively.

**Table No: 2 TotalSex Ratio byDistrict, 2011**

| Sr. No. | Name of District | Total |
|---------|------------------|-------|
| 1 | Nanded | 943 |
| 2 | Hingoli | 942 |
| 3 | Parbhani | 947 |
| 4 | Jalna | 937 |
| 5 | Aurangabad | 923 |
| 6 | Beed | 916 |
| 7 | Latur | 928 |
| 8 | Osmanabad | 924 |
| **9** | **Marathwada** | **933** |

*Source:Census of India.*

**Total Sex Ratio of Marathwada Region in 2011**
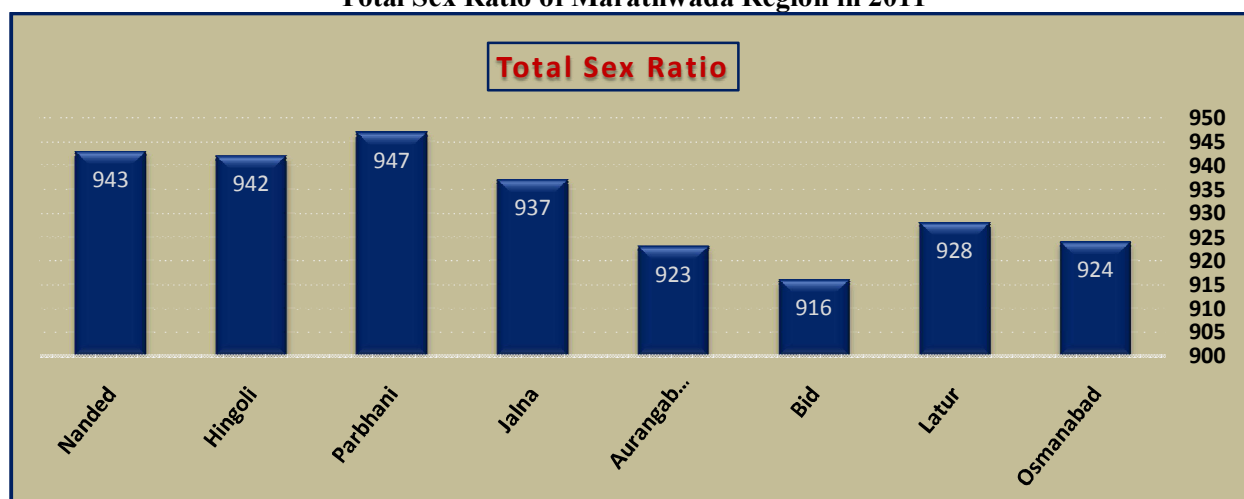


**Fig No. 2**

**Rural Urban Sex Ratio:**

The rural urban changing structures of sex ratio are showing table no.3. InMarathwada region the rural and urban sex ratio different considerably in the census year2011. The sex ratio for rural and urban areas is 930 and 937 respectively. In rural areas highest sex ratio is found in Nanded district 945 and lowest sex ratio for only 912 in Beed. Nanded,Hingoli, Parbhani and Jalna district are

**Table No: 3. Ratio Rural–Urban Sex Ratio 2011**

| Sr. No. | Name of District | Rural | Urban |
|---|---|---|---|
| 1 | Nanded | 945 | 937 |
| 2 | Hingoli | 941 | 946 |
| 3 | Parbhani | 942 | 958 |
| 4 | Jalna | 935 | 944 |
| 5 | Aurangabad | 924 | 923 |
| 6 | Beed | 912 | 923 |
| 7 | Latur | 926 | 932 |
| 8 | Osmanabad | 922 | 934 |
| 9 | Marathwada | 930 | 937 |

*Source: Census of India 2011.*

above the total average Rural sex ratio of Marathwada region and remaining four District are below the average sex ratio. On the opposite the urban sex ratio for the region higher than the rural sex ratio. Parbhani (958) District is highest sex ratio urban areas and Beed and Aurangabad (923) district are jointly the lowest sex ratio. Hingoli (946) district second position as regard to urban sex ratio among the various district Marathwada Region. Beed, Aurangabad, Latur and Osmanabad District are below the average Urban sex ratio of Marathwada region.

**Rural Urban Sex Ratio of Marathwada Region in 2011**
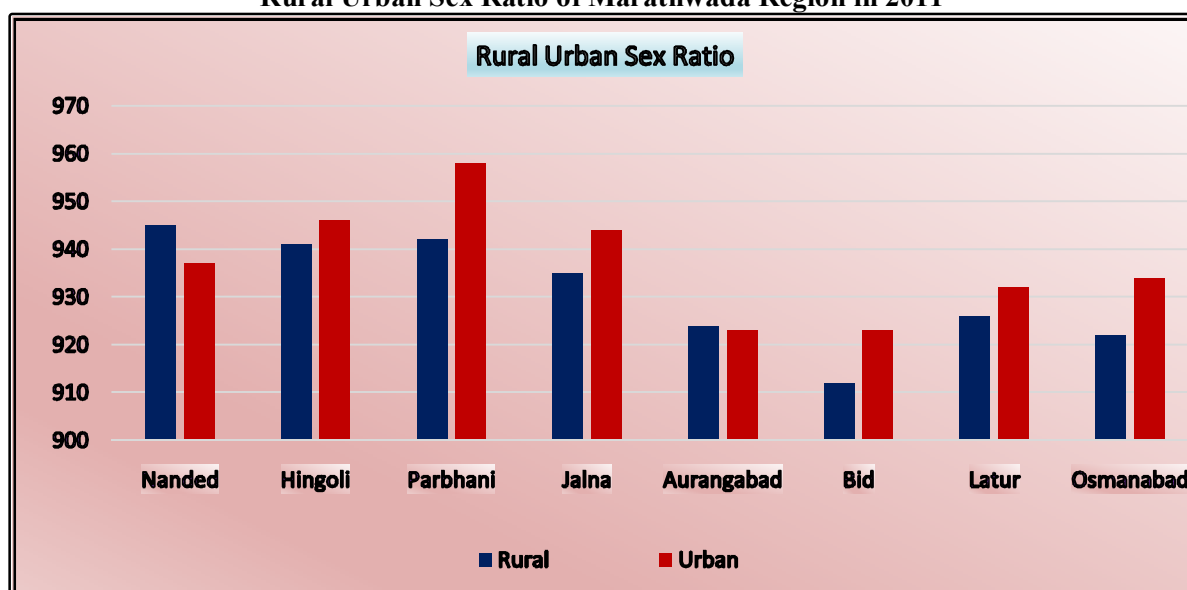


**Fig. No.3**

**Conclusion:**

The above study concluding that sex ratio of the Marathwada region was not a stable,it continuously up and down but its overall decreased 1901 to 2011 (Fig. no.1). Beginning the twentieth century it was 992 females per thousands of males and in 2011 it was 933 females per thousands of males. Spatial pattern of sex ratio of the region was diversely distributed to district level in census year 2011. The highest sex ratio found in parbhani district (977) followed by Nanded, Hingoli, and Jalna and lowest sex ratio is found in Beed district (916) after that Osmanabad, Aurangabad and Latur district respectively. Urban sex ratio is higher than the rural sex ratio (Fig. no.3), in rural area sex ratio is 933 females per thousands of males and 937 females per thousand males in urban area of Marathwada region, rural sex ratio was low because less available of medical facilities in rural areas, Sex Selective Migration, low status of women in society and modern way of life in urban area of the study region.

**References:**

1. *K. C. Mitra (2012): Population Geography, Wisdom press, New Delhi.*
2. *R.C. Chandana (2011) Geography of Population, Kalyani Publishers, New Delhi.*
3. *Human Geography – Majid Husain, Rawat Publication New Delhi.*
4. *District Census handbook , Census of India 2001 &2011.*
5. *Socio-economic review of study region district.*
6. *http://censusindia.gov.in*

# Educational Transformation in Kolhapur District (M.S.) : A Geographical Study

**Dr. O.V. Shahapurkar**
Head and Research Guide,
Department of Geography,
Rajarshi Shahu Mahavidyalaya
[Autonomous], Latur-413512.

**Mr. Pradip G. Gorambekar**
Research Fellow,
Rajarshi Shahu Mahavidyalaya,
[Autonomous], Latur-413512.

**Abstract:**

Educational development refers to both qualitative and quantitative nature. Education plays very important role in the socio-economic and cultural development of the people in the study region. Every individual needs education for his fullest possible development without education there will be no proper development of an individual, there will be proper development of society. Though education continues for a whole life span, the formal education is more beneficial to the people. The schools and colleges are the only places where formal education is possible to achieve the aims and objective of the education the role played by the public and private institutions, is of great importance.

Education is not all about studying and getting good marks. It is really a means to discover new things which we don't know about and increase our knowledge. An educate person has the ability to differentiate between right and wrong or good and evil. It is the foremost responsibility of a society to educate its citizens. A person becomes perfect with education as he is not only gaining something from it, but also contributing to the growth of nation. Education should be a means to empower children and adults alike to become active participants in the transformation of their societies. Learning should also focus on the values attitude and behaviors which enable individuals to learn to live together in a nation characterized by diversity and pluralism.

**Keywords:** Education, Transformation, Learning, School, etc.

## Objective:

The main objective of the present paper is to study and analyzed Educational transformation in Kolhapur district.

## Data base and Methodology:

The present paper is based on Secondary Source of data. The data is collected from various sources which includes both published and unpublished books, government publication and private publications. Secondary data has been obtained fromZillah parishad, Panchayat samiti, Municipal corporation, District gazetteers, district statistical department, socio economic review and district statistical abstract of Study region district. Collected data is processed and presented in the tabular forms.

## Study Area:

Kolhapur district is situated in the Southern part of Maharashtra. It is located in between $15^0$ 42' 30" to $17^0$ 11' 25" North latitude and $73^0$ 43' 10" to $74^0$ 43' 45" East longitude. Kolhapur district is surrounded by Sangli district to the North, Karnataka State to the East and South, Ratnagiri and Sindhudurg districts to the West. The Sahyadri ranges to the West and Varna River to the North form the natural boundaries. For the administrative purpose, the district is divided into 12 tahsils i.e. Shahuwadi, Panhala, Hatkanangale, Shirol, Karvir, Bavda, Radhanagari, Kagal, Bhudargad, Ajra, Gadhinglaj and Chandgad.

The total population of the district is 38, 76,001 persons, as per 2011 census, it constitutes 3.45 percent population to the state total. The geographical area of district is 7746.40 square kilometer, which constitutes 2.52 percent of state.

## Primary Education:

The primary schools from the base of the hierarchy of educational institution. Their basic purpose is to provide rudimentary, formal education to all the eligible children. Primary education is the foundation for the further education. Primary education includes balwadis, kindergarten schools and schools from 1st to 4th or 7th standard. The primary education in the study region is under the control of Zillah perished, panchayat samiti, nagar perished and large in number of institutions run by the private bodies. There were 2766 primary schools in 2015-16 in the Kolhapur district.
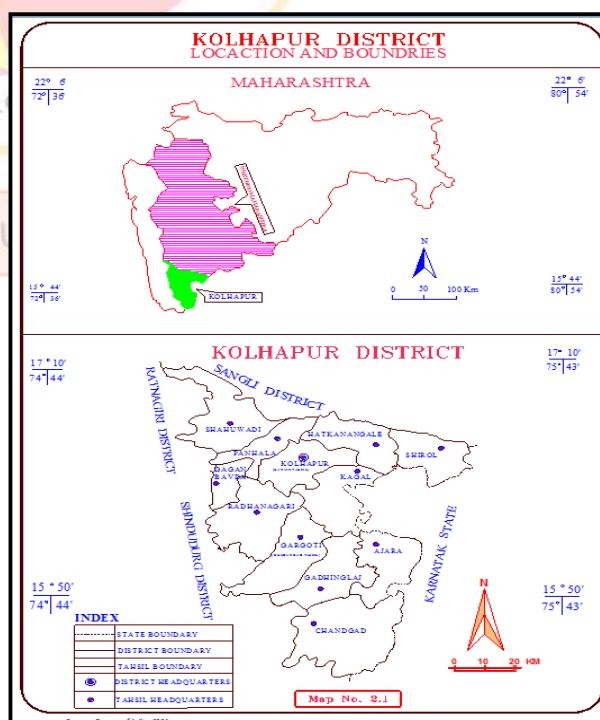
**Table No.1.1: Kolhapur District: Primary Education**

| Sr. No. | Particulars | 2005-06 | 2015-16 |
|---|---|---|---|
| 1 | Institutions | 2150 | 2766 |
| 2 | Enrollment | 555020 | 344685 |
| | I) Boys | 280510 | 169024 |
| | ii) Girls | 274510 | 165661 |
| 3 | Teachers | 16663 | 13442 |
| 4 | Number of Students per Primary Schools | 258 | 124 |
| 5 | Teachers- Pupil ratio | 1:33 | 1:25 |
| 6 | Secondary to Primary Institution ratio | 1:3 | 1:3 |

*Source: Socio-Economic Abstract of Kolhapur District2005-06&2015-16.*

Indicates that number of institution was 2150 in 2005-06 which was increased to 2766 in 2015-16.the total enrollment in the primary school was 555020 in 2005-06 which was decreased to 344685 in 2015-16. The number of student per primary school was 258 in 2005-06 and 124 in 2015-16. The teacher pupil ratio was 1:33 in 2005-06 and 1:25 in 2015-16.the secondary to primary institution ratio was 1:3 in 2005-06 and 2015-16.

## Secondary Education:

A great importance is rightly attached to the high school and the higher secondary school education. This is so becomes high school and higher secondary education provides a person with the first recognized certificate for entry into any field of employment or admission to higher institutions of vocational or general education and the provision of these facilities is considered as a step ahead in educational development. There has been steady growth of secondary schools during the last ten years.

**Table No.1.2: Kolhapur District: Secondary Education**

| Sr. No. | Particulars | 2005-06 | 2015-16 |
|---|---|---|---|
| 1 | Institution | 667 | 736 |
| 2 | Enrollment | 404238 | 186126 |
| | I) Boys | 218111 | 101059 |
| | ii) Girls | 186127 | 85067 |
| 3 | Teachers | 10608 | 6325 |
| 4 | Number of Students Per Secondary Schools | 606 | 253 |
| 5 | Teachers Pupil Ratio | 1:38 | 1:29 |
| 6 | Higher Secondary to Secondary Institutions Ratio | 1:8 | 1:2 |

*Source: Socio-Economic Abstract of Kolhapur District2005-06&2015-16.*

The total enrollment in the secondary school was 667 in 2005-06 which was increased to 736 in 2015-16. The total teacher in the secondary school was 10608 in 2005-06 which was decreased to 6325 in 2015-16. The number of student per secondary school was 606 in 2005-06 which was decreased to 253 in 2015-16. The Teachers pupil ratio was 1:38 in 2005-06 and 1:29 in 2015-16. The higher secondary to secondary institutions ratio was 1:8 in 2005-06 and 1:2 in 2015-16.

There were 667 secondary schools in 2005-06. The number was increased to 736 in 2015-16. The reason for such alarming increase in the number of high schools is the outcome of the state and local body government. Due to this number of private institutions started their high school to meet the demand of the people in the study region. In the urban center of the study region beside Marathi medium high school, there are English, semi-English, and Urdu medium high schools also.

## Result and Discussion:

To enhance the development of pupils in primary schools role of zillha parishad, panchayat samiti, municipal corporation and private institutions is important in the study region. District plays is very noteworthy role through the schemes and programs like various scholarship examination, science exhibited etc.

The reason for such alarming increase in the number of high schools is the outcome of the state and local body government. Due to this number of private institutions started their high school to meet the demand of the people in the study region. In the urban centre of the study region beside Marathi medium high school, there are English, semi-English, and Urdu medium high schools also.

## Conclusion:

- Karveer is the most sought after destination for students for medical and engineering. Students from as far as Nashik, Ahmednagar, Satara, Sangli, Ratnagiri, Sindudurg, Beed, Latur, Solapur, Aurangabad and Prabhani seek admission in Karveer colleges.
- There were 667 secondary schools in 2005-06. The number was increased to 736 in 2015-16. The reason for such alarming increase in the number of high schools is the outcome of the state and local

body government. Due to this number of private institutions started their high school to meet the demand of the people in the study region.

- Due to lack of development in educational facilities the quaternary economic activities is very low in study region. There were wide disparitiesinschoolingfacilitiesindifferenttahsilsofKolhapurdistrict. In order to overcome the issue, it is recommended that new schools canbestartedinunservedareaandprovideadequateinfrastructure like drinking water facilities, toilets and urinals, playgrounds, library and integrated science laboratories.
- In the urban center of the study region beside Marathi medium high school, there are English, semi-English, and Urdu medium high schools also.

**Reference:**
1. *Kolhapur District Census of India, 2001 and 2011.*
2. *Socio-Economic Abstract of Kolhapur District, 2001 to 2011.*
3. *Dharne S. P. (2015): "Social Transformation in Osmanabad District: A Geographical Study", Unpublished M.Phil. thesis, S. R.T. M. University, Nanded.*
4. *Dube, R.S. and Mishra R. P. (1981): "Level of Education: A Versatile Indicator of Regional Development", Geographical Review of India.*
5. *Dr. Shete, S.T. and Dr. Kankure K.B. (2004): "Geographic Basis of Socio-Economic Development-A Case Study of Solapur District".*

# Negative Impact of Pesticides on Environment: A Geographical Study

**Dr. P. B. Achole**
Assistant Professor and Research Guide,
Azad College, Ausa, Dist. Latur.

**Mr. B. M. Swami**
Research Scholar,
S.R.T.M University, Nanded.

**Introduction:**

   *Pest problem on environments is severe throughout the world. Different types of pests destroy about one-third of the world's total crop production. For huge population we take measure to control those pests and we do it mostly by applying toxic chemical (insecticide). Pest problems in some countries of the world are so severe that the control programmes are incorporate in their national budget. Through the pesticides give quick result they manifest a prolonged and disastrous affect on the environment in the long run. There are thousands of varieties of pest which do an enormous harm to mankind, animals, crops and property. The pests mainly cause damage to agricultural crops right from seedlings stage to the storage of the crop production.*

**Keyword:** Pesticide, Organic, Insecticide, Environment.

**Objective:**

   The objective of the present paper is to study and examined impact of Pesticides on Environment.

**Source of Data:**

   The present paper is based on Secondary Source of data. The data is collected from various sources which includes both published and unpublished books, government publication and private publications.

**Result and Discussion:**

**Types of pesticides:**

   The pesticides which generally in use are broadly classified in two types these are followings.

**Inorganic pesticide:** these insecticides have been in use for long time. however, now days these are limited use owing to their long persistence in nature less effective Ness and effect on the non-target organisms

**Organic pesticides:** Organic pesticides are the latest origin, these are more effective less persistent in nature and many of them are target specific therefore these have become popular day by day. These can be classified into natural and synthetic organic pesticides.

**A) Natural pesticides:** These may be plants, animals or microbial origin these are various essential oils, botanical and microbial.

**B) Synthetic organic pesticides**: These insecticides are of modern origin quick and very effective against the pests according to their molecular constitutional they can be broadly classified in to following three types.

**1. chlorinated hydrocarbons**: The most common example is DDT (Dichloride Diphenyl Trichloro ethane) methoxychlor, BHC, Aldrin, Diel Drin, heptachlor, Eldrin etc. chemically these are highly stable and persistent because of this nature once applied they are not degraded in nature easily

**Effects of chlorinated hydrocarbon:**

**i) Effects on Animal**: A large number. Of birds and mammals have been reported to be killed as a consequence of application of DDT or similar compounds in the vicinity of habitat of the birds, earthworms.

**ii) Effects on Soil:** 1 square metre of land harbours about 9,00,000 types different invertebrate animals. residual effect of insecticide causes the death of the most of the organisms are responsible for the fertility of the soil. With the death of the organisms the soil becomes infertile and barren the animals which live in the soil and largely responsible for the fertility of the soil include collembolan, mite, symphild, earthworms etc. in the absence of these organisms the land turns unproductive once applied, DDT, BHC etc. can stay in nature up to10 years or even more.

**iii) Effect of Biological Magnification:** Since the chlorinated hydrocarbon are not easily degradable they get accumulated and stored in the body of the animals they are  stored in various tissues , especially  in fat containing tissues the amount of storage increases day by day and the process is called biological magnification when the stored amount exceeds the tolerance limit animal dies.

**2. Organophosphorus Compounds:** Among the organophosphorus insecticides parathion malathion etc are quite well know. These are persistent in nature and degradable easily after application their mode of action is to attack the nerve impulse transmission the chemical inhibit the activity of choline estrage enzymes there by the allowing the continuous Flow of nerve impulse which disrupt the normal system.

**3. Carbamates:** These are very popular in controlling the household pest as well as agriculture pests. the well-known compounds are carbaryl, carbofuroan, propoxur, aldicrab, mrthiocarb etc. these are cheap and very effective insect control but thesy are known to cause severe ecological imbalance by killing the the wasps and honey bees.

**The Negative Impacts of Pesticide:**

**Persistence in Nature:**

The application of chlorinated hydrocarbon has severe impact on environment owing to it's long persistence in nature once applied they remain active for long time and degrade very slowly into DDD, DDE etc. which are more toxic than original applied DDT so once applied the chemical toxicity of DDT increasing day by day.

**Bio Magnification:**

Many pesticides are not easily destroyed or digested in animal body therefore the accumulate in tissues of the body and their concentration gradually increases the process of bio magnification poses a risk of elimination of animals of higher trophic levels, where the concentration of pesticides becomes lethal.

**Emergence of Resistance:**

Various animals and plants turn resistant to application of pesticide. with the passing of time they developed resistance against the chemical and their body.as a result to check the pest population one has to apply higher does every next time. Certain organisms have developed a total resistance to some pesticide and need to be countered by more potent insecticides.

**Emergence of Cross Resistance**:

Many organisms alter their physiological process in such a manner that while getting resistance to particular insecticide they also become resistant to pesticides of different chemical structures and even to more potent ones. This leads to a greater economic loss as well as severe health hazards.

**Elimination of Non-Target Species:**

The non-target species also get attacked by application of pesticides to particular organisms as a result the natural predator population of that pest gets eliminated and resurgence of pest problems occurs in more severe manner owing to the absence of the natural predators it also eliminates natural parasite population which cause a great ecological imbalance

**Hygiene Effect:**

The chemical gets stored in body through food, water, or air. The immediate effect of their toxicity can be found in various disorders in gastric, neural or brain- related diseases. Though the severity of their effect. Has not been properly assessed on human beings the certainly have some impact on human life. This can be ascertained from the data provided by WHO, which reveals that every year around 20,000_ 50,000 people of the world die of indirect or direct effect of pesticides.

**Conclusion:**

There are thousands of varieties of pests which do enormous harm to mankind, animals, crops and property. The pest mainly cause damage to agricultural crops right from the seedling stage to the storage of crop produce. A large number of toxic chemicals have been a use to control the pests at various stages of their life cycle. Though most of the chemicals have proved fatal to the pests they are responsible for severe health hazards to man and other animals. Environment lists have long been crying against using many of these chemical pesticides however to feed the ever increasing human Population there seems to be no other choice but control the pest by using those chemical pesticides. The day has now come when we should think. Of more effective alternatives to the check the pest population. Until the most useful biological control method is properly devised, integrated pest management seems to be the best remedy of pesticide pollution in the world.

**References:**

1. *Environmental Studies: R. Rajgopalan*
2. *Environmental Geography: Dr. M. Z. A. Khan and Dr. S. K. Agarwal*
3. *Environmental Studies: S. P.  Agarwal.*

# Spatial Variation of Agricultural Landuse in Ahmednagar District 1960-61 and 2010-11

**Prof. Manohar Ramnath Erande**
Assistant Professor,
Department of Geography,
Shri Mulikadevi College Nighoj,
Tal Parner, Ahmednagar, India.

**Dr. Rajeshwar D. Khakre**
Assistant Professor,
Department of Geography,
Jaikranti Arts College Latur,
Latur, India.

**Abstract:**

> *The Net Area Sown, Land Not Available for Cultivation, Cultivable Waste, Fallow Land and Forest Cover are included in agricultural land use. Use of land is an important factor for planning process because of the predetermined nature of land resource. In Ahmednagar district net sown area steadily decreased by 5.84 percent since 1960-61 to 2010-2011. The trend of cultivable waste increased 0.55 percent from 1960-61 to 2010-11. In the Ahmednagar District, the land not available for cultivation was 9.11 percent (1960-61) to the total geographical area; it increased 0.99 percentages (10.10%) in 2010-11. The highest area under follow land has increased to 11.88 percent to total geographical area followed by land not available for cultivation 10.10 percent to total geographical area in the district. The cultivation of crops in Ahmednagar District is confined to kharif and rabbi seasons.*

**Keywords:** Agricultural Landuse, Net Area Sown, Land Not Available for Cultivation, Cultivable Waste, Fallow Land, Forest.

**Introduction:**

The fundamental utility of land is fulfilling the human needs of food habitation and housing materials. It is essential to choose proper mode of agricultural landuse planning and allocation to various ingredients of optimum landuse to solve the human needs (Kellong, 1980) has rightly pointed out that this calls for the clear understanding of land classification for successful planning and development. The application of various inputs in land may change the allocation of land to different uses. The factors, conservation and quality of our socio economic environments are most elemental for the proper use of our land in each crop. This statement is true not only of percent Jawar is large urban centre as well as most of the remote areas. In order to deal with these and to plan for optimum utilization of land, it is necessary to have accurate and up to date information in all possible details on crops. It is therefore, the study of classification of under crop area in agricultural landuse pattern in Ahmednagar District would be helpful for preparation of the completed need of food and development plan for the district.

**Data Source andMethodology:**

The area of covered each landuse factor had converted into percentage to total geographical area. Secondary data has been used from Socio-Economic Reviews and District Statistical Abstracts of Ahmednagar District in 1960-61 and 2010-11. The description of each land classification has been supplemented by numerous spot-inquires, besides information embodied by using the Ahmednagar District Census Handbook, District Gazetteer and District Socio Economic Review of Ahmednagar District.

**Objectives:**

1. To highlight the tahsilwise agricultural land use in Ahmednagar district in 1960-61 and 2010-11.
2. To analysis the spatial distribution of each landuse factor.

**Study Area:**

Ahmednagar district is situated partly in the upper Godavari Basin. It lies between $18^0 2'$ North latitude to $19^0 9'$ North latitude and $73^0 9'$ East longitudes to $75^0 5'$ East longitudes. It is surrounded by Nashik district in the North, Beed and Aurangabad districts in the East, Pune district in the South, Thane and Raigad district in the North-West. Ahmednagar district has an area of 17410 square km and a population is 4543159 (2011 Census). It ranks first in terms of area and sixth in terms of population amongst the district of the state. The main stream of hills in the Sahyadri which is runs north-south in the western proportion of the district. It acts as a watershed between the Pravara and its tributaries which drain towards the Godavari. The climate of the district is generally dry except during the South-West monsoon season. The average annual rainfall for the district as a whole is 488.4 mm. Within the district there are considerable variations in rainfall. The rainfall in generally decrease as one proceeds from West to East. Temperature begins to increase rapidly from the latter half of February. May is the hottest month and December is the coldest month with the Maximum temperature at 36.38°C and minimum temperature at19.92°C at Ahmednagar. The soil of the district is essentially derived from the Deccan Trap which is the predominant rock formation of the district

**Spatial Analysis of Agricultural Landuse:**

The spatial pattern in landuse in Ahmednagar District is the result of interaction between physical environment and socio-economic environment. But the impact of regional and local factors is clearly evident from the landuse patterns. Besides these factors, amount of rainfall exerts profound influence on the types of landuse in the Ahmednagar District. These subtypes are as follows:

1. Net Area Sown (**NSA**)
a. Land put to non-agricultural uses
2. Cultivable Waste (**CW**):
a. Permanent pastures and other grazing land
b. Land under miscellaneous tree crops and groves not included in net sown area
c. Cultivable Waste
3. Fallow Land (**FL**):
a. Current fallow land
4. Forest/Forest Cover (**F**)

2. Land Not Available for Cultivation (**LNAC**)
b. Barren and uncultivable land

b. Fallow land other than current fallow

The above mentioned categories have been used to examine the spatial pattern of landuse in Ahmednagar District. The percentage of each landuse type has been calculated to total geographical area of the district. The percentage area of landuse type has given in Table 1 and 2.



Map 1: Ahmednagar- General Landuse (1960-61)
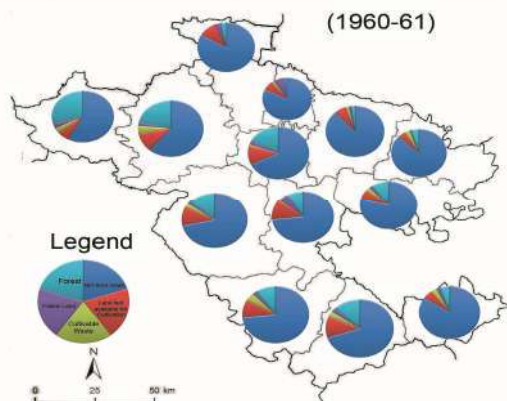
Map 2: Ahmednagar- General Landuse (2010-11)
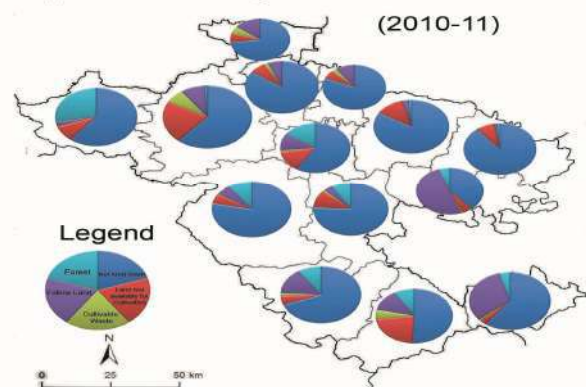
**1. Net Sown Area:**

The net sown area includes land actually under food crops, cash and fodder crops. The Ahmednagar District has 68.11 percent land under cultivation to total geographical area showing relatively greater than Maharashtra (56.52%) in 2010-11. This peculiarity of the land pattern of the district can be accounted by the presence of Sahyadrian Mountain range and its off shoots spread within the district.

Table 1 and Map 1 reveal the spatial variations in the percentage of net sown area to total geographical area in the Ahmednagar District (1960-61). It is observed from this map that net sown area was maximum ( more than 70 percent) in Kopargaon (83.50%) followed by Shrirampur (82.24%), Newasa (88.39%), Shevgaon (87.30%), Pathardi (78.57%), Nagar (73.05%), Parner (71.57%), Shrigonda (73.46%) and Jamkhed (84.47%) while it was minimum ( less than 60 percent) in Akole ( 57.91%). This is the outstanding trend of net sown area. This can be explained by the fact that the western part (Akole and Sangamner) of the district occupied by Sahyadrian mountain range that is almost forest land, unsuitable and low fertility soil. As a result, comparatively less percentage of area has been brought under cultivation. Remaining part of the district (Pravara, Mula, Sina river basins) is low-lying plain with medium to deep black soil, suitable for extensive land under plough.

**Table 1: Ahmednagar District: General Landuse (1960-61)** (Area in Percentage)

| Sr. No. | Tahsil | LANDUSE TYPES | | | | |
|---|---|---|---|---|---|---|
| | | NSA | LNAC | CW | FL | F |
| 1 | Akole | 57.91 | 6.12 | 3.32 | 3.26 | 29.39 |
| 2 | Sangamner | 61.08 | 10.87 | 4.63 | 2.20 | 21.21 |
| 3 | Kopargaon | 83.50 | 10.07 | 0.19 | 3.54 | 2.70 |
| 4 | Rahata | --- | --- | --- | --- | --- |
| 5 | Shrirampur | 82.24 | 6.93 | 1.82 | 7.54 | 1.46 |
| 6 | Newasa | 88.39 | 6.42 | 1.86 | 1.47 | 1.86 |
| 7 | Shevgaon | 87.30 | 4.23 | 3.13 | 1.10 | 4.23 |
| 8 | Pathardi | 78.57 | 7.26 | 2.50 | 1.83 | 9.84 |
| 9 | Nagar | 73.05 | 12.38 | 0.73 | 4.99 | 8.85 |
| 10 | Rahuri | 67.55 | 11.70 | 0.98 | 2.56 | 17.21 |
| 11 | Parner | 71.57 | 10.92 | 2.36 | 1.61 | 13.54 |
| 12 | Shrigonda | 73.46 | 10.16 | 4.30 | 2.43 | 9.66 |
| 13 | Karjat | 69.82 | 11.94 | 2.95 | 2.55 | 12.74 |
| 14 | Jamkhed | 84.47 | 5.02 | 3.20 | 2.17 | 5.14 |
| | **Total** | **73.95** | **9.11** | **2.58** | **2.74** | **11.63** |

*Source:* Socio-Economic Abstract- Ahmednagar District.

Table 2 and Map 2 clearly show that in 2010-11, there was great change or decrease in the percentage of net sown area to total geographical area. In 2010-11, maximum percentage (more than 70 percent) of land under net sown area is found at Kopargaon (73.93%), Shrirampur (81.44%), Newasa (83.55%), Shevgaon (89.23%), Nagar (75.86%) and Parner (78.29%).

During the year 2010-11 the category consisting 60 to 70 percent net sown area to the total geographical area is shown in Map 2 and Table 2. Only three tahsils comes under this category i.e. Akole (60.79%), Sangamner (61.30%), Shrigonda (69.04%) and Jamkhed (60.04%) and 50 to 60 percent net sown area observed in Rahuri (59.13%) and Karjat (50.72%) tahsils. Below 50 percent net sown area observed in Pathardi (38.83%) tahsil.

**Table 2: Ahmednagar District: General Landuse (2010-11)** (Area in Percentage)

| Sr. No. | Tahsil | LANDUSE TYPES | | | | |
|---|---|---|---|---|---|---|
| | | NSA | LNAC | CW | FL | F |
| 1 | Akole | 60.79 | 8.74 | 0.39 | 2.35 | 27.72 |
| 2 | Sangamner | 61.30 | 21.65 | 7.18 | 9.04 | 0.84 |
| 3 | Kopargaon | 72.93 | 6.90 | 5.70 | 14.48 | 0.00 |
| 4 | Rahata | 84.98 | 6.95 | 1.82 | 6.25 | 0.00 |
| 5 | Shrirampur | 81.44 | 5.93 | 2.66 | 9.97 | 0.00 |
| 6 | Newasa | 83.55 | 12.26 | 0.09 | 2.97 | 1.13 |
| 7 | Shevgaon | 89.23 | 7.93 | 0.28 | 1.50 | 1.06 |
| 8 | Pathardi | 38.83 | 5.00 | 0.83 | 49.88 | 5.46 |
| 9 | Nagar | 75.86 | 10.42 | 1.17 | 3.78 | 8.76 |
| 10 | Rahuri | 59.13 | 13.14 | 1.08 | 11.21 | 15.45 |
| 11 | Parner | 78.29 | 5.38 | 0.43 | 5.84 | 10.06 |
| 12 | Shrigonda | 69.04 | 5.19 | 1.52 | 14.77 | 9.48 |
| 13 | Karjat | 50.72 | 22.16 | 5.73 | 12.62 | 8.76 |
| 14 | Jamkhed | 60.04 | 2.74 | 0.95 | 31.95 | 4.31 |
| | **Total** | **68.11** | **10.10** | **2.03** | **11.88** | **7.89** |

*Source: Socio-Economic Abstract- Ahmednagar District.*

Table 3 shows the percentage variation in general landuse between the study periods. The percentage of net sown area increased in Akole, Sangamner, Shevgaon, Nagar and Parner tahsils while in reaming tahsils the percentage of net sown area goes on decreased. This significant decreased in net sown area may be due to more land under roads, residuals subsequently under land put to non agricultural use, cultivable waste and fallow land. There was decreased in the percentage of net sown area (-5.84%), cultivable waste (-0.55%) and forest (-3.74 %) while the percentage increased in land not available for cultivation (0.99%) and fallow land (9.14%) in Ahmednagar District.

**Table 3: Percentage Variation in General Landuse(Between 1960-61 to 2010-11)**

| Sr. No. | Tahsil | LANDUSE TYPES | | | | |
|---|---|---|---|---|---|---|
| | | NSA | LNAC | CW | FL | F |
| 1 | Akole | 2.88 | 2.62 | -2.93 | -0.91 | -1.67 |
| 2 | Sangamner | 0.22 | 10.78 | 2.55 | 6.84 | -20.37 |
| 3 | Kopargaon | -10.57 | -3.17 | 5.51 | 10.94 | -2.7 |
| 4 | Rahata | 84.98 | 6.95 | 1.82 | 6.25 | 0 |
| 5 | Shrirampur | -0.8 | -1 | 0.84 | 2.43 | -1.46 |
| 6 | Newasa | -4.84 | 5.84 | -1.77 | 1.5 | -0.73 |
| 7 | Shevgaon | 1.93 | 3.7 | -2.85 | 0.4 | -3.17 |
| 8 | Pathardi | -39.74 | -2.26 | -1.67 | 48.05 | -4.38 |
| 9 | Nagar | 2.81 | -1.96 | 0.44 | -1.21 | -0.09 |
| 10 | Rahuri | -8.42 | 1.44 | 0.1 | 8.65 | -1.76 |
| 11 | Parner | 6.72 | -5.54 | -1.93 | 4.23 | -3.48 |
| 12 | Shrigonda | -4.42 | -4.97 | -2.78 | 12.34 | -0.18 |
| 13 | Karjat | -19.1 | 10.22 | 2.78 | 10.07 | -3.98 |
| 14 | Jamkhed | -24.43 | -2.28 | -2.25 | 29.78 | -0.83 |
| | **Total** | **-5.84** | **0.99** | **-0.55** | **9.14** | **-3.74** |

*Source: Compiled by the Researcher.*

## 2. Land Not Available for Cultivation (LNAC):

This is divided into following types;
a) Land-put to non-agricultural uses: Land occupied by settlements, roads, railways, streams, canals and rivers are included in this type.
b) Barren and uncultivable land: Outcrops of hills and mountains are included in this type. The small part of this land can be brought under cultivation of very high costs. Generally, barren and uncultivated land is associated with poor soils, heavy rainfall and intense erosion.

Fig.1: Percentage Variation in General Landuse (Between 1960-61 to 2010-11)
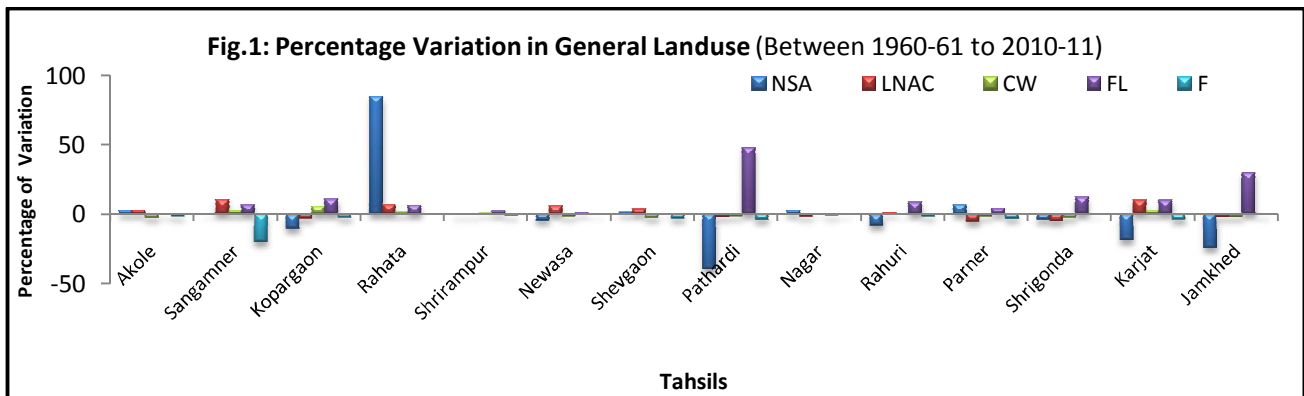
In 1960-61 more than 10 percent land not available for cultivation was observed in Sangamner, Kopargaon, Nagar, Rahuri, Parner, Shrigonda and Karjat tahsils; while remaining tahsils observed less than 10 percent land not available for cultivation (Table 1 and Map 1). As well as in 2010-11, there is significance change in land not available for cultivation. Table 2 and Map 2 shows that three tahsils falls in the range of 10 to 15 percent viz. Newasa (12.26%), Nagar (10.12%) and Rahuri (13.14%) and two tahsils increased to more than 20 percent viz. Sangamner (21.65%) and Karjat (22.16%) of land not available for cultivation in the study area. While in remaining tahsils have less than 10 percent land not available for cultivation.

In the Ahmednagar District, the land not available for cultivation shows considerable variations within the district (Table 3). The land not available for cultivation (10.10%) was less to the Maharashtra (10.33%). The percentage of land not available for cultivation was highly increased in Sangamner (10.78%) followed by Karjat (10.22%), Newasa (5.84%) and Rahata (6.95%), while it was highly decreased in Parner (-5.54%), Shrigonda (-4.97%), Kopargaon (-3.17%), Jamkhed (-2.28%), Pathardi (-2.26%) and Nagar (-1.96%) tahsils between the study period (Table 3 and Fig. 1).

## 3. Cultivable Waste (CW):

The cultivable waste land includes other uncultivated lands excluding fallow land. This category is divided into three types.

a) Permanent pastures and other grazing lands,

b) Miscellaneous tree crops and groves and

c) Cultivable waste.

The permanent pastures and grazing lands include all land, are under grass-cover, government and private land; or permanent pastures which are kept reserved as a village common grazing ground or vast tract of protected land, not open for free grazing and unreserved grassland. The miscellaneous tree crops and groves include land under grasses, bamboo, bushes and other groves for fuels etc. which not included under orchards or forests are included in this category and the land not cultivated during the preceding five years is called cultivable waste.

The Ahmednagar District had 2.58 percent (1960-61) and 2.03 percent (2010-11) to total land under cultivable waste (Table 1 and 2). It was slightly decreased (-0.55%) between the study period and 5.82 percent less as compared to Maharashtra. The cultivable waste was observed in varied ranges within the district. In 1960-61, all tahsils come under less than 5 percent cultivable waste land. While in 2010-11, Sangamner, Kopargaon and Karjat observed more than 5 percent of cultivable waste land as well as Akole, Rahata, Shrirampur, Newasa, Shevgaon, Pathardi, Nagar, Rahuri, Shrigonda and Jamkhed tahsils observed less than 5 percent cultivable waste land.

Table 3 clearly shows that there was significant variation in cultivable waste between the study periods. There was high percentage of cultivable waste land increased at Kopargaon tahsil (5.51%) followed by Karjat (2.78%), Sangamner (2.55%), Rahata (1.82%) and Shrirampur (0.84%) while the percentage of cultivable waste land highly goes on decreased at Akole (-2.93%) followed by Shevgaon (-2.85%), Shrigonda (-2.78%), Jamkhed (-2.55%) and Parner (-1.93%) tahsils.

## 4. Fallow Land (FL):

The fallow land is generally, divided into two categories;

(a) Current fallow land and

(b) Other than current fallow land.

The current fallow land includes the land which is not cultivated during the current year due to variety of regions i.e. as phase to rotation, for regaining fertility or due to some other constrains. Other than current fallow land includes arable area which is taken up for cultivation but has gone temporarily out of cultivation for a period of not more than five years.

The Ahmednagar District had 2.74 percent (1960-61) and 11.88 percent (2010-11) to total area under fallow land (Table 1 and 2). It was increased (9.14%) between the study period and 3.52 percent more as

compared to Maharashtra (2010-11). The fallow land was observed in varied ranges within the district. In 1960-61, Akole, Kopargaon, Shrirampur and Nagar observed more than 3 percent fallow land in 1960-61, while remaining tahsils observed less than 3 percent of fallow land to the total geographical area. As well as in 2010-11, high percentage of fallow land observed at Pathardi (49.88%), Jamkhed (31.95%), Shrigonda (14.77%), Kopargaon (14.48%), Karjat (12.62%) and Rahuri (11.21%). While Shrirampur (9.97%), Sangamner (9.04%), Rahata (6.25%), Parner (5.84%), Nagar (3.78%), Newasa (2.97%), Akole (2.35%) and Shevgaon (1.50%) tahsils observed low percentage (less than 10 %) of fallow land in the district.

Table 3 clearly shows that there was great variation in fallow land between the study periods. There was high percentage of fallow land increased at Pathardi tahsil (48.05%) followed by Jamkhed (29.78%), Shrigonda (12.34%), Kopargaon (10.94%) and Karjat (10.07%), while the percentage of fallow land decreased at Nagar (-1.21%) and Akole (-0.91%) tahsils only.

## 5. Forest Land (F):

In assessing the character of the vegetation type, a factor that can not be neglected in the long occupation of man and the consequent change on the vegetal carpet through agriculture. The type of vegetation met with any given locality depends on the climate, soil and past treatment has been emphasized by the leading plant ecologists.

The Ahmednagar District had 11.63 percent (1960-61) and 7.89 percent (2010-11) of total area under forest land (Table 1 and 2). It was decreased (-3.74%) between the study period and 9.05 percent more as compared to Maharashtra (2010-11). The forest land was observed almost in stable range within the district. One comes across the maximum forest land at Akole (29.39%) followed by Sangamner (21.21%) Rahuri (17.21%) and Parner (13.54%) in 1960-61 and Akole (27.72%), Rahuri (15.45%) and Parner (10.06%) in 2010-11, while the minimum at Shrirampur (1.46%) in 1960-61 and 2010-11 in the study period.

Table 3 clearly shows that there was significant variation in forest land. There was high percentage of forest land highly goes on decreased at Sangamner (-20.37%), Pathardi (-4.38%), Karjat (-3.98%), Jamkhed (-3.74%), Parner (-3.48%) and Shevgaon (-3.17%). There was not more decreased in forest land in the district. But the density of trees goes on decreased day by day.

## Summary and Conclusion:

1. The net sown area was observed maximum in Kopargaon and minimum in Akole Taluka.
2. In the district the percentage of net sown area decreased (5.84%) in the study period. Net sown area increased in Akole (2.88%), Nagar (2.81%) and Parner (6.72%) while the remaining part of the district the percentage of net sown area observed on decreased.
3. The land not available for cultivation in district observed (10.10%) was less to the Maharashtra (10.33%).
4. The percentage of land not available for cultivation was highly increased in Sangamner (10.78%) and highly decreased in Parner (-5.54%) taluka.
5. The maximum cultivable waste observed at Sangamner 4.63% in 1960-61and 7.18% in 2010-11 and the minimum at Kopargaon 0.19% in 1960-61 and Newasa 0.09% in 2010-11 in the study period.
6. The high percentage of cultivable waste land increased in Kopargaon taluka and decreased in Akole taluka.
7. The maximum fallow land observed at Shrirampur (7.54% in 1960-61) and Pathardi (49.88% in 2010-11) while the minimum at Shevgaon in 1960-61 and 2010-11 respectively 1.10% and 1.50% in the study period.
8. The high percentage of forest land increased in Pathardi taluka and decreased in Nagar taluka.
9. Ahmednagar District has 11.63 percent and 10.91 percent of land under forest cover during 1960-61 and 1970-71 respectively. From 1990-91 to 2010-11 land under forest decreased by 3.14 percent.

## References:

1. *Das M.M.(1981); Land use Pattern in Assam, Geog. Review of India, Vol.43, Number 3 Sept.1981 p.p.243-244.*
2. *Singh, Jasbir (1974); An Agricultural Atlas of India A Geographical Analysis, Vishal Publication, Unversity Campus, Kurukshetra, 1974.*
3. *Khakare R.D. (2006);Land Utilization In Aurangabad District In 1983-87 and 1995-99, The Goa Geographer, Vol.3 Dec.2006.*
4. *Dept. of Agriculture & Revenue Circle wise Village Information in Talathi Office.*
5. *Dr.B.C.Vaidya, Agricultural land Use in India, (A study in Yashoda Basin), Manek Publication Pvt.ltd. New Delhi.1997.*
6. *Ahmednagar Gazetteer, 2001, Gazetteers Department, Government of Maharashtra, 1976.*
7. *Balak, Ram and Joshi D.C. (1984) Landuse Soil Relationship in Arid Zone. The Deccan Geographer Vol-XXII*
8. *Bharadwaj O. P. (1964) The national Geographical Journal of India. 10,2.*
9. *Hussan M. (1999) Systematic Agriculture Geography. Rawat Publication.*
10. *Majid Hussain (2004) Agriculture Geography , Rawat Publication*
11. *Mohammad Shafi (2006) Agriculture Geography. Pearson Education.*

# Application of GIS in an Evaluation of Jalyukt Shivar Abhiyan in Kolhapur District

**Mr. Sunil Bhosale**
Research Student,
SRTM University, Nanded.
(Study Center, MBM, Latur).

**Dr. P. B.Achole**
Research Supervisor,
Head, Department of Geography,
Azad College Ausa, Latur.

## Introduction:

Water is one of the most important substances on earth. All plants and animals must have water to survive. If there was no water there would be no life on earth. Apart from drinking it to survive, people have many other uses for water. The Maharashtra government in India has launched a water conservation scheme named "Jalyuktshivarabhiyan" to make Maharashtra a drought-free state by 2019. The programme aims to make 5000 villages free of water scarcity every year. The key aim of JalyuktShivarAbhiyan is to establish belief in a farmer that "every drop of rainwater is owned by me and it should percolate in my land". At hence in this research project we have to examine statues of Jalyuktshivarabhiyan.According to JalyuktShivarYojana website data theseschemehas been implemented 108 villages out of 1216 in Kolhapur distract from last three year. This scheme is implemented 69 villages in 2015, 20 and 19 villages in 2016 and 2017 respectively. The government of Maharashtra in year 2015spentamount 3021.57lakhsrupees for the work of Jalyuktshivarabhiyan, 1838.19lakhs for 2016 and 142.63lakhs for 2017.It means thatlast three yeargovernment have been spent 5002.39lakhs rupees in Kolhapur district for watershed management program under Jalyuktshivarabhiyan.The5002.39 lakhs was spent under the Jalyuktashivarabhiyan, but the main aim of this scheme was completed? Sothat in this research paper toevaluate ground reality of this scheme. For the assessment of ground reality of this scheme5 villages out of 16in Shahuwadi tehsil have been selected for field work. The secondary data have been collocated from district agricultural office and government website of BHUVAN and Jalyuktshivarabhiyan. The GIS, GPS tools and techniques have been used for data calculation and representation.

## Study Area:

Kolhapur district is situated in the extreme southern part of Maharashtra State. It lies between 15$^o$ 43' to 17$^o$ 17' north latitudes and 73$^o$ 40' to74$^o$ 42' east longitudes. It is surrounded by Sangli district to the north, Karnataka State to the east and south and Ratnagiri and Sindhudurg districts to the west. The Sahyadri ranges to the west and Warna River to the north form the natural boundaries. The district has an area of 7,685.00 sq. km and a population of 3876001 populations as per 2011 census data.



**Fig. No 1**

Kolhapur district, which is a part of Pune division, has no jurisdictional changes since 1991 census to 2011 census. According to census data in 12 tehsil there are 1216 Villages and 23 Towns recorder in 2011.This scheme is implemented 69 villages in 2015,20 and 19 villages in 2016 and 2017 respectively. In Kolhapur district 108 villages are selected under JSA in last three year, out of these 16 highest numbers of villages within Shahuwadi tehsil. For the evaluation of JSA 4 villages are selected within in Shahuwadi tehsil in AmbiraNala watershed area. The average rainfall of JSA selected village in Kolhapur district is 1600 mm and 1250 mmrainfall in selected villages of Shahuwadi tehsil.

## Objectives:

1.      To examine work status of Jalyuktshivarabhiyan in study area.
2.      To identify status of constructed cement bandhara in selected Village of JSA.

## Hypothesis:

The use of improper watershed management techniques constructed bandharas are stored by silt instead of water.
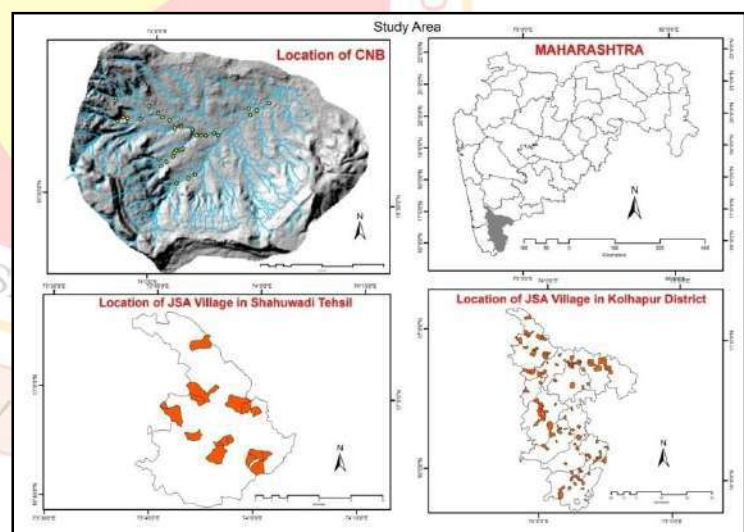
**Data Base and Methodology:**

The present study is based on primary and secondary data during 2015– 2017from last three year. The using stratified random sampling method 4 villages are selected within watershed area of AmbiraNala in Shahuwadi tehsil. The sources of primary and secondary data and methodology have given below.

**Primary Data:**

Fieldwork and Survey method

**Secondary Data:**

- SIO (Survey of India) Toposheets: 47/H 13 and 47/L11
- Cartosat DEM data (30 m resolution): Cdne43e, Cdne43n, Cdne43o and Cdne43t
- Kolhapur District Census Handbook, Village Directory 2001 and 2011
- Government web site Jalyuktshivarabhiyan
- Kolhapur District Agriculture Office

**Methodology:**

- Stratified Random Sampling Method
- ArcSWAT Watershed Delineation method
- Hill shade Method
- 3D ArcScene Method
- Software: Quantum GIS, Arc GIS 10.3, ArcSWAT 10.3, Google Earth
- Instrument: Garmin GPS

**Formulas:**

➢ **Volume of Water Stored at Cement Nala Bund**

**Formula,**

**Volume of water stored (m$^3$)** = Length of water impounded (m) × Width of CNB (m) × Average depth of water impounded (m)

➢ **Silt Deposition in Cement Nala Bund**

**Formula,**

I. **Area of silt deposition** = Length of CNB water impounded (m) × Width of CNB (m$^2$)

II. **Volume of silt deposition** = Area of silt deposition (m) × Depth of silt deposition in CNB (m$^3$)

III. **Weight of silt deposition** = Volume of silt deposited (m$^3$) × Density of Soil (gm/cc) in CNB (tonnes)

**Result and Discussion:**

**Important key points of Jalyuktshivarabhiyan:**

The Maharashtra Government launched a new scheme named"JalyuktShivarYojana Scheme" on 26th January, 2016. The JalyuktShivar team dedicated to spread the awareness campaign for the scheme. Considering drought-like situationoccurring frequently in the state, JalyuktShivar Campaign is being taken up under 'water for all - drought-free Maharashtra 2019'. There are the two types of sources of this essential resource viz. surface water and ground water. Maharashtra, the second largest state in India, both in area as well as in population, has very limited assured irrigation. Almost 82% area in the state is dry land while 52% area is drought-prone. There are 188 Tehsil (2234 villages) where groundwater level dropped for more than 2 meter and drought situation were declared in 19059 villages from 22 districts in the year 2014-15. This scheme has already become a people's scheme where huge amount of masses are coming forward together to support the scheme. The Maharashtra government has already started initial talks with actor Aamir Khan to become the part of this campaign which will surely boost up the scheme.

**Aims:**

1. Increasing area under irrigation in the state - Increasing assured water for farming and efficiency of water usage.
2. Harvesting maximum rainwater in the surrounding village of JSA.
3. The government aims to cover 12,514 drought-prone villages under the scheme this time, and make them water-sufficient.
4. Creating decentralized water storages.
5. Creating public awareness about balanced use of water.
6. Starting new projects to create water storage capacity.
7. Sensitizing people about water harvesting / increasing public participation.
8. Increasing water storage capacity of existing water sources in small dams, village tanks, percolation tanks and cement dams.
9. Increasing level of groundwater

**Key Points:**

1. The Maharashtra Government has selected 108 villages in the last three year from 2015-2017. For this scheme, the government has been spent 2340 lakhs rupees in Kolhapur district.

2. The target is to make the entire state free of drought by the end of 2019. The Government has set yearly targets for completing this entire project within the promised deadline. In last three year from 2015-2017 in Kolhapur district 1298 works are proposed and 1277 works are completed. It means that 98 per cent work completed within the promised deadline.

3. There are several other water conservation, irrigation and draught management schemes in the state. Those all schemes were brought together and bonded with one single scheme and form the JalyuktShivarYojana.

**Evaluation of Jalyuktshivarabhiyan:**

The Maharashtra government in Kolhapur district has launched a water conservation scheme named "Jalyuktshivarabhiyan" to make drought-free state, District and Every Village by 2019. The scheme is started from 26th January, 2016 and total work of this scheme is carried out in four phases. In the year 2016 to 2018 three phases are completed, for following table shows that three year brief review of Jalyuktshivarabhiyan.

In Kolhapur district 108 villages out of 1216 are selected under the scheme of Jalyuktshivarabhiyan from last three year. Out of 108 villages there are 16 (14.81%) villages are in Shahuwadi tehsil. In this scheme various type of watershed development work carried out viz. Farm Pound, Vanraibandhara, Contour Trenches, Loose Boulder structure, Percolation Tank and Cement Bandhara. In Kolhapur district above type of 1816 works are completed and these work covered 2422.21 Hector areas. For this work government has been spent 5002.39 lack amount.

**Table No 1: Evaluation of Jalyuktshivarabhiyan in Kolhapur district and Shahuwadi Tehsil**

| Sr. No | Place | Year | Village | Work | Amount (in lack) | Area (inHect.) |
|--------|-------|------|---------|------|------------------|----------------|
| 1 | Kolhapur | 2015-16 | 69 | 1168 | 3021.57 | 1599.39 |
| | | 2016-17 | 20 | 416 | 1838.19 | 769.62 |
| | | 2017-18 | 19 | 187 | 142.63 | 53.2 |
| | | **Total** | **108** | **1816** | **5002.39** | **2422.21** |
| 2 | Shahuwadi | 2015-16 | 12 | 132 | 262.16 | 112.78 |
| | | 2016-17 | 2 | 76 | 107.50 | 227.4 |
| | | 2017-18 | 2 | 73 | 198.81 | 70 |
| | | **Total** | **16 (14.81%)** | **281 (15.47%)** | **568.47 (11.36%)** | **410.18 (16.93%)** |

*Source: Agriculture Office of Kolhapur District& Government Website of Jalyukt Shivar.*

In Kolhapur district there are 12 tehsil but Shahuwadi tehsil give more benefits of JalyuktaShivarAbhiyan. In last three year16 villages are get benefit of this scheme; in this scheme 281 watershed development works are completed. These works are covered 410.18 Hector area of tehsil. For this scheme government has been spent 568.47 lack amount in last three year. In Shahuwadi tehsil major work are carried out in Banbavde circle at Ambiranalawatershed area. This watershed area covers 14 villages but under jalyuktshivar scheme only 4 villages are selected. In the first phase 12 villages are selected in jalyuktshivarabhiyan (2015-16) but for the assessment of ground reality of this scheme Sonavde, Parkhandale, ShitturTarfMalkapur and Pishvi village are selected for field work. The 528.14 lack total amount will be spent on watershed development program. In the scheme of JSA Pishvi village get more benefit, 269.33 lack amounts has been sanctioned followed by 105.24 lack for Shittur, 102.73 lack for Sonavde and 50.84 lack for Parkhandale Village.

**Status of Constructed Cement Bandhara:**

The table no 2 and Fig no. 2 show that status of cement nala bunds.In the scheme of JalyuktshivarabhiyanSonavde, Pishavi, ShitturTarfMalkapur and Parkhandale village are selected in the first phase. To find out the ground reality of JSA scheme, Sonavde, Shittur, Pishvi and Parkhandale villages are selected for field work. In jalyuktshivarabhiyan 58.13% amount will be spent on construction of cement bandharas at hence in this research project to identified status of cement bandhara. There are 32 cement bandhar are constructed in this four village viz. 06 in Sonavde, 10 in Pishvi, 10 in Shittur and 6 in Parkhandale. Table no 3 shows that distribution of actual water storage capacity and silt deposition in cement bandhara.

**Table No 2: Jalyuktshivarabhiyan: Status of Cement NalaBandhara**

| Sr. No | Village | Total Amount | No of CNB | CNB Amount | CNB Amount (in %) |
|--------|---------|--------------|-----------|------------|-------------------|
| 1 | Pishavi | 269.33 | 10 | 91.48 | 33.97 |
| 2 | Parkhandale | 50.84 | 06 | 31.48 | 61.92 |
| 3 | Shittur | 105.24 | 10 | 96.81 | 91.99 |
| 4 | Sonavde | 102.73 | 06 | 87.22 | 84.90 |
| | Total | 528.14 | 32 | 306.99 | 58.12 |

*Source: Government Web Site Jalyukt Shivar.*
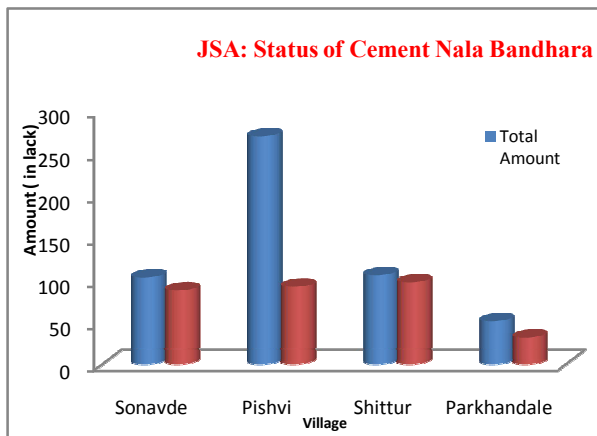
**Fig. No: 2**
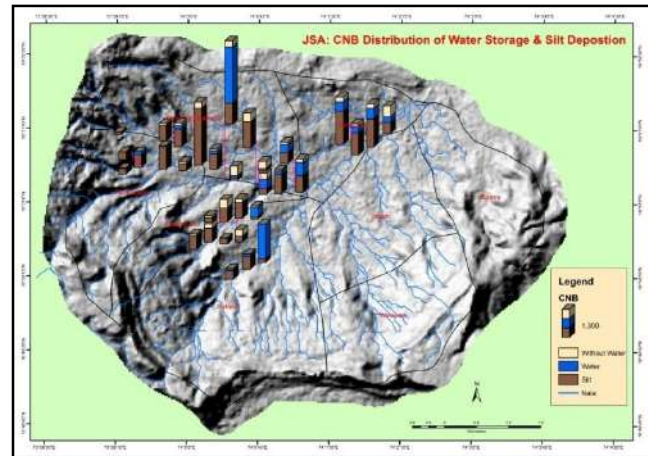


**Fig. No. 3**

In this 32 cement bandharas8473.8 m³waterhave been stored in this rainy season. The maximum water stored in cement bandhara of (3402 m³) Shittur village because of hard igneous rack structure found at nalabed. In Sonavde village cement bandharas are found in gentle slope area and width of nala is 8 to 10 met. at hence 2467.8 m³ water have been stored. In very less amount (228 m³) of water stored at cement bandhar of Parkhandale village. The cement bandharas of Parkhandale village are situated at steep area and width of nala is 6 to 7 met.

**Table no 3: JSA Cement Bandhara: Distribution of Water and Silt**

| Sr. No. | Village | Volume of Water (in m³) | Water (in lit.) | Volume of Water (in %) | Volume of Silt(in m³) | Silt (in tonnes) | Volume of Silt (in %) |
|---|---|---|---|---|---|---|---|
| 1 | Sonavde | 2467.8 | 2467800 | 26.42 | 5562 | 7341.84 | 59.54 |
| 2 | Shittur | 3402 | 3402000 | 25.00 | 7833.5 | 9227.13 | 57.56 |
| 3 | Pishvi | 2376 | 2376000 | 28.29 | 4728 | 5784.68 | 56.29 |
| 4 | Parkhandale | 228 | 228000 | 6.55 | 3070 | 3377 | 88.22 |
| 5 | Total | 8473.8 | 8473800 | 24.33 | 21193.5 | 25730.65 | 60.84 |

*Source: Field work.*

The total silt deposited in all cement bandharahas found to be 25730.65 tonnes over a period of three years.The 61 per cent area of all cement bandhara is covered by silt deposition in study area. The maximum silt deposition is found in Parkhandale (88.22%) village because of all bunds are found in steep slope area. After the construction above the result it is seen that storage capacity of all the cement bunds has been reduced due to deposition of silt. In order to increase the storage capacity of these water harvesting structures, it is necessary to excavate the silt after every 2-3 years.

**Finding:**
1. The JalyuktShivar Scheme is implemented in 108 villages in Kolhapur district and 16 Villages in Shahuwadi Tehsil. For the purpose of decentralize water storage 1816 works and 281 works viz. Farm Pound, VanraiBandhara, Contour Trenches, Loose Boulder structure, Percolation Tank and Cement Bandhara are carried out in Kolhapur district and Shahuwadi tehsil.
2. The due to steep slope water impounding area of cement bandhara have been reduced and in these area siltation problem is high.
3. The hypothesis of these research project is prove, due to improper watershed management techniques14.83% of area is without silt and water, 60.84% silt is deposited in 33 cement badharas and 24.33% of water have been stored.
4. Political intervention is found in construction of cement bandhara. In Shittur village most of the political leaders have worked as cement bands near their own wells, at hence only water level of the wells has increased on the edge of the cement bandhara.
5. The agricultural lands have been damaged near the edges of more silted bandharas.
6. There is no people's participation in the work of jalyuktshivarabhiyan, in addition to that only government contractor get job, no person in the village got any employment in this scheme.

**Suggestions:**
1. The Jalyuktshivar scheme is implemented within the political boundary of selected village, but water has a natural boundary. The jalyuktshivar scheme is implemented on the basis of watershed management technique will get more benefit.

2. If the small one feet vanraibandhars and Loose Boulder structure are constructed in upper part of cement bandhar, to increase the water storage capacity instead of silt. As compere to Cement Bandhara, KT Wear is more suitable for more water storage and reduces siltation problem.

3. The Bambu plantation is useful for less erosion and reduces farm land damage to near edges of cement bandharas.

4. There should be strict restrictions on activities like mountain grass burning because of grass roots and thorn bushes hold the soil on slopped area of hill.

5. Under the Jalyuktshivarabhiyan government start to innovative concept such as "Youth for JalyuktShivar" through NSS department of universities and colleges. Also awareness campaign should be carried out by NSS in the village.

**Reference:**

1. *http://mrsac.maharashtra.gov.in/jalyukt/*
2. *Manchand Singh, Deepali Kulkarni, S. D. Talegoankar (2017): Assessment of Effectiveness, Plan and Design of Watershed Management: A Case Study of Khor Village, Daund Tehsil, Pune District, Maharashtra, India IJSRSET, Volume 3, Issue 2 Print ISSN: 2395-1990 , Online ISSN : 2394-4099, P.p 282-289.*
3. *Ullewad Swapnil Ramrao (2018): Impact of Soil and Water Conservation Works of Jalyukt Shivar Abhiyan At Mandakhali, Dist. Parbhanion Water Availability and Crop Productivity, Vasantrao Naik Marathwada Krishi Vidyapeeth.*
4. *R. T. Pachkor (2017): Assessment of Works under Jalyukta Shivar Campaign – A Case Study of Pusad Region, IJRASET, Volume 5 Issue IV, P.p. 1614-1619.*
5. *Niranjan J. Khillare (2017): Analysis of Delays in Works under Jalyukt Shivar Campaign, International Journal for Scientific Research & Development, Vol. 5, Issue 04,  P.p. 1059-1066.*

# Geographical Study E-waste Management in Nanded City

**Dr. R. B. Kotalwar**
HOD Geography,
Shankarrao Chavan Mahavidyalaya,
Ardhapur  Dist. Nanded.

**Dr. Smita U. Kondewar**
Head Department of Economics,
Late Vasantrao Kale (Sr.) College,
Nanded.

## Introduction:

Usage of the electronic equipment is increasing day by day. Other side information and communication technology sectors are enhancing the electronic equipment's quality and its efficiency. Hence people are using new electronic equipment and that old running or dead electronic equipment becomes an electronic E-waste. Electronic waste is simply known as "E-waste". Electronic waste is term used to describe old, end of life electronic such as computers, mobiles, camera, fan, chargers, watch, televisions, VCR, stereos, copier, and fax machine are common electronic product Electronic waste.  E-waste is highly toxic in nature as it contains hazardous plastics, glass, and metals such as lead, mercury, cadmium, etc., which can be potentially toxic and hazardous to the environment and human health. E-waste recycling in the non-formal sector by primitive methods, if not handled in an environmentally sound manner then it can damage the environment. E-waste is growing in India at the rate of 10%. Electronic waste is one of the fastest growing waste streams not only in India but also in worldwide. E-waste is not hazardous if it is stocked in safe storage, reuse or recycled by scientific methods in the formal sector.

Government records and NGO observation prove that major reuse or recycling of e-waste is carried out in the non-formal sector using primitive and hazardous methods. Ninety-five percentage of the e-waste in India is being recycled in non-formal sector and five percentage of the e-waste volume are handled in formal unit. Non-formal units generally follow the steps such as collection of the e-waste from the rag pickers, disassembly of the products for their useable parts, components, modules, which are having resell value. The rest of the material is chemically treated to recover precious metals. Due to inadequate means, it may cause leaching of hazardous substances to the air, soil, and water.

"It is estimated that 80-85% of electronic products were discarded in landfills or incinerators, 20 to 50 million metric tons of E-waste are disposed worldwide each year." It is very serious issue for our environment. Local area of India is not free from this environment problem. I have observed that my native place Nanded city is not free from it. It was observed that people are not handling e-waste in a proper way and most of them are separate valuable element form e-waste and reaming part of it burn it or throw here and there, which is        the most dangerous way of disposing e-waste. These non-formal methods of e-waste handling produce air and water and soil pollution. Overcome this problem we have to study it from root level and work as per stander layout. Hence this topic is selected to analyze e-waste amount, e-waste collection method, people approach to reuse or recycle of e-waste, awareness etc. things at local level. Also it will give proper guideline to handle e-waste for eco-friendly environment.

## Aims and Objectives:

The main aim of this project is analyze current e-waste management and find sustainable e-waste management system for Nanded city area.

- ➢ To explore what type of e-waste is generated in home, institute and shop.
- ➢ To find out people tendency of e-waste management
- ➢ To estimate e-waste generates volume and its growth rate.
- ➢ To understand e-waste management system in Nanded.
- ➢ To show people value of e-waste management.
- ➢ To motivate people for reuse and recycle of e-waste.
- ➢ To suggest how to reduce, reuse and recycle e-waste.

## Brief Overview of Study Area:

Nanded City is famous as "Holy City" due to the presence of the Sachkhand Gurudwara one of the five Takhats of Sikh religion. Nanded city is located at 18°30' North latitude and 77°10' East longitude at about 489 meters above mean sea level.  The total area under Nanded-waghala municipal corporation jurisdiction is 61.74 sq. k.m. Nanded is the second largest city in Marathwada after Aurangabad. The river Godavari flows through the city. Nanded city has about 8 km of riverfront. Nanded city has a long history of over 7 centuries. Nanded Waghala City Municipal Corporation



Study Area Location Map

Maharashtra State — Nanded District

Nanded Waghala City Municipal Corporation Nanded

Location :18°30' North latitude and 77°10' East longitude
Elevation : 489 meters above MSL.
Total Area : 61.74 sq. k.m.

Map Source: PITR GIS institue Nanded
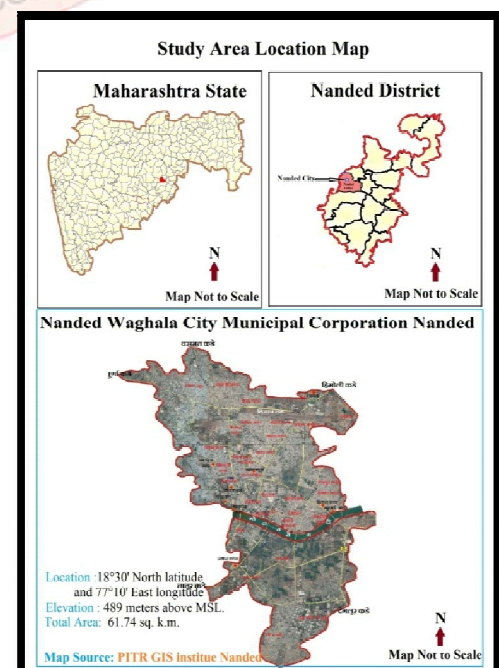
(NWCMC) was established on 26th March 1997, by merging Nanded Municipal Council and adjoining Waghala Municipal Council. Godavari river divided Nanded city into two parts, the old Nanded is situated on the left bank of Godavari and new Nanded is situated on right bank of Godavari. Population of Nanded Waghala in 2011 is 550,439; of which male and female are 285,433 and 265,006 respectively.

The climate of the city is generally dry except during southwest monsoon season that sets in the first week of June and lasts about 2.5 to 3 months. The average annual rainfall in the city is about 901 mm and temperature range is between 46°centigrade (maximum) to 18°centigrade (minimum). The city has fertile black cotton soil as in the rest of the Godavari valley. The natural topography of the city converges towards the river on either side.

It is about 260 km each from Aurangabad and Hyderabad and about 300 km from Nagpur. In terms of railway connectivity, Nanded is part of the South-Central Railway Division of the Indian Railway. It lies on the Mumbai to Secunderabad railway line. Nanded city has an airstrip. The closest regular airports are at Aurangabad and Hyderabad.

**Data and Information:**

Data and information such as a) global level as well as India level e-waste volume and it growth rate. b) Information of scientific method of e-waste management. C) Nanded city e-waste management D) Nanded city geographical setting E) Population data F) Rule and regulation of e-waste has been collected from following secondary sources of information.

1) Maharashtra Pollution Control Board  2) Central Pollution Control Board
3) Ministry of Environment & Forests 4) Census of India 2011
5) Nanded District Gazette  6) Research Paper and thesis  7) Daly news paper
8) Website of government and provide department.

To check out assumption and to understand real situation field dada has been collected by visiting home, shop, and institute. In this project 15 families, 3 institutes, 14 shops and 4 garbage collector data has been collected.

**Table No. 1 Overview on Filed Survey**

| Survey Category | Survey Points |
|---|---|
| Family | 15 |
| Institute | 3 |
| Shop | 14 |
| Garbage Collector | 4 |
| Total | 36 |



Fig. No. 1 Overview of Filed Survey
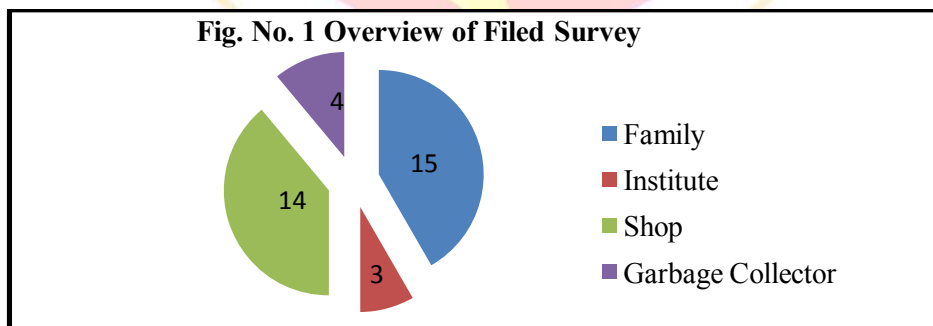
**Method:**

Firstly I have selected project title and study area after that subject expert's guidance has been taken. As per guidelines and time duration some objectives have decided. To get project layout and idea in advance some literature regarding topic has been studied. This project is completed as per following flowchart.

Study area required information has been collected from Nanded district gazette, research paper and census of India. Project data has been collect from filed survey. In this study 36 locations data has been collected by using random survey method. Nanded commissioner interview has been taken to understand overview of e-waste management system of Nanded city. Different location observation has been done such as landfill site, scrap shop, electric shop river side and dustbin etc. to understand e-waste collection, separation, and reuse, recycle process of Nanded city.

**Conclusion:**

Based on observation and analysis conclusion is given. Awareness program of e-waste management has taken. Lastly some effective e-waste management some demo has given.

**Overview on Nanded City Solid Waste with Reference to E-waste in Nanded:**

The total amount of solid waste generated in Nanded is to the tune of about 240 MT (metric tons) per day. Out of the total generated, about of 230 MT MSW is collected daily in Nanded city through an effective

system established by NWMC. The remaining 10 MT of the waste remains unaccounted. Almost 3.5% (8 MT/day) out of the total waste is categorized as hazardous waste while about 0.507 MT of biomedical waste is generated per day in Nanded city. Waste from the city is collected with help of tractors, Refuse compactors, Nala cleaner machine, Bobcat machine and disposed at the Tupa dumping site situated around 2 km from the city. As per the guidelines of Honourable Supreme Court on March 1999 and Municipal Solid Waste (Management & Handling) Rules September 2000, the solid waste management system has been organized for effective management and disposal.

NWCMC has engaged a private agency for the collection of biomedical waste from all the medical facilities in the city. This agency collects biomedical waste from all the private facilities for a monthly fee of Rs. 300 per private clinic, The private agency pays a fee per unit weight of waste to be disposed at the Incinerator. It is estimated that about 507 kg of bio medical waste is generated per day.

NWCMC does not collect e-waste spartanly. All e-waste is collected by non formal method and organization. Hence it is difficult to estimation of e-waste. As per this study 1.5 MT/day e-waste generated in Nanded. It is calculated using following method.

$$\text{Method of measure total e-waste per day} = \frac{\text{Total Population of Nanded city x 1 kg per person e-waste}}{365 \text{ days}}$$

Interview findings = per person generate 1kg e-waste yearly in Nanded city

$$\text{Method of measure total e-waste per day} = \frac{550,439 \times 1}{365}$$

= 1508 kg

= 1.508 MT

## Source and Composition of Waste:

The main source of solid waste is from the residential area comprising mainly of household waste with a share up to 71% followed by commercial areas, markets and restaurants As seen in Fig. No. the waste mainly consists of biodegradable (65%) waste from the residential areas followed by inert, ash & debris; plastic and so on. Almost 3.5% out of the total waste belongs to hazardous waste.

## Awareness of 3R in Nanded:

We have always heard about "Reduce, Reuse, and Recycle" (3R). But it does not practice in day today life. Same thing has been found in this study. It has observed that about 64% people aware about but they do not apply their knowledge in day today life.

## E-waste Handling:

E-waste handling means what people do with e-waste. Most of Nanded people know value of e-waste. Also they well known that e-waste can be reuse and recycle. For every one it is not possible to reuse and recycle so they sell to Bhagarwala, put in dustbin, store it and some of reuse and recycle. This study shows that about 50 % of people reuse it, 36 % of people of sell it to bhagarwala , 11% of people put it in dust bin and about 3% of people store it.

## Awareness of E-waste Hazard:

*Electronic waste* or *e-waste* is one of the rapidly growing problems of the world. *E-waste* comprises of a multitude of components, some containing *toxic* substances that can have an adverse impact on human health and the environment if not handled properly.Such information people should know. In this study 75% people aware that e-waste can be hazard for the environment if not handled properly.

## Existing E-waste Management in Nanded:

*Electronic waste* is one of the fastest-growing pollution problems worldwide given the presence if a variety of toxic substances which can contaminate the environment and threaten human health, if *disposal* protocols are not meticulously managed. In this study it has found that there is no formal scientific management system for e-waste management. NWCMC does not collect e-waste spartanly. All e-waste is collected by non formal method and organization i.e. Rag picker, Scrap collector, Bhangarwal, Private Scrap Separation unit.  Hence I could not get estimation of e-waste in Nanded city.  This study shows that 64 % of people ruse e-waste and give to other people, about 17% of people sell it to recycle. About 19% people do not anything or put in dustbin.  There is no scientific management system to handle the e-waste hence non formal system separate precious element and other partial of e-waste spared here and there.  Some time they burn it or put in dustbin. This type of process e-waste management is very dangerous for our environment. Due to it Air Soil and water pollution is increasing day by day. Some evidence is given in news paper cut outs, photographs and figures.

**Awareness of E-waste Management Organization and it Role:**

These are important role of e-waste management organization. E-waste management organization should be established in every city. Nanded city is Municipal Corporation but there is no E-waste management organization. Apart from that about 92 % people doesn't know any information about E-waste management organization and its role. Only 8% people know about e-waste management organization and its.

**Awareness of E-waste Management Organization and it Role People Awareness of E-waste rule and Regulation:**

*Electronic waste* or *e-wastes* are a *major* threat not only to flora and fauna but threatened the very existence of mankind. "*E-wastes* are considered dangerous, as certain components of some electronic products contain materials that are hazardous, depending on their condition and density. To the avoid environment hazardous some rule and regulation are created by our nation. To make eco-friendly environment people should know the rule and regulation of e-waste management. In this study it has found that only 14% people know about E-waste rule and Regulation.

There is a need to develop a comprehensive e-waste management system in the city based on adequate investigations and estimation of quality and quantity of e-waste generated. The proposed system should aim at applying best practices solid waste management, including in waste segregation at source, community-based collection systems, efficient transportation and scientific treatment and disposal of e-waste. There are several models of privatization being practices in the country today – NWCMC could consider adopting most appropriate frameworks, methods and technologies for managing its e-waste.Waste Management Strategy for progressive, clean and healthy Maharashtra Treating waste as a resource is the first step towards efficient and sustainable waste management. The following principles should be followed to deal with waste: • Minimize waste generation • Segregate waste at source • Maximize waste reuse and recycling • Decentralize waste management • Promote waste processing technologies • Promote safe disposal of waste.

**References:**

1. Dr. S. Chatterjee : " lectronic Waste and India" Scientist-E Department of Information Technology Electronics Niketan"
2. Sheikh et al: (2012): "bacteria were found in ground water near solid waste landfill site at Valmikinagar"
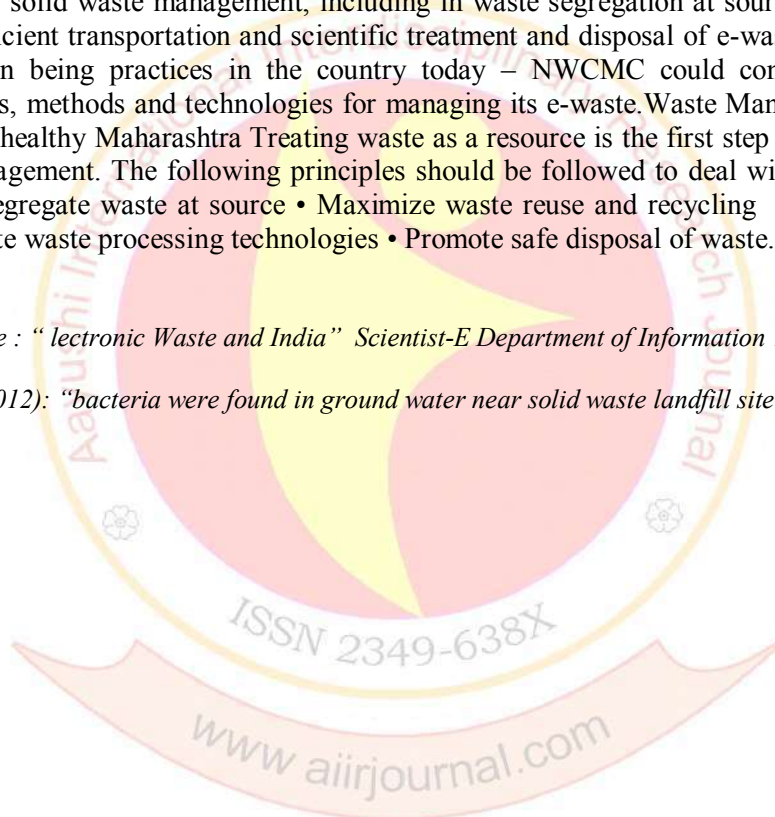
# Implementation of Programming or Customization in the Study of Warasgaon Lake Catchment

**Mrs. Swati Subhash Kalwade**
Research Student,
Mahatma Basweshwar College, Latur.

**Dr. N. G. Mali**
Head and Research Guide,
Dept. of Geography,
Mahatma Basweshwar College, Latur.

**Abstract:**

Customization is the process of developing an existing application keeping in minds the uses and features required by the user of that application. Customization an application gives the user the freedom to look through different features without getting into the complexity of the GIS environment and ease of maneuvering of different layers. Implementation of programing in the study of Warasgon Lake Catchment is seems very effectively and pinpoint easily what we should want to exact study. For this study we write codes for generating the layers and queries in VB using ARC GIS platform.

**Keywords:** GIS, research, customization

**Introduction:**

The some of the different packages available for the customization in GIS environment are Arc Objects SDK for ESRI's ArcGIS, Python Scripting Language for Quantum GIS, ProSDK for PCI Geomatica and MapBasic for MapInfo.

A user-friendly interface for the project is developed using the ArcObjects for Visual Basic Application, on the Arc Editor Platform. The different types of interfaces provided are that of Adding Layers and Query.

ArcGIS from Environmental Systems Research Institute (ESRI), Inc. uses a single, scalable architecture. The three versions of ArcGIS (ArcView, ArcEditor, and Arc Info) share the same applications of ArcCatalog and Arc Map. The geodatabase data model and Arc Objects provide the foundation for these two desktop applications themes.

**Study Area:**

The study area is located southeast of Pune city at a distance of about 40 km. The area is accessible from Pune by all-weather tar road. Index map of the study area is shown in the study area comprises the Warasgaon Catchment, which is supplying drinking water to Pune city and that is 40-k.m wests to Pune city. The total area is approximately 132.64 sq km. The study area lies between the geocoordinates $18^0$ 21' 00" to $18^0$ 25'48" North latitude and $73^0$ 25'12'' to $73^0$ 37' 12" East Longitude. This falls in Survey of India Toposheet no. 47 F/7 and 47 F/11.



**Fig. 1 Study Area**

**Methodology:**

**The Process of Customization:**

Customization is the process of adapting a system to an individual specification. GIS can be customized in several different ways. In order to explain this it isnecessary todescribe ingeneral terms thearchitecture of modern GIS software systems. Figure 2 shows in schematic form a generalized architecture for a desktop or professional GISsoftware system Users normally interact with the GISsoftware via a typically graphical, menu driven,icon-based graphical user interface (GUI).Selections from the GUI make calls to geoprocessingtools (i.e. tools for proximity analysis, overlayprocessing, or data display). The tools in turn makecalls to the data management functions responsiblefor organizing and managing data stored in adatabase. This three-tier architecture has been widelyused (at least conceptually) by many softwaredevelopers in order to facilitate organization andmanagement of software development.

More advanced users and softwaredevelopers are also interested in customizing the data management routines within a GIS softwaresystem, perhaps to add new datasets to create a new spatial database schema or connect to an externaltabular database. These are only a few of the ways inwhich general-purpose GIS software systems can be customized to create specificpurpose, user-orientated applications.

All GIS implementations, including those involving customization, have in common the fact that theymust meet user requirements and be delivered on time, in budget, and in accordance with quality standards. These goals will be greatly facilitated if a rigorous software engineering approach is adopted and if
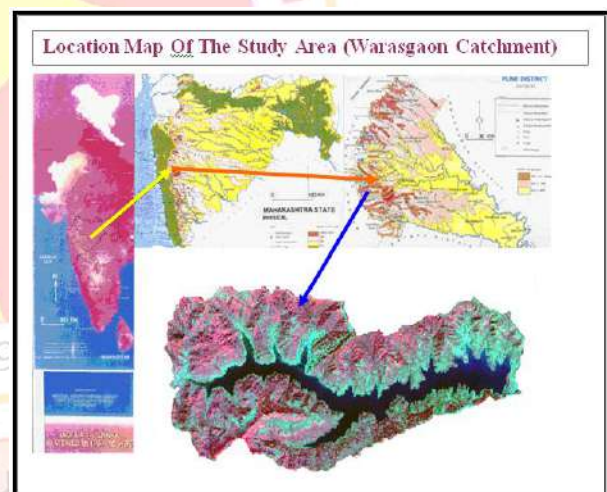
the process of software development is split up into a series of independent steps which are carried out in sequence. In this so-called software development lifecycle, also referred to as the 'waterfall model'

Waterfall Model of Customization in Study area**Fig. 2**
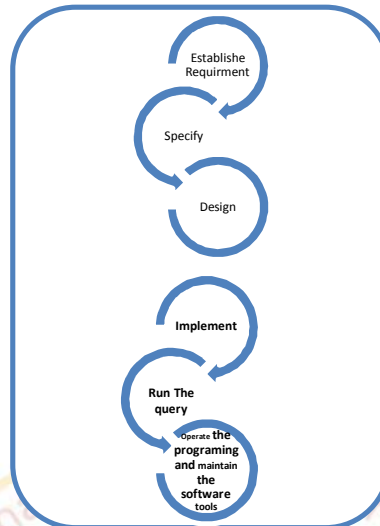


**Implementation of Customized Layer for study area:**

**1.    Add Layers**

The interface lets the user add different layers such as that of Watershed boundary, Watershed, Landuse, Settlement, Contour, Drainage, Road, etc. The interfaceprovides text as well as pictorial representation of the different layers of the map. (Fig3) The pictorial representation helps the users in easily identifying the layers he want to add.

**2.    *Query***

The query interface helps the user to query the map layers on the basis of the watershed boundary and the data of the observation Sub watershed therein. The query can be used for mining different data of watersheds (fig 4), Watersheds Query dialog helps the users to locate the Morphometric Characteristics & to add the different layers like with the values either equal to, greater than or less than a given value of morphometric analysis.
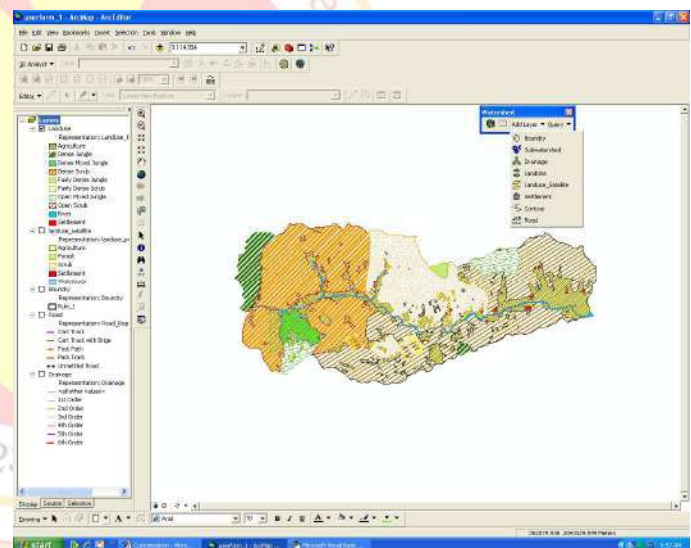


**Fig. 3 Add layer Dialog Box**
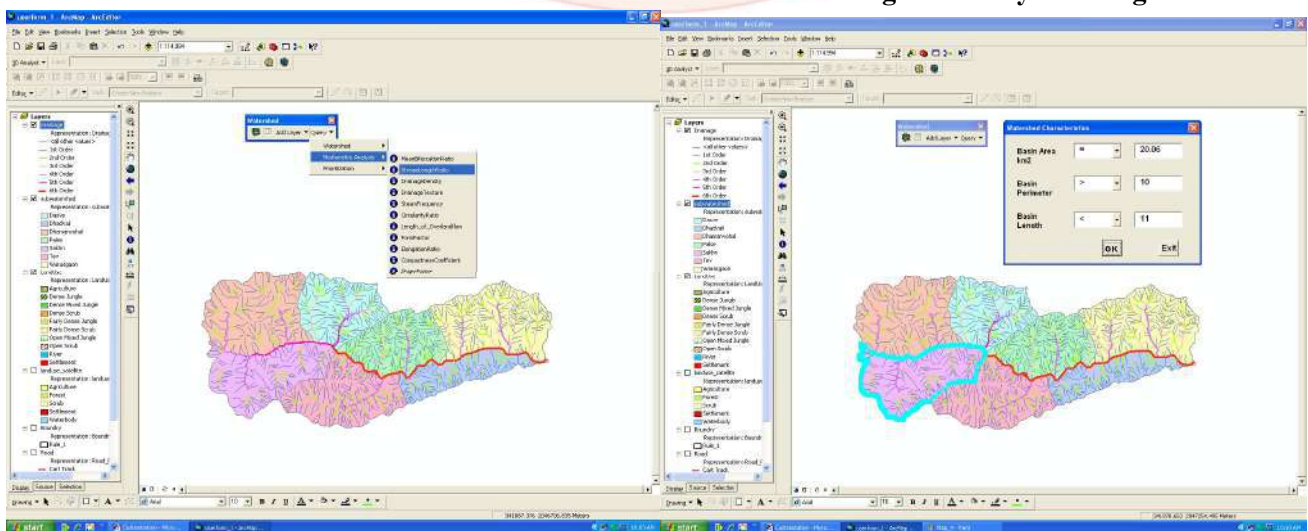


**Fig. 4 Query Dialog Box**



**Fig. 5 Query Dialog Box**

**Conclusion:**

There is an easy way to create custom commands with VBA. You can create a new button, tool, combo box, or edit box (collectively called UI Controls), then attach code to the control's events, such as what happens when you click a button. After you have created it, you can drag this new control onto a toolbar.I t's fast and easy to create, test, and debug macros inside ArcMap and ArcCatalog.

The standard ESRI type libraries are already referenced for you.

If we want the ArcMap and ArcCatalog interfaces to reflect our research work with own preferences and the way we work as follows,

Customize Arc Map and Arc Catalog in many ways. Like

- Position toolbars in a specific area of the application.
- Group commands in a way that works best for you, as per our study requirement
- Add new macros or load custom commands from another source.
- It's easy to interpret our work and data.

**References:**

1. *ARC-GIS- ARC object Help Document.*
2. *VBA Code helps from Internet.*
3. *(P. D. Aher, J. Adinarayana, S. D. Gorantiwar and S. A. Sawant):Information System for IntegratedWatershed Management UsingRemote Sensing and GIS.*

# Impact of Sugar Industry on Regional Development in Lower Bhima Basin Special Reference to Pandharpur Tahsil

**Dr. Suresh J. Phule**
Research Supervisor,
Rajashri Shahu College Latur,
(Autonomous).

**Mr. Ranjeet R. Patil**
Research Scholar,
Rajashri Shahu College, Latur
(Autonomous).

**Abstract:**

Sugar industry is second largest agro-based industry. It is also helpful to solve the problem of unemployment. The Sugarcane based industries will help to absorb some of the unemployment and consequent rural-urban migration for seeking job. (The Sugar industry has enhanced agricultural productivity by providing various inputs like fertilizer, machinery techniques knows how financial assistance etc.) Finally Sugar industry is located within the Cane growing areas. Considering Sugarcane products and sugar industries sugarcane cultivation is helpful for trades and transports.

Sugar industry is one of the basic industries which is provided raw material to Paper industry, Winery industry, Ethanol production etc. These industries further helped to solve the problem of unemployment. 30000

Established of Co-operative sugar factory in a region has acted as a growth center for the development of region. Such development content like as Construction of roads, establishment nationalize and Co-operative banks, Co-operative marketing societies, educational institutions, medical centers etc. have brought all round development of the people of the region. It creates employment opportunities in the region and stop migration of youth from rural to urban area.

The Sugar industry is the one of the important industries for the sustainable development life of rural people in Pandharpur tahsil In Pandharpur Tahsil there are 4 sugar factories situated out of which 2 Co-operative basis and 2 in private sector. The Pandharpur Tahsil has occupied 9.91 % of total land of Solapur district out of them more than 6.05% land which covered by black cotton Soil.

The Sugarcane and Sugar industry growth has brought some good effect on the general economy, educational, Social, Cultural, and agricultural of the region as well as it has created some socio economic impact and regional development

**Keyword:** Sugar Industry, Irrigational Facility, Regional Development.

## Introduction:

The Pandharpur tahsil is one of the most important tahsil of Solapur district. It lies entirely in the Bhima basin upto the border of Mangalwedha, Mohol, Sangola, Madha and Malshiras tahsil. The Pandharpur tahsil is located central part of Solapur district. Its geographical location of Pandharpur tahsil on the map is between $17^0$ 30' North to $17^0$ 55'latitude and $75^0$ 05'East to $75^0$ 34' longitudes. It covers an area of 1303 s.q. km. The minimum annual average rainfall in the tahsil is 650 m.m. and soil of this tahsil is various type but in Bhima river basin mostly fertile soil.

The Bhima River flows in the middle part of the study region. Bhima and Nira main canal provide more water facilities to this study region. Due to fertile soil, irrigation facilities, dry tropical type of climate, annual average rainfall 650 m.m. so sugarcane & other cash crop production is the very better in the study region

In Pandharpur tahsil irrigation facilities spreads through the all over region by Central part Bhima River, Ujjani Canals, Wells and other sources of irrigation. Its affects in sugarcane cultivation in last decades as well as to developed the sugar industries in tahsil. Pandharpur tahsil is the second in Solapur district for the Canal and lift irrigation facilities developed. Therefore the two sugar factories have established in very past year in 1985 to 1995 and then other two sugar factories established in 2011 to 2012. Now in Pandharpur tahsil up to 4 sugar factories at which 2 are in Co-operative sector and other two (2) are in private sector. Their locations were four different parts of tahsil

Zone wise output of sugarcane per hector is calculated in Western zone of tahsil average yield per hector is 85.5 M.T. tones and Central zone average yield per hector is 90.6 M.T. and Eastern zone average yield per hector is 82.2 M.T., because expenditure on inputs are less in eastern zone.

The soil of this tahsil is various and fertile land is at Bhima basin. The Ujjani dam is very close to Pandharpur tahsil and through this dam and Sub-Canals there are 34454 Hectors total area is under irrigated in district out of which averagely 6500 to 7000 hectors. Thus sugarcane area under irrigated increased and its benefits to 73 Villages in Pandharpur tahsil. Thus these irrigation facilities get the several developments in various fields of this tahsil.

**Study Area**:

The Tahsil of Pandharpur is one of the most important tahasil of the Solapur district both in terms of area and population. It lies entirely in the Bhima basin up to the border of Manglwedha, Mohol, Sangola and Madha and Malshiras tahasil. Pandharpur tahasil is situated in the south west of Solapur district. Its geographical place on the map is at Pandharpur tahsil in between $17^0$ 30' North to $17^0$ 55'latitude and $75^0$ 05'East to $75^0$ 34' longitudes. It covers an area of 1303 sq.km. Which is area lies mostly rural.
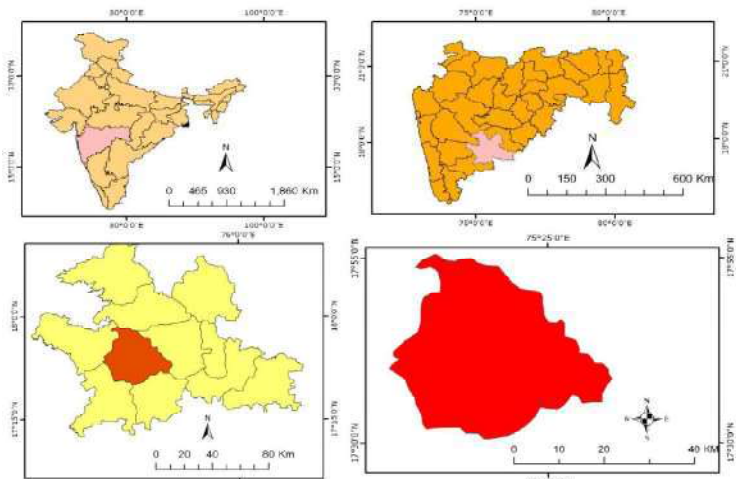


**Location Map**

**Objectives:**
1. To review the physical and socio economic setup of the study region
2. To study the Sugarcane cultivated area as basis for the Sugar industry
3. To examine the impact of sugar industry on regional development in the study region.
4. To study the socio economic impact of Sugar industries in Pandharpur Tahsil

**Methodology:**

The data collected and used for the period of 2001 to 2015. The study of impact of sugar industries on regional development and related change can be carried out by using various data source. The present study will be based on primary and secondary sources of data. The primary data is collected though field survey, questionnaires and personal interviews method and secondary data is collected through various government reports and available sources.

**(I) Sampling:**

In the study region there are seven circles were presently working namely; Karkamb, Patvardhan, Puluj, Kasegaon, Bhalwani, Tungat and Pandharpur. Out of these seven circles only four circles having sugar industries. For study purpose we have selected total 34 villages these seven circles.

**(II) Data Collection:**

**A) Primary Data Sources:**

The primary data will be collected be conducting the intensive field work of the well planned and thoughtful questionnaires will be prepared so as to have the required data and information about various aspects i.e. working results of sugar factories, sugarcane production, sugarcane crushing, sugar production, factory workers, development of sugar industries, irrigation facilities, cropping pattern agriculture land use, crop combination etc. statistical information collected from various sources.

**B) Secondary Data Sources:**

The secondary data collected from various sources i.e. survey of India district census handbook, statistical abstract of Solapur district, socio economic views, library of Vasantdada sugar institute Manjari (Pune), Solapur District gazette, annual report of published by sugar factories, Indian sugar monthly bulletin published by Indian sugar mill association new Delhi above all these sources the researcher collected the data and visited different institute and collected data. All sugar factories in the Pandharpur Tahsil were visited and collect the information.

The Bhima, Man River and Ujjani Dam right and Left Canals as well as other irrigation sources have increased area under Sugarcane and Various Crops production in Pandharpur tahsil.

It is observed that studies of socio economics facility in Pandharpur tahsil in very importance in process of development the socio economic are complimentary to standard of living and quality of life. This is the best indicator of development. These Socio economic facility include such as accessibility to health and public health service, efficiency of transport accessibility to banks and post office, no. of educational institutional and accessibility to primary, secondary, higher secondary, Technical & higher educational other public utility services like electricity. Therefore in present study the following seven socio-economic facilities are considered to asses to the development in study region from 1991-2015. The most important socio economic facility as like post & telephone, educational facility, medical facility, electricity facility, bank facility, transport facility, weekly market facility. These facilities are available in Pandharpur tahsil.

## Circle Wise Crop Concentration Index Based on Bhatia's Method
## (2001 to 2005, 2011to 2015)

| Sr. No. | Name of Village | Sugarcane | Wheat | Jowar | Maize | G.Nut | Fodder | Grapes | Pomegranate | Vegetables |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Kasegaon | 2.40 | 0.63 | 0.04 | 0.63 | 4.11 | 0.73 | 2.39 | 1.34 | 1.90 |
| 2 | Bhalwani | 1.49 | 0.51 | 0.27 | 1.06 | 3.35 | 2.52 | 0.85 | 2.72 | 1.44 |
| 3 | Tungat | 2.00 | 0.68 | 0.32 | 0.80 | 4.13 | 2.83 | 0.39 | 1.05 | 0.04 |
| 4 | Pandharpur | 1.55 | 0.70 | 0.40 | 1.02 | 0.0 | 0.27 | 0.89 | 0.37 | 6.52 |
| 5 | Karkamb | 1.36 | 1.73 | 0.25 | 1.59 | 0.06 | 1.25 | 1.75 | 0.70 | 0.32 |
| 6 | Patvardhan | 2.46 | 0.74 | 0.43 | 0.49 | 1.26 | 1.37 | 0.19 | 0.10 | 1.52 |
| 7 | Puluj | 1.76 | 1.73 | 0.15 | 1.59 | 0.00 | 0.50 | 0.07 | 0.70 | 0.02 |

*Source: Compiled by the Socio-Economic Abstract.*

## Socio Economic Development In Pandharpur Tahsil

| Sr. No. | Name of the Facilities in study area | Particulars | 1991 | 2001 | 2011 | 2015 |
|---|---|---|---|---|---|---|
| 1 | Post/ Telephone office | Number of post office | 20 | 35 | 48 | 55 |
| | | Number of Post & Telegraph office | 4 | 10 | 15 | 20 |
| 2 | Educational Facilities | Primary School | 85 | 180 | 320 | 385 |
| | | High School | 7 | 30 | 60 | 74 |
| | | Junior College | 3 | 5 | 15 | 22 |
| | | Senior College | 1 | 2 | 4 | 6 |
| 3 | Medical | Private Hospitals | 25 | 45 | 210 | 255 |
| | | Government PHC R RHC | 15 | 78 | 85 | 98 |
| 4 | Electricity | Street Light | 5 | 55 | 390 | 750 |
| | | Residential Parikshan | 80 | 6985 | 35320 | 60185 |
| | | Public Water Supply Connection | 5 | 22 | 250 | 340 |
| | | Commercial Connection | 7 | 1652 | 3935 | 4930 |
| | | Industrial Connection | 5 | 220 | 725 | 782 |
| | | Agricultural Connection | 65 | 8220 | 23815 | 38385 |
| 5 | Bank Facility | Nationalize Bank | 5 | 7 | 17 | 24 |
| | | District Co-operative Bank | 6 | 28 | 44 | 50 |
| | | Primary Agricultural Credit Society | 45 | 85 | 120 | 132 |
| 6 | Transport (Per 100 Sq. Km.) | Metal Road | 11.20 | 20.13 | 60.8 | 112 |
| | | Un metal Road | 8.30 | 12.4 | 75.9 | 135 |
| 7 | Weekly Market Facility | No. of Villages | 15 | 17 | 20 | 22 |

*Source: Compiled by the Socio-Economic Abstract.*

**Finding and Conclusion:**
1. Agriculture is the main occupation of the people of the study region because of the high proportion activities. The geography studied all phenomenons of nature land, water, climate, soil, population, settlement economics activities which have lateral become distinguished sub branches of geography.
2. Industrial geography was able to benefit from the existing work in economic. Human investment, capital power, water supply, transport and communication are vital elements in the process of agricultural and industrial development. In the field of industrial geography a study in details is necessary particularly in relation to agriculture area.
3. Sugar industry is the largest agro-based industry in rural area. The agro-based industries leave a deep impact on the rural economy and bring about fundamental changes in rural area. A co-operation & private sugar factory in the rural area or for that matter any agro-based large scale industry is considered as a growth center. The skilled and semiskilled workers mostly from the rural areas of sugar industry have been a focal point for socio-economic development is the rise of socio economic development is the rural generating employment and higher income transport and communications facilities.
4. Further many sugar factories have established schools, colleges, medical centers and hospitals for the benefit of the rural population. Some of the sugar facilities have also diversified into by-product based industries baggers molasses paper and board facilities and co-generation plants.
5. The setting up of co-operative sugar factories in rural areas has imported implications for the process of industrialization. Sugarcane cash crop, being the main input for a sugar factory the establishment of sugar factories increases the economic importance of the sugarcane crop. The changing in the form of technology and cropping pattern generate additional jobs for agriculture labour. The increase in trade and commercial activities requires an increase in the number of commission agents and banking facilities.

6. The sugar factories may spend on the various social services such as education medical recreation. It may also incur expenditure on agricultural attention services like dairy development agricultural research as also provision of irrigation facilities and other agriculture inputs.

7. The transportation of sugarcane, sugar, by-products and increased propensity to travel results in the expansion of road transport facilities around the location of the factories. Thus from the input and output side, a sugar factories is expected to generate linkage effects in a rural area.

8. The object of the study was to measure the impact of sugar factories and its role on the economic development of the surrounding a rural area. The details of the objectives and methodology of this study are explained.

9. In the cropping pattern, it has been observed that there is a dominance of food grains vise cereals and pulses. Sugarcane is the major cash crop of the serine and it is increasing year by year. Jowar is the first ranking crop in tahsil. The Sunflower and Tur were second ranking crops in the tahsil of the region

10. In the study region due to irrigation facilities the lands under sugarcane and production of sugarcane have increased. The various schemes have been adopted by sugar factories for the surrounding rural area development.

11. Within last ten years the area under sugarcane is increased. In the study area impact of irrigation on agricultural development is more as compared to other influencing factors. The trend of service facilities are found very high in sample village.

12. It has been observed that by undertaking agricultural development activities like lift irrigation percolation, tanks dams, soil testing, supply of improved seeds technological guidance to the activities etc. and the factories helped in increasing agricultural productivity as well as in developing scientific attitude in the farmers.

13. Due to agricultural development income of farmers increased. The cultivation of sugarcane and the increased productivity of agricultural added to farmer's income from land.

14. It is observed that 48.28% of the sugar factories laborers come from traditional farming household where as 51.72% are landless labors.

15. We can say that established of the sugar factories generated additional employment opportunity for the people an attempt is made to find out the impact of sugar factories on the lives of agricultural labor. The most important point to note is that compared to the agriculturalist the economics conditions of the agricultural labors actually worsened.

16. Most of the irrigation facility are developed in the Bhima river basin middle part of the study region, along the river canal & lift irrigation source. In the study region due to irrigation facilities the lands under sugarcane and production of sugarcane have increased.

17. In the study region transport & communication system is well developed. The sugar factories have provided various type facilities to come grower farmers, so that they have produced and yield more sugarcane. Various schemes have been adopted by sugar factory for the surrounding rural area development. Which agricultural exhibition, supply of Molasses supply good quality sugarcane seeds, sugar factory school, accident insurance, labor welfare programmers etc.

18. Finally, we can say that the establishment of sugar factories in rural areas works as a growth center. It has accelerator the economic development of the rural area. Especially, it is evidence that this transformation of segment rural are into ecology active and socially awakened region. It is of expanding capital, power roll, better utilization of local resources and economic mobilization of monitory exchange urban contact and education generate by the establishment industrial enterprises such as a sugar factories.

**References:**

1. Chandana, R.C. (2008): Regional Planning and Development: Kalyani Publishers, B-I/1292, Rajindar Nagar, Ludhiana, 1410008.

2. Gailwad S.B. (1993): Post independence Growth of Sugar Industry in Maharashtra – A Geographical appraisal, unpublished M.phil. Dissertation, submitted to Shivaji University Kolhapur.

3. Gadgil D. R., Sugar Co-operatives in Maharashtra, published by the National Federation of Sugar Factories ltd., New Delhi

4. Gowda. K. (1985): Geo. Economic Problems and Prospects of Sugar Industry in Karnataka (1971-1981), unpublished Ph.D. thesis submitted to Mysore University, Mysore, Karnataka.

5. Jugale, V. B., (1983), 'Impact of Co-operative Sugar Factories on the Socio Economic Development of the Region and the Share Holder in Maharashtra', Unpublished M. Phil Dissertation, Shivaji University, Kolhapur.

6. Knowles R. and Wareing j. (1994): Economic and Social Geography: Rupa and Co. 7/16, Asavari Road, Daryaganj, and New Delhi. 1100002.

7. More, K. S., (1980), 'Changing Pattern of Agriculture Landaus in Kolhapur District (Maharashtra)' unpublished Ph. D thesis, Shivaji University, Kolhapur.

8. Negi (1979): Human Geography- An Ecological Approach, Kedarnath Ramnath Publishers, Meer 10. NABARD, Mumbai (2010) Economics of sugarcane cultivation and processing, p.1.

# The Micro Level Study of Integrated Watershed Management Progrmmer (IWMP-19) in Kandhar Tahsil of Nanded District (Maharashtra)

**Prof. Prakash Dhansing Rathod**
Assistant Professor,
Department of Geography,
Mahatma Jyotiba Phule,
Mahavidyalaya, Mukhed,
Dist. Nanded, Maharashtra, India.

**Dr. Santosh Kalyanrao Mangnale**
Assistant Professor,
Department of Geography,
Mahatma Jyotiba Phule,
Mahavidyalaya, Mukhed,
Dist. Nanded, Maharashtra, India.

## Introduction:

In developing countries both Non-government Organizations (NGOs) and Government development agencies have implemented watershed management projects for at least 25 years with the aim of increasing agricultural productivity and reducing poverty on hillsides and rainfed agriculture in rural areas.

The concept of watershed management has internationally gained significance following the United Nations Conference on Environment and Development in 1992 in Rio de Janeiro (also known as the Earth Summit). Watershed management as a measure of development implies that the resources within a defined watershed should be utilized for the benefit of the local population and in harmony with the environment. Integrated Watershed Management Program (IWMP) is basically central and state funded watershed development program. The project Implementing Agency (PIA) for this program is Agriculture Department, Government of Maharashtra.

## Objectives:

1) To study changes employment and migration.
2) To study changes in drinking water availability.
3) To study change in life of wells and streams and in groundwater level.

## Data Collection and Analysis:

During the study, primary as well as secondary data were collected from the various sources. During 2011-2012 and 2015-2016 year the primary data were collected following focus group discussion as well as through stratified detailed household survey. we have visited watershed villages and conducted meetings with farmers followed by field visits collect primary information on general agriculture crops and their productivity, surface and groundwater and socio-economic, migration data. This was collected through investigation of farmers with pre-tested questionnaire. The secondary data was collected from various sources like reports prepared by the implement agencies and various government office. The data was analyzed using statistical techniques.

## Location:

The study was undertaken in the Integrated Watershed Management Programmer is Number -19 which is located in Kandhar Tahsil of Nanded District of Maharashtra State. This mega watershed is located in the catchment of Manayd River basin, Longitude of this watershed is $77^0 14'00''$ to $77^0 20' 00''$ East and North latitude of this watershed is $18^0 44'00''$ to $18^0 48'00''$. The Geographical area of this project is 4648.11 hectare and area for treatment 4151.87 hectare is consisting of 3 villages namely Pethwadaj, Sawargaon Nipani, Kallali from Kandhar Block of District Nanded.
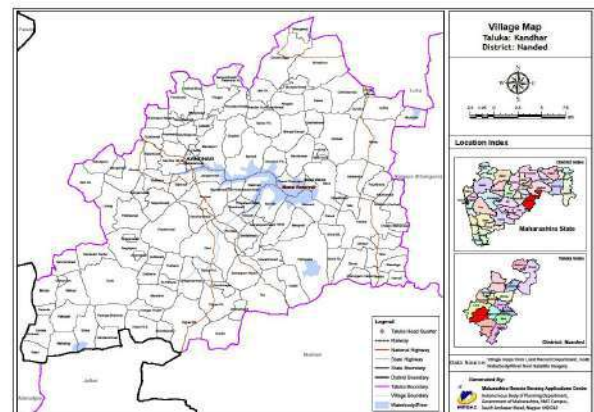


## Impact:

The watershed development programmer involving the entire community and natural resources influence (i) Attitude of the community toward project activities and their participation at different stages of the project, (ii) Productivity and production of crop, changes in land use and cropping pattern, adoption of modern technologies, increase in milk production, etc., (iii) Socio-economic conditions of the people such as income, employment, health, assets, energy use and education, (iv) Use of land, water livestock and human resources. It is thus clear that watershed development is a key to sustainable production of food, fodder, fuel wood, and meaningfully addresses the social, economical and cultural status of the rural community. The watershed development programmers influence bio-physical and environmental aspects and thereby bring changes in the socio-economic condition of the people. The socio-economic indicators like changes is employment, migration and drinking water are considered for the impact assessment.

**Climate:**

The area of this project falls in the assured rainfall zone. Even though it is in assured rainfall zone but from last five years erratic and irregular rainfall is observed. Maximum rainfall in last five years is 1051 mm & minimum rainfall is 428.20 mm. The average annual rainfall is 636.04 mm. but number of rainy days is decreasing. Intensity of rain fall in a day is increasing which resulted in heavy soil reason.



Watershed MR-49 : IWMP -19 :: Taluka - Kandhar :: District - Nanded

**Creation of mitigation of population migration and employment opportunities:**

The watershed programmer increased the employment for all categories of farmers due to various activities related to agriculture, horticulture, a forestation, animal husbandry floriculture, and small enterprises. The soil and water conservation measures like water storage structures, mini percolation pits, gully control, gabion structures and other were constructed in the fields, which provided additional job opportunities to the small and marginal farmers.

**Employment:**

National Resource management (NRM) activates proposed under the project (IWMP-19) in Kandhar tahsil will generate total 374760 working day's employment in the project villages and self employment through livelihood activities for landless and production system. The details of employment generated for SC, ST, Other, Women are furnished in table 1 and 2.

**Table 1- Employment Generation (Wage Employment) of Study Area (IWMP-19 in Kandhar tahsil) 2015-16**

| Sr. No. | Name of the villages | Wage employment | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Numbers of working days | | | | | No. of beneficiaries | | | | |
| | | SC | ST | Other | Women | Total | SC | ST | Other | Women | Total |
| 1 | Pethwadaj | 42000 | 36000 | 194040 | 108600 | 272040 | 700 | 600 | 3234 | 1810 | 4534 |
| 2 | Sawargaon (Nipani) | 4500 | 0 | 33540 | 15600 | 38040 | 75 | 0 | 559 | 260 | 634 |
| 3 | Kallali | 18000 | 12600 | 34080 | 26340 | 64680 | 300 | 210 | 568 | 439 | 1078 |
| | Total | 64500 | 48600 | 261660 | 150540 | 374760 | 1075 | 810 | 4361 | 2509 | 6246 |

*Source: Socio-economic survey conducted by under DPR preparation, Agriculture office Kandhar Dist. Nanded.*

**Table 2 - Employment Generation (Self Employment) of Study Area (IWMP-19 in Kandhar tahsil) 2015-16**

| Sr. No. | Name of the village | Self employment | | | | |
|---|---|---|---|---|---|---|
| | | No. of beneficiaries | | | | |
| | | SC | ST | Other | Women | Total |
| 1 | Pethwadaj | 10 | 2 | 25 | 5 | 37 |
| 2 | Sawargaon (Nipani) | 5 | 0 | 9 | 2 | 14 |
| 3 | Kallali | 7 | 3 | 16 | 5 | 26 |
| | Total | 22 | 5 | 50 | 12 | 77 |

*Source: Socio-economic survey conducted by under DPR preparation, Agriculture office Kandhar Dist. Nanded.*

**Out migration:**

There is considerable reduction in out migration due to employment generation through the project from National Resources Management (NRM) treatment in watershed employment generated for farmers and wage labors. Self employment too generated from livelihood activates at IWMP-19 in Kandhar Tahisil.

**Table 3 - Seasonal Migration from Study Area: (IWMP-19 in Kandhar tahsil) Pre-project Status 2011-2012**

| Sr. No. | Name of the villages | No. of persons migrated | No. of days per year of migration | Distance of destination from the village (Km.) | Occupation during migration | Major reason (s) for migrating |
|---|---|---|---|---|---|---|
| 1 | Pethwadaj | 1289 | 120 | 20 To 90 | Wages | After kharif season there is no work hence there is such migration |
| 2 | Sawargaon (Nipani) | 290 | 120 | 20 To 90 | Wages | |
| 3 | Kallali | 310 | 120 | 20 To 90 | Wages | |
| | Total | 1889 | 360 | | | |

*Source: Socio-economic survey conducted by under DPR preparation, Agriculture office Kandhar Dist. Nanded.*

During pre-project, 1889 persons out migrated for details of pre and post project migration status is furnished in table 3 and 4.
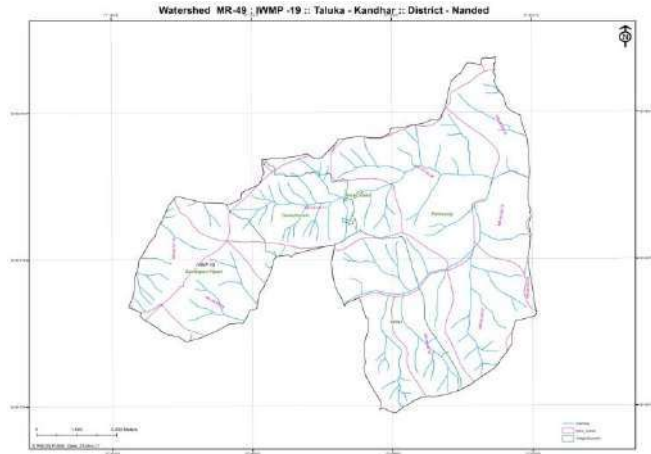
## Table 4 - Seasonal Migration from Study Area: (IWMP-19 in Kandhar tahsil)
## Post-project Status 2015-16

| Sr. No. | Name of the villages | No. of person migrated | No. of days per year of migration | Major reasons for migrating | Distance of destination from the village (Km.) | Occupation during migration | Income from such occupation (Rs. Lakhs) | For reduced migration major activities of IWMP | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Structure | Livelihood |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1 | Pethwadaj | 645 | 120 | After kharif Season there is no work hence there is such migration | 20 To 90 | Wages | 025 | NRM Activities have Engaged Population | Fisheries cultivation, Sericulture, Agri. Based processing units, Dairy |
| 2 | Sawargaon (Nipani) | 145 | 120 | | 20 To 90 | Wages | 0.25 | | |
| 3 | Kallali | 160 | 120 | | 20 To 90 | Wages | 0.25 | | |
| | Total | 950 | 360 | | | | | | |

*Source:* Socio-economic survey conducted by under DPR preparation, Agriculture office Kandhar Dist. Nanded.

### Drinking water availability:

The search for potable water especially in summer breaks the backs of women who have to trudge long distances and spent several hours each day to get water is often unfit for consumption.

## Table 5- Status of Drinking Water of the Study Area (IWMP-19 in Kandhar tahsil) pre and Post Project (2011-12 and 2015-16)

| Sr. No. | Names of the villages | Availability of drinking water (No. of months in a year) | | Quality of drinking water | |
|---|---|---|---|---|---|
| | | Pre-project 2011-12 | Post-project 2015-16 | Pre-project 2011-12 | Post-project 2015-16 |
| 1 | Pethwadaj | 7 Month | 09 Month | No Satisfied | Semi Satisfied |
| 2 | Sawargaon (Nipani) | 7 Month | 09 Month | No Satisfied | Semi Satisfied |
| 3 | Kallali | 9 Month | 11 Month | No Satisfied | Semi Satisfied |

*Source:* Socio-economic survey conducted by under DPR preparation, Agriculture office Kandhar Dist. Nanded.

In drought prone areas, tankers with drinking water come once in two days during February to August, depending on the rains. However, from the second year itself, in treated areas which have experienced a reasonable monsoon three is an appreciable increase in the groundwater table which has reflected in an increased water level in the village wells. The details of pre and post project drinking water status are furnished in table 5.

Clean drinking water is now available and water for protective irrigation. This has considerable impact not only on agriculture but also and particularly so on the quality of life and health of women and the family. Her anxiety and work load are reduced to a considerable extent.

### Change in life of wells and streams and in groundwater level:

One of the objectives of watershed development progtammes, especially in drought-prone and rain fed regions is to mitigate the distress with regard to water for drinking and domestic purpose (including water for cattle). It is generally observed in many studies that watershed activities increase the irrigation potential in a given watershed (and even in the downstream areas) through increased availability of groundwater and surface water. However the correlation between the extent of increase in groundwater and area brought under irrigation through the increased resource is something, which requires further analysis. This is important because the increased number of borewall and in certain cases through increasing the depth of existing dug wells. It is also in certain cases through increasing the depth of existing dug wells. It is also Important to look at the recuperation rate of wells and borewells (before/ after, normal rainfall/ drought) to understand the issue of groundwater recharge.

## Table 6 Average Groundwater Status in the Study Area IWMP-19 in Kandhar tahsil (Pre and Post Project 2011-2012 and 2015-2016)

| Sr.No. | Names of villages | Pre-Project 2011-2012 Stage of ground water in the study area (Safe/ Semi Critical/ Overexploited) | Reason for over exploitation | Post- Project 2015-2016 Stage of Ground water in the project area (Safe/Semi Critical/Critical/Over exploited) |
|---|---|---|---|---|
| 1 | Pethwadaj | Over Exploited | Low rainfall Soil type is more erosion Water holding capacity of soil is less Advance irrigation system is not adapted | Semi Critical |
| 2 | Sawargaon (Nipani) | Over Exploited | | |
| 3 | Kallali | Over Exploited | | |

*Source:* Socio-economic survey conducted by under DPR preparation, Agriculture office Kandhar Dist. Nanded.

The wells in the study area will be functioning with increased irrigation potential. The details of pre and post project groundwater availability status are furnished in table 6 and 7.

**Table 7 Average Ground Water table depth in the Study area IWMP-19 in Kandhar tahsil (Pre and Post Project 2011-12 and 2015-2016)  (in meters)**

| Sr. No. | Name of Villages | Sources | Pre-Project level | Post-Project level |
|---|---|---|---|---|
| 1 | Pethwadaj | Open Wells | 08 Mtr. | 6 Mtr. |
| | | Borewells | 20 Mtr. | 15 Mtr. |
| | | Others (Specify) | - | - |
| 2 | Sawargaon (Nipani) | Open Wells | 10 Mtr. | 8 Mtr. |
| | | Borewells | 34 Mtr. | 28 Mtr. |
| | | Others (Specify) | - | - |
| 3 | Kallali | Open Wells | 12 Mtr. | 10 Mtr. |
| | | Borewells | 26 Mtr. | 24 Mtr. |
| | | Others (Specify) | - | - |

*Source: Socio-economic survey conducted by under DPR preparation, Agriculture office Kandhar Dist. Nanded.*

**Observation and Conclusion:**

It has been observed from the table 1 and 2 that the employment and self employment generated during 2015-2016 is considerably good in the study area. The generation of employment has helped all section of the society including women. It has also helped in the generation of self employment catering opportunity to the youth of the region and mitigating out of the population. So for as drinking water is concerned situation improved from not satisfied in 2011-2012 to semi satisfied in 2015-2016.

The major impact of watershed programmer was on improved surface and groundwater availability even during the critical periods of post-rainy and summer seasons. Increased surface and groundwater availability resulted in increased cropping intensity and diversification to more remunerative land use systems involving livestock, horticultural and vegetable production.



Today watershed development has become the main intervention for natural resource management and rural development. Integrated Watershed Management Programmer not only protects and conserves the environment, but also contributed to livelihood security. The importance watershed development as a conservation programme is being recognized, not only for rain fed areas, but also for high rainfall areas, coastal regions, and catchment areas of dams. Experiences show that the watershed development programme has produced desired results and there are differences in their impacts. Hence, the watershed impact assessment should be accorded due importance in the future planning and development programmers.

**References:**

1. CRIDA, (1995): Field Manual on Watershed Development, Central Research Institute for Dryland Agriculture, Pune.
2. G. B. Pant Institute (1992): Integrated Watershed Management, Sikkim Himalaya.
3. GOI, (1995, 2001, 2003): Guidelines for Watershed Development, Ministry of Rural Development, Government of India.
4. Hedge, (1998): Handbook of Watershed Development, BAIF Development Research Foundation, Pune.
5. Kakade, B.K. (1997): Soil and Water Conservation Structures in Watershed Development Programme, BAIF Development Research Foundation, Pune.
6. Kakade, B.K., Kulkarni H., et.al. (2001): Integration of Water Supply and Sanitation and Watershed Development, Unpublished Research Report, BAIF Development Research Foundation, Pune.
7. Katar Singh (1989): Dry land Watershed Development and Management through a Case Study in Karnataka, Unpublished Research Report.
8. Rajora, R. (1998): Integrated Watershed Management: Field manual of Equitable, Productive and Sustainable Development.
9. Singh Rajvir, (2000): Watershed Planning and Management, S. Publishing House, 1E14, Pavanpuri, Bikaner,
10. Vidas S. Kulkarni, et. al. (1989): "Impact of Watershed Management on dry Land Farming in Dharwad district of Karnataka", Unpublished Research Report.
11. Waman, S.V. (1993): Water Balance Studies in a Micro Watershed, M. Tech Dissertation, IIT Mumbai, Unpublished Report.
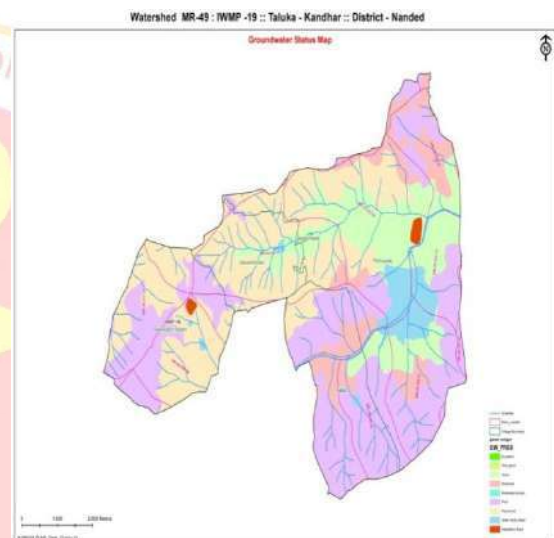
## Spatial Distribution of Market Centers in Nanded District: A Geographical Study

**Dr. N. S. Gound**
Department of Geography,
B.K.D.Mahavidyalaya, Chakur,
Dist- Latur.

**Dr. B. T. Patil**
Department of Geography,
M.P.J.Mahavidyalaya, Mukhed,
Dist- Nanded.

### Introduction:

Many geographers are mainly concerned with the spatial distribution of geographical phenomena. The distribution of market centers is influenced by different physical and cultural factors. In the study region market centers are unevenly distributed. At tahsil level there is a great variation also in the distribution of market centers. Each factor has its own influence and affects directly or indirectly on the distribution of market centers (Pawar & Lokhande 2000). Nevertheless merdy numerical distribution of market centers in percent do not give correct picture as it ranges from 15 in Kinwat Tahsil to only one (01) in Bhokar tahsil. The co-relation between number of such phenomenon with area, inhabited villages and population etc. may give a more realistic picture (Gharpure & Pawar 1919).

The present research paper is an attempt to analyze the spatial distribution of area and market centers ratio-in Nanded district from 1981 to 2001 and spatial pattern analysis has been carried out of the tahsil to tahsil.

**Key Words:** Spatial Distribution, Market centers**.**

### Data Base and Methodology:

The present research study of spatial distribution of area and market centers has been based on primary and secondary data. The data has been collected from various sources i.e. District Census Handbook and District statistical Abstracts etc. It is collected for the period of 1981 to 2001. Finally the data has analyzed by statistical as well as cartographic techniques.

### Objectives:

The specific objective of the present paper is as follows:
1. To study the spatial distribution of Market centers in Nanded district.
2. To analyze the tahsil wise variation in Market centers of Nanded district.

### Study Area:

For the present research paper Nanded district of Maharashtra state is selected as a study region Nanded district is situated in Marathwada region and south eastern part of the Maharashtra state. It lies between 18°15' to 19°55' north latitude and 77°7' to 78°10' east longitudes.The study region has an area of 10532 sq. kms. This study about 3.41% of the total area of the Maharashtra state. As per 2001 Census, Nanded district has 28, 76,259 population. For administrative purpose the district is divided into 16 tahsils.

### Discussion and Result:

### Spatial Distribution:

The general spatial distribution of market centers in Nanded district, is analyzed for (16) sixteen tahsils of the district (Fig.1.1A). Kinwat has the highest number of market centers. It exceeds the mean by more than two standard deviation and is followed by Kandhar and Hadgaon which is grouped in the class of X+25.D.

Mahur, Loha and Mukhed is very near to mean, falling within the addition of one standard deviation (X+ 15.D) to mean. Out of sixteen tahsils as only nine tahsils have minus one standard deviation values, they are Himayatnagar, Deglor, Ardhapur, Mudkhed, Dharmabad, Biloli, Naigaon, Nanded, Umri. Out of these all tahsils only Bhokar tahsil is below the value of mean and minus two standard deviation.

### Area and Market Center Ratio:

While studying the area and market centers Ratio as the number of market centre per 100 km of area are 0.83 for the whole study region. Not with standing this spatial variation at tahsil level is remarkable. In Mahoor tahsil the ratio is 1.14 which considerably decreased to 0.47 in Himayatnagar tahsil and 0.17 in Bhokar tahsil. It is also seemed that the four tahsils fall in the classes above X (mean). Out of which Mahoor, Kinwat, Ardhapur, and Kandhar fall in the class X+15.D. and Mahoor & Kandhar tahsils falls in the class X+25.D. and the remaining five tahsils are below X. Out of which Himayatnagar, Mukhed and Deglor fall in the class X-15.D.(Fig.1.1B). Not with standing, it is observed that the co-relation between these two variables is significant (r = 0.7317). It is due to the location and fertility of the area status are very essential to support the population as a threshold to give base of the market centers.

## Table No. 1.1: Distributional Relationships of Market Centres

| Tahsil | General Statictics | | | | Statistical Values of Market Centers | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | No. of Market Centers | Area Km$^2$ | Inhabited village | Popul ation | Per 100km$^2$ | Per 100km$^2$ Inhabited | Per 10,000 Population |
| Mahoor | 06 | 524.45 | 89 | 86782 | 1.14 | 6.74 | 0.69 |
| Kinwat | 15 | 1497.27 | 182 | 210630 | 1.00 | 8.24 | 0.71 |
| Himayatnagar | 03 | 640.57 | 69 | 88924 | 0.47 | 4.35 | 0.34 |
| Hadgaon | 10 | 1050.05 | 148 | 224354 | 0.95 | 6.76 | 0.46 |
| Ardhapur | 03 | 291.81 | 53 | 98755 | 1.02 | 5.66 | 0.30 |
| Nanded | 02 | 448.98 | 85 | 598969 | .45 | 2.4 | 0.03 |
| Mudkhed | 03 | 333.81 | 51 | 97286 | 0.90 | 5.88 | 0.31 |
| Bhokar | 01 | 598.44 | 81 | 119229 | 0.17 | 1.23 | 0.08 |
| Umri | 02 | 412.59 | 65 | 86206 | 0.48 | 3.1 | 0.23 |
| Dharmabad | 03 | 326.07 | 52 | 86362 | 0.92 | 5.77 | 0.35 |
| Biloli | 05 | 575.51 | 81 | 155318 | 0.87 | 6.17 | 0.32 |
| Naigaon | 05 | 566.44 | 86 | 161134 | 0.88 | 5.81 | 0.31 |
| Loha | 07 | 836.85 | 123 | 207306 | 0.84 | 5.69 | 0.34 |
| Kandhar | 09 | 801.26 | 124 | 211347 | 1.12 | 7.26 | 0.43 |
| Mukhed | 08 | 939.18 | 151 | 243030 | 0.85 | 5.29 | 0.33 |
| Degloor | 05 | 683.79 | 106 | 200627 | 0.73 | 4.71 | 0.25 |
| Region | 87 X=5.44 SD= 3.53 | 10527. 07 | 1546 | 2876259 | 0.83 X=0.80 SD= 0.26 | 5.63 X=5.32 SD=1.70 | 0.30 X=0.34 SD=0.17 |

*Source: Compiled by researcher.*

### Inhabited Villages and Market Centers Ratio:

The study of Inhabited villages and market ratio indicates that the study region the number of market centre per 100km$^2$ inhabited village is 5.63 ratio But it is also observed that there is spatial ratio variation at tahsil level And this relationship ranges from 8.24 in Kinwat tahsil to 1.23 in Bhokar tahsil the relationship also show that for tahsil fall in the closes above the mean ( 5.32) out of which in Eight tahsil i.e. Mahoor Hadgaon,Ardhapur, Mudkhed, Dharmabad Biloli, Naigaon and Loha fall in the class X+15.D.Kinwat and Kandhar fall in the class X+25.D… Remaining Six tahsil below out of which Himayatnagar, Mukhed and Degloor fall in the X-15.D And the tahsil Nanded, Bhokar and Umri fall in the class X-25.D.(fig 3.1 )The correlation ( r = 0.5228) analysis between two variables shows important relationship. It is seen that the density of settlement in the central area is more and market centers are less. In the plain area density of settlement and number of market centers are more Because the size of the settlement which is big in plain and small in other area.

### Conclusion:

The above discussion indicates that the spatial distribution of market centers is characterized by their unnerve distribution in the entire study region It is though that the spatial distribution of market centers are generally affected by physical setting of the region population development of transportation network settlement pattern development of economic activities like agriculture industries etc.

It is analysed for sixteen tahsils of the district Kinwat has the the highest number of market centers while studying the area and market centers ration as the number of market centers per 100 Km of area are 0-83 for the whole study region .In Mahur tahsil the ration is 1.14 which consider ably decreased to 0.47 in Himayatnagar tahsil and 0.17 in Bhokar tahsil.

### References:

1) *Berry B.J.L., (1967): Geography of Market Cenres and Retail Distribution, Englewood Cliffs, N. J.Prentice Hall, pp.5,74-88.*
2) *Breombely, R. J. (1971): Markets in Developing Countries - A Review; Geography, Vol. 56, pp. 124-132*
3) *Clark, P.J. and Evans, F.C., (1954): Distance to Nearest Neighbor as a measure of Spatial Relationship in Populations: Ecology, 35, pp. 445-453.*
4) *Dacey, M. F., (1962): Analysis of Central Place and Point Patterns by nearest Neighbor Methods, Lund Series (B) in Geography, 24, pp. 55-76.*
5) *Socio Economic Review and districts statistical abstract inNanded district.*

## Agricultural Density and Land Use Pattern: A Case Study of Nanded District (1991)

**Dr. Sunita Shinde**
Hod & Asso.Prof,
Smt. Sushiladevi Deshmukh
Mahila Mahavidyalaya, Latur.

**Mr. Dnyaneshwar Fajage**
Research Student,
Department of Geography,
Mahatma Basweshwar College, Latur.

*Abstract:*
*Agricultural land various densities such as crude density, rural density Agricultural density and caloric density are calculated the following formulas are used for the calculation of various densities.To measuring the actual pressure of population on Agricultural land and relative co efficient of over population are computer by taking into consider ration.*

**Keyword:** Land Use Pattern, Crud Density Physiological Density, Agricultural Density Caloric Density Efficiency Density.

**Introduction:**

The proposes to describe and analyses, The Land use in Nanded district. Land use in the surface utilization of all developed and vacant land on a specific point at a given time and space this, leads one back to the village from and farmer to the fields garden, pastures, fallow land forest and to the is orated farmstead. One as geography deals with the spatial relationship between these aspects and planning, this is because land use changes to meet the variable demands of the land. The society in its new ways and condition of life. The demand for new uses of land may be inspired by a technological change, or by a change in the size composition and requirements of a community some changes are short lived, whereas others requirement a more constant demand, in the short land utilization is the use made of the land by man, as surveyed and mapped in a series of recognized, by categories.

The growth of population may change. The forest fallow land and pasture land in to crop land, it also convert in to residential land and industrial land according to the needs of growing population, The study of land utilization has both economic, geography and demographic dimensions. The geographic aspect the temperature, humidity, topography, and soil conditions which influence. The utilization of land for crops pasture of forest the demographic aspect considers the studies of population distribution, composition, characteristics and trends not only in the area being surveyed, but, in the whole region presently, we are considering the general land use. From the view point of agricultural development of the study region.

**Objectives:**

1) To assess the land use pattern of Nanded district
2) To find out the: Different agricultural density in Nanded district.

**Study Area:**

Nanded district lies in the Godavari basin in the south eastern part of the Maharashtra state. It is situated between 18° 16' to 19° 55' North latitudes and 76° 56' to 78° 22' East longitudes. It is surrounded by Yavatmal district to the North, on the East and South east by Adilabad and Nizamabad district of Andhra Pradesh state and on the South by Bidar district of Karnataka state, on the south by Latur district, on the North west by Parbhani and Hingoli district of Maharashtra state.

The area presents an undulating topography with uneven hills, plateau, gentle slopes and valleys. The district can be divided into two major parts, the hilly region on the North and North East and low lying area on the banks of the rivers Godavari, Manjra, Manyad, and Panganga.
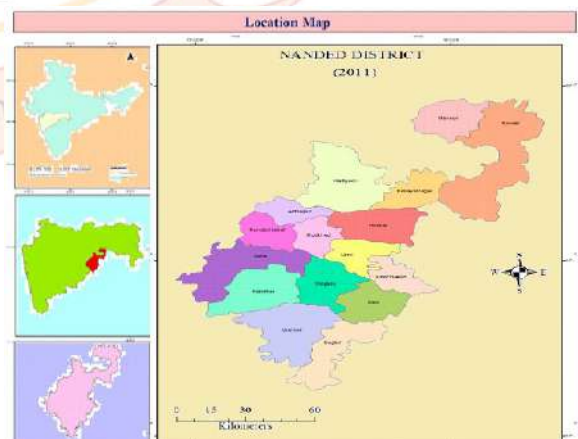


**Fig 1.1 Study Area**

The district has an area of 10,528 sq. Km. The Nanded District is at a distance of 568 Km from Mumbai, 260 Km Aurangabad, and 440 Km Poona, 315 Km Hyderabad. It is well connected by rail and road routes and Air ways.

**Data Base and Methodology:**

The present study is based on secondary data collected from census Reports of government of India, district census handbook 1991 Socio-economic review and district statistical abstract. The Geographical study of landuse Agricultural over 1991 years has been analyzed. For detailed study of Population16 tahsil land use has considered. The collected data has been processed and analyzed by using different quantitative, statistical technique. The tabulated data has been presented by graph and maps. To make the comparative analysis the

Agricultural land use Nanded district has also been computed. It can give better understanding regarding the Agricultural land in Nanded district.

For the studying land use efficiency the following formal is used.

**Index of land use efficiency** $= \dfrac{\text{Total gross cropped Area}}{\text{Net sown Area}} \times 100$

For the calculation of agricultural density fallowing methods has been used.

**Crude density** $= \dfrac{\text{Total population}}{\text{Total Geographical Area}} \times 100$

(100 hectare is equal to 1sq. Km)

**Physiological density** $= \dfrac{\text{Total population}}{\text{Net sown Area}} \times 100$

(100 hectare is equal to 1sq. Km)

**Agricultural density** $= \dfrac{\text{Total Agricultural Population (Agricultural Labors + Cultivators)}}{\text{Cultivators area Net sown Area}} \times 100$

(Persons per square Km)

**Caloric density** $= \dfrac{\text{Total population}}{\text{Total gross cropped Area}} \times 100$

(100 hectare is equal to 1sq. Km)

**Index of Land use efficiency** $= \dfrac{\text{Total Gross cropped area}}{\text{Net sown area}} \times 100$

**Analysis and Result:**

**Table 1.1: Land Use Pattern of Nanded District 1991 (Area in Hectors)**

| Sr. No. | Land Use Category | Area 1991 | Percent |
|---|---|---|---|
| 1 | **Non Cultivable Land** | | |
| i | Forest | 91700 | 8.87 |
| ii | Area Not Available For Cultivation | 53700 | 5.19 |
| a) | Land Under Non Agriculture | (19800) | - |
| b) | Barren and Uncultivated Land | (33900) | - |
| 2 | **Other Uncultivable Land** | | |
| iii | Other Uncultivable Land | 75100 | 7.26 |
| a) | Cultivated Land But Not in Use | (5200) | - |
| b) | Pasture | (51300) | - |
| c) | Fruit Garden and other trees, Plants But Not in Used in Net Sown Area | (18600) | - |
| 3 | **Cultivable Land** | | |
| iv | Net Area Sown | 723200 | 69.99 |
| v | Follow Land | 89500 | 8.66 |
| a) | Current Follow | (69600) | - |
| b) | other Follow | (19900) | - |
| | **Total** | **1033164** | **100** |

**Physiological Density:**

Table 1.2 and Fig 1.3 show the Physiological density or man soil density is calculated by dividing total population by total net sown area it given rather a more concert picture. Physiological density is calculated by the following formula.

**Physiological density** $= \dfrac{\text{Total population}}{\text{Net sown area}} \times 100$

(100 Hectare =1 sq. km)

Where: 100 is used as hectares to convert total physiological density in to square km In 1991 the physiological density in Deglur tahsil was 326 person/square km, below 100 physiological density was found in, Nanded, Bhokar, taluka, while 100 to 250 physiological density. Pressure was found in Mahur,
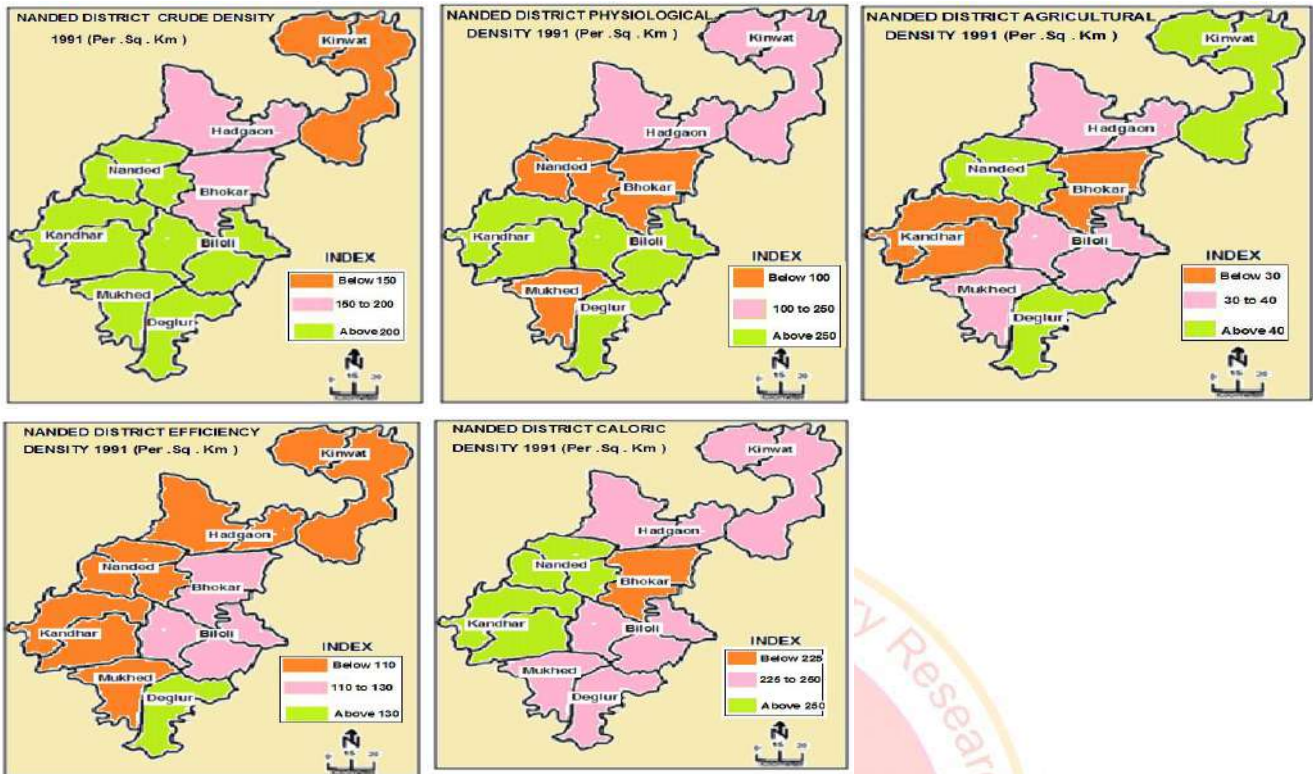
Himayatnagar and taluka in 1991 above 250 physiological densities per square km was observed in Nanded taluka. The population pressure on net sown area is increased in every district it shows that in all taluka.

Fig 1.3: Physiological Density 1991

**Agricultural Density:**

In order to assess the agricultural development in the study area. Table 1.2 and Fig 1.4 show the study of agricultural density and its pattern. Is necessary to asses agricultural density has been worked out by using the following formula.

$$\text{Agricultural Density} = \frac{\text{Total Agricultural population (Agriculture labors + Cultivators)}}{\text{Cultivated area or Net Sown Area (Persons per square km)}} \times 100$$

Where: the agricultural density is more the people try to increase the production by adoption new techniques and putting more, input land and thus the transformation of agricultural become a necessary, once the process of transformation deigns and prosperity shown signs it attracts more rural population and more transformation take place.

**Different Types of Densities in Nanded District in 1991:**

**Table 1.2: Different Types of Densities in Nanded District in 1991(Per.Sq.Km)**

| Sr.No | Name of Taluka | Crud Density | Physiological Density | Agricultural Density | Caloric Density | Efficiency Density |
|-------|----------------|--------------|----------------------|---------------------|-----------------|--------------------|
| 1 | Mahur | 120.83 | 230.01 | 40.39 | 229.39 | 100.26 |
| 2 | **Kinwat** | | | | | |
| 3 | Himayatnagar | 172.55 | 242.79 | 39.18 | 235.11 | 103.26 |
| 4 | **Hadgaon** | | | | | |
| 5 | Ardhapur | | | | | |
| 6 | **Nanded** | 579.43 | 93.87 | 51.84 | 857.15 | 109.52 |
| 7 | Mudkhed | | | | | |
| 8 | **Bhokar** | 162.48 | 20.49 | 26.23 | 203.47 | 100.74 |
| 9 | Umri | | | | | |
| 10 | Dharmabad, | | | | | |
| 11 | **Biloli** | 230.52 | 281.98 | 37.08 | 237.41 | 118.17 |
| 12 | Naigaon | | | | | |
| 13 | Loha | 217.13 | 285.11 | 25.88 | 282.68 | 100.85 |
| 14 | **Kandhar** | | | | | |
| 15 | **Mukhed** | 219.06 | 31.62 | 32.76 | 298.69 | 105.87 |
| 16 | **Deglur** | 252.02 | 326.68 | 47.04 | 226.52 | 144.21 |

The densities were observed in Nanded district from the year 1991. It includes physical densities, agricultural density, caloric density and efficiency density as described in the following table1.2.

**Crude Density:**

Fig 1.2 and table 1.2 show the crude density show general condition of population pressure on Land. Crude Density is a simple arithmetic ratio which is compute by during total population by total geographical area. The Lowest crude density of population in Nanded district is observed in Mahurtaluka 120 persons per square Km in 1991 and highest crud density observed in Nanded District.Fig 1.2: Crude Density 1991.

Agricultural density is a batter approach to analyze Land use in agriculture countries. where heavy reliance is placed on farming, the cultivated area take no accurate of area sown more than once but does induce fallow Land during 1991 the highest agricultural density 51.84/sq.km wear found in Nanded, lowest agricultural density 26.23 person/square km was found in Bhokar tahsil.The height agricultural density Deglur, Nanded, Ardhapur, Mudkhed, Mukhed and Kinwat taluka during the study period 1991.Fig 1.4 Agricultural Densities 1991.

**Caloric Density:**

Table 1.2 and Fig 1.5 show the Man and food crop ratio. Caloric density of population is calculated by dividing total rural population by total food cropped area. Caloric density is calculated by the following formula.

$$\text{Caloric density} = \frac{\text{Total Rural Population}}{\text{Total gross cropped area}} \times 100$$

(100 hectare is equal to 1sq.Km)

Where: 100 is used as hectors to convert the total caloric density per square km indicated that the below 225 caloric density was recorded in Bhokar, Umri taluka where: 225 to 250 caloric density was observed in Mahur, Himayatnagar, Mukhed, Biloli and Naigaon taluka 1991. High caloric density was observing 250 above in, Kandahar and Nanded.Fig 1.5: Caloric density 1991.

**Nanded District Land use Efficiency:**

The proportion of potential geographical land (uncultivated land) from 3.2-2.3 Percentage transferred to net sown area during the period of investigation in the study region as shown in table 1.2 and fig 1.6. There is vast scope for extension of cultivated land by brining fallow and potential agricultural land under net sown area. their immediate need is to give more emphasis on intensity of cropping and in cropping vied from existing, cultivate area problem of under use of net sown area low productivity and risk of crop failure are taking. The rural population therefore it is fruits to investigate the degree of the intensity with the net sown area is utilized land use efficiency may be defined extent to which the net sown area is cropped or reason. The gross cropped area as a percentage of the net sown area given a measure of Land use efficiency which means the intensity of cropping.

In this during year 1991 index of Land use efficiency was below 110 Percent land use efficiency index was found in Hadgaon, Whereas Himayatnagar, Nanded, Bhokar, MukhedLoha taluka where as highest 144.21 observed in Deglur taluka.Fig 1.6: Nanded District Land Use Efficiency 1991.

**Reference:**

1) Anuradha Sengupta: a water resources and agricultural productivity in malady district geographical review of India Vol. 64 2002 pages -12.
2) Back (1937) the assessment of agricultural productivity in terms of grain equivalent per head of population was first employed) in his study of land utilization.
3) Bhatia (1967) used the index suggested by sparer and Deshpande with slight modification. He used yield index of crops, instead of yield ranking of individual crops.
4) Bhatia, S.S., (1967), 'A New Measurement of Agricultural efficiency in Utter Pradesh (India)'. Economic geography, Vol. 43, No. 3, P.P. 244-266.
5) Bhatia, S.S., (1967), 'Spatial Variations Changes and Trends in Agricultural Efficiency in Uttarpardesh 1953-63', Indian Journal of Agricultural Economic, Vol. 22, No. 1, page 66- 80.
6) J. K Ostrowiki (1968) agricultural typology, agricultural reorganize is action and agricultural development 21st abstract, paper Calcutta.
7) K.K.Das. population and land resources in north Bihar plain west of the kosi published PhD thesis Bhagalpur University (1979).
8) K.S More and S.D Shinde population pressure on agriculture (Kolhapur district) a geographical analysis, journal of Shivaji university Kolhapur (science 1978).

# A Quantitative Analysis of Rural Settlements in Una Taluka of Junagadh District (GJ) - A Remote Sensing and GIS Approach

**Sunil Soma Gavit**
Research Student,
S. R. T. M. U. Nanded.

**Dr. A. K. Hange**
Research Guide,
Shivaji College, Renapur.

**Abstract:**

The spacing distribution of rural settlements was studied for 156 settlements in the Una tehsil of Junagadh district in central India using high declaration satellite imageries available in 'Google Earth'. Spatial statistical technique of 'nearest neighbor analyses was used to study the randomness in the delivery of settlements. The methodology used in the study demonstrates cost useful and correct means to study the spacing of settlements in rural surrounding area. The results of the study provide essential inputs for growing a development model for rural settlements by the local developmental establishment.

The investigative study of rural settlements with respect to spacing of settlement has large significance in terms of regional development and spatial included arrangement inputs.

**Introduction:**

Rural settlements are the mainly feature form of the cultural landscape. It is artificial habitation on the earth's surface and study of the distribution of rural settlements has taken an important situation in the historical growth of geography. It is important that judgment makers concerned in rural development have at their disposal particular information to identify impact locations for concentration of services, nodes of transportation outline, development centers, etc. which mostly control the cost of services.

*Una* is located on the bank of Machchundririver. It has an average elevation of 14 meters (46 feet). *Kodinar* is located on the west, Diu is on the south. *Una* has the highest number of villages of all the Talukas in Gujarat state. The study area cover 156 settlements is located inside the *Una tehsil* of Junagadh district and covering an area of 775 sq. km. The area is fundamentally an agrarian, thickly populated and well connected with major roads and railway. Though there are big portions of forested areas and a few water bodies in the study area. (Fig.1). The general topography in the area is represented by an undulating plateau typical of the Deccan traps with altitude unstable from about 600m to 260m above msl.

The word distribution refers to the way in which human being settlements are extending over the landscape. The pattern may be individual of isolated homes, each divided by big distances, and the pattern can be random, regular or clustered. There are a variety of factors and situation responsible for different types of rural settlements. These are: physical features nature of topography, height above sea level, type of weather and accessibility of water, cultural and ethnic factors societal structure, caste and religious conviction, and defense factors, defense against theft and robberies. Once formed, settlements may continue for centuries, long after the original advantages of the situated have become unrelated. However, it is particularly improbable that the pattern of distribution of settlements will stay behind the same settlement disappear and grow up, some disappear completely even as completely fresh ones are recreated.

Five major types of spacing patterns can be easily identified as clustered, agglomerated or nucleated, semi-clustered or fragmented, helmeted, and dispersed or isolated. A statistical technique i.e. quantitative technique of *'Nearest- neighbor statistics'* is used for influential the randomness of distributional pattern of rural settlements. Its principle is based on a assessment of the in a straight line distances separating point from their nearest neighbor points with the distances which strength be expected if these points be scattered in a random manner within the similar area.



**Objective:**

The main objective of this study is first of all to identify the spatial distribution randomness of rural settlement and factor influence it and secondly demonstrate the effectiveness method used in related studies of rural settlements.
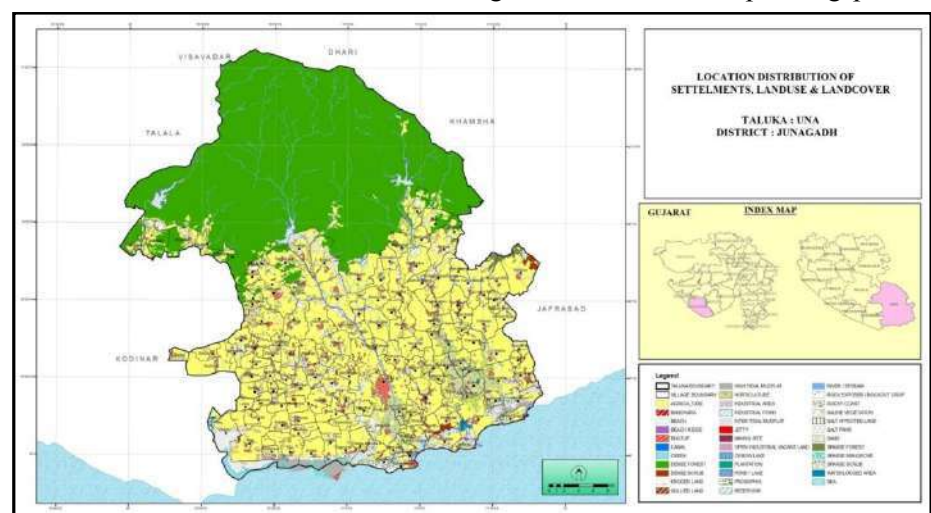
**Location Distribution Settlements:**

**Methodology:**

The rural settlement boundaries within *Una Taluka* of Junagadh districts were digitized and mapped in a GIS situation. The administrative boundaries of rural settlements were transferred and overlaid on high declaration satellite imageries using *'Google Earth'* which is obtainable free on internet area. The features of the coverage of rural settlements, water bodies and transportation were delineating from the satellite imageries and supplementary to the map. The villages without any settlements were recorded as well. The nearest distance between the rural settlements was measured using the *'ruler'* tools in *'Goggle Earth'*. The update map was exported to GIS for supplementary investigation and map put on show.

The nearest neighbor statistic is derived by—$Rn = 2.dm. ¥ (N/A)$

Where, **Rn** = nearest neighbor statistic,

**dm**= mean observed nearest neighbour distance between points,

**N** = number of points, and **A** = area concerned

The computed values of **Rn** lie on a continuous scale which ranges between 0 and 2.15, and where, 0 denotes complete clustering, 1.00 denotes random scatter and 2.15 denotes complete regularity, i.e., each point equidistant from six other points.

*The nearest neighbor will bring into being a distribution pattern series as per the distribution*
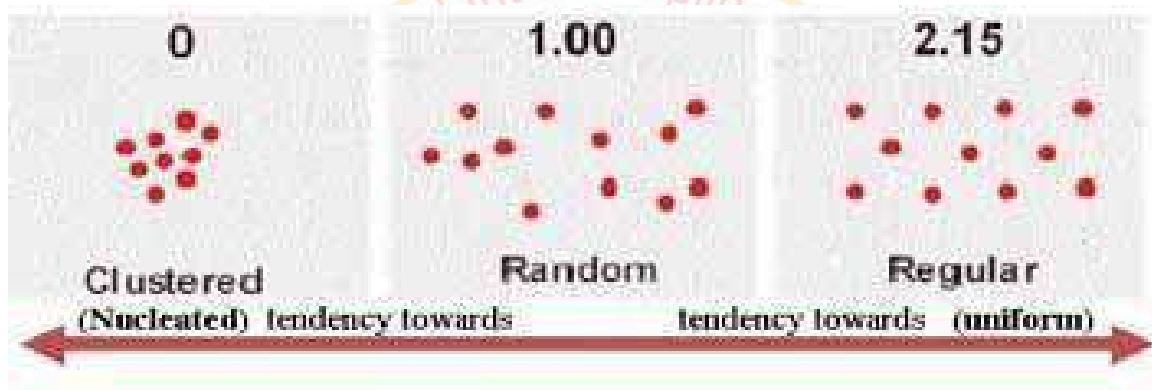


*patterns exposed in Fig. 2*
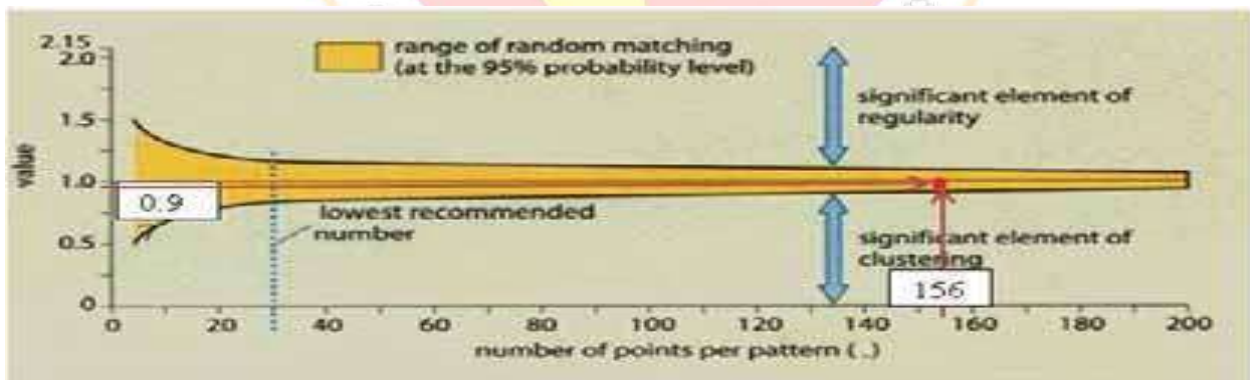


*Fig 3. Range of Random Match*

**Results:**

The study area forms large sector of forest land where the settlements are less. A test for spatial inequality in the distribution of rural settlements was carried out for both with as well as apart from the forest areas in order to understand their control on the randomness of distribution of settlements.

*Using the nearest neighbor formula Rn = 2.dm. ¥(N/A) the randomness was calculated as below.*

| Study Area | Area (Sq.km) | dm=D/N | Rn |
|---|---|---|---|
| Including forest area | 697 | | 0.928 |
| Excluding forest area | 775 | 161.42/156= 1.034 | 0.979 |

It is motivating to identify that the results for the test of distribution are parallel in case of whether forest areas are considered or otherwise. The **Rn** calculated for both these cases are close to '1' along with lie in the middle segment of the random scale indicating a random distribution of the settlements. (Fig.2)

However, there is a opportunity that this pattern have occurred by chance. Using the graph of probability (fig.3), it is apparent that the values of **Rn** must lie inside the shaded area before a distribution of random can be present accepted as important. Values untruthful in the shaded area at the 95% probability level show random distribution. The plotting of derived values of randomness on the graph confirms that the **Rn** values of (0.979 and 0.928) have a significant element of randomness with number of Settlements at 156.

**Conclusion:**

The results of the randomness derived from 'Nearest *Neighbors Analysis (Rn)'* for *Una Tahsil* of Junagadh district reveals that spatial distribution of settlements is a random pattern. The lack of a regular landscape and productive agricultural area is mostly, in charge for a random distribution pattern of rural settlements. The presence of 45 *'Rithi'* villages (Villages without settlements) can be an additional feature contributing to a random distribution of rural settlement in the study area. The wooded areas do not contribute significantly to the random distribution scale since they are not lightly distributed in the area under investigation but somewhat aggregate in the western portion of the study area. The settlements with random distribution of this kind are unable to connect the benefit and form themselves into a difficult group by adopting some rural development programmers in their community. The neighboring development powers that be would find the results of the study useful to consider while

Formulate strategy for development programs in such rural settings. The methodology adopted in the study is rate effective and simple in terms of using state of art technology of Remote Sensing and GIS in studying geo- spatial aspects of the rural habitat. The rate of satellite imageries in the present study is finally eliminated with the successful use of 'Google Earth' available free on the internet.

**References:**

1.  Prasad A (1972): *The Types of Rural Settlements in Chhota Nagpur Plateau, in Selected Papers Vol – III, ibid, pp207 –211.*
2.  R L (ed. 1972): *Rural Settlements in Monsoon Asia, Proceedings of the IGU Symposia at Varanasi and Singh Tokyo, National Geographical Society of India, Varanasi*
3.  R L (ed. 1972): *Rural Settlements in Monsoon Asia, Proceedings of the IGU Symposia at Varanasi and Singh Tokyo, National Geographical Society of India, Varanasi*
4.  Sinha V N P (1972): *Evolution of Settlements in Chhota Nagpur, India, in Selected Papers Vol – III, ibid, pp262–264.*
5.  Tamaskar B G (1972): *The Sites of Rural Settlements on the Sager – Damoh Plateau, in Singh R L (ed. 1972).*
6.  Verma R V (1972): *The Evolution of Rural Settlements in Avadh, India, in Selected Papers Vol – III, ibid, pp305 –315.*
7.  Wonders W C (1972): *Dispersed Rural Settlement Patterns in Alberta, Canada, in Selected Papers Vol – III, ibid, pp342 –349.*
8.  Worthington B D R and Gant R (1975): *Techniques in Map Analysis, Macmillan Education Ltd., Lon.*

# Physical Environment and Their Impact on Coastal Tourism or Beach Tourism in Goa

**Prof. Vijay D. Chaudhari**
**Research Fellow,**
Asst. Professor, Department of Geography
B.P. Arts, S.M.A. Science &
K.K.C. Commerce College,
Chalisgaon, Dist. Jalgaon. Pin-424101.

**Dr. S. B. Ashture**
Head & Research Guide,
Dept. of Geography,
Shri Kumarswami Mahavidyala,
Ausa, Dist. Latur-413520.

**Abstract:**

Coastal areas are among the most densely populated zones worldwide and at the same time subjected to rapid environmental changes due to their land-sea interface locations. The phenomenal growth of coastal tourism in the last few decades, especially in the tropical countries, has created environmental havocs by drastically altering the local ecological milieu in which the indigenous communities have thrived for generations. Coastal tourism refers to land-based tourism activities including swimming, surfing, sunbathing and other coastal recreation activities taking place on the coast for which the proximity to the sea is a condition including also their respective services. Goa has a series of silvery beaches along its 107 km long coastal stretch, separated by promontories and estuaries. They are Calangute, Baga, Vagatore, Anjuna, Colva, Palolem, candolim, sinquerim, dona paula, cansaulim, majorda, benauli etc.with high standing lush green coconuts with green bush backgrounds.

**Keywords**: Coastal Tourism, Beach Tourism, Physical Environment, Beaches, Foreign Tourist, Environmental Impact etc.

## Introduction:

Coastal Tourism is one of the major forms of recreational tourism. India has very long coastline along the mainland and numerous islands. It has ample scope to develop coastal tourism. It has achieved commendable success in Goa and Kovalam regarding beach tourism. Other coastal States are also changing atmosphere favorable for it. Coastal tourism is a process involving tourists and the people and places they visit, particularly the coastal environment and its natural and cultural resources. Most coastal tourism takes place along the shore and in the water immediately adjacent to the shoreline. Today, tourists travel to the coastal zone for parts of a day, for weekends, for short vacations, and for prolonged stays. Tourism is generally focused on the coastal areas of Goa, with decreased tourist activity inland. In 2010, there were more than 2 million tourists reported to have visited Goa, about 1.2 million of whom were from abroad. As of 2013, Goa was a destination of choice for Indian and foreign tourist, particularly Britons and Russians, with limited means who wanted to party. The state was hopeful that changes could be made which would attract a more upscale demographic.

## Study Region:

Goa is a state on the western coast of India, within the region known as the Konkan. It is bounded by Maharashtra to the north and Karnataka to the east and south, with the Arabian Sea forming its western coast. Goa encompasses an area of 3,702 km (1,429 sq m). It lies between the latitudes $14^0$ 53'54"North to $15^0$ 40'00" North and longitudes $73^0$ 40' 33" East to $74^0$ 20'13" East. It is India's smallest state by area and the fourth smallest by population. Goa has the highest GDP per capital among all Indian states, two and a half times that of the country.

## Objectives:

1. To study the characteristics and importance of the coastal tourist centers in Goa.
2. To study of the coastal tourist center or beaches in Goa.
3. To study of the physical environment and their impact on coastal tourism in Goa.

## Database and Methodology:

The paper is based on both primary and secondary sources of data. The methods applied in this study include field level assessment of beach activities and participatory tourist. The reports of several NGOs, publications in local newspapers and extended internet-based tourist-blog surveys have also been taken in consideration in order to collect multiple views about the nature, dynamics and impact of tourism development in Goa. The present study is mostly exploratory in nature with extensive literature survey carried out for gaining the

relevant information of reliable government publications articles, news report prints, journals, etc. Field visits were undertaken for exploring the regional aspects.

## Coastal Tourism:

"Coastal tourism refers to land-based tourism activities including swimming, surfing, sunbathing and other coastal recreation activities taking place on the coast for which the proximity to the sea is a condition including also their respective services".

## Beach Tourism:

Beach tourism is very popular among the affluent societies as well as in the middle class section. It is popular among the people of all age groups with their varying motivations. It is basically a leisure activity and more popular among the people of temperate, warm temperate and cold countries. Beach tourism activities include water and land resources use. The water usage comprises swimming, surfing, sailing, wind-surfing, water-scootering, motor-boat-skiing, parasailing, snorkeling etc.

## Beaches:

Goa has a series of silvery beaches along its 107 km long coastal stretch, separated by promontories and estuaries. They are Calangute, Baga, Vagatore, Anjuna, Colva, Palolem, candolim, sinquerim, dona paula, cansaulim, majorda, benauli etc.with high standing lush green coconuts with green bush backgrounds. These are very popular among foreign as well as domestic tourists. Goa stands 6th in the Top 10 Nightlife cities in the World in National Geographic Travel. One of the biggest tourist attractions in Goa is water sports. Beaches like Baga and Clangute offer jet-skiing, parasailing, banana boat rides, water scooter rides and more.

## Physical Environment of Goa:

Goa is also rich in historical and cultural heritage. About four and a half centuries of Portuguese rule has left its imprints everywhere. Thus it has been a melting pot of eastern and western cultures. Goa enjoys a tropical humid 'Muggy' climate, with an average annual temperature of 26 $^0$ c. The mean minimum and maximum temperature varies between $21^0$c to $31^0$ c. Thus, the area is hot and humid throughout the year. The rainy season or monsoon winds bring torrential rainfall in the area, many times over 280 cm in a year. Thus the climatic figures and climograph clearly shows that the climate is not tolerable for Europeans in summer and monsoon seasons. But the winter months are pleasant for shivering Europeans.

## Environmental Impacts:

There are numerous rivers intersecting the Western Ghat and flowing into the Arabian Sea. The two main rivers which cross the state are Mandovi and Zuari. Other small rivers are Tirocol, Chapora, Sal Talona etc. They provide natural highways of communication. They can be exploited fully for tourism and offer eminence scope for development of water sports. There are some islands engulfed by the Mandovi in North and the Zuari in south. The beautiful locations of islands are ideal as picnic spots. The mechanism of land and sun heating creates pleasant land breeze in morning and cool sea breeze in evening. During October-November the average velocity of sea-breeze ranges from four to five kilometer per hour. In other months, particularly in monsoon period sometimes the wind velocity exceeds 35 kilometer per hour.

Negative impacts from tourism occur when the level of visitor use is greater than the environment's ability to cope with this use within the acceptable limits of change. Uncontrolled conventional tourism poses potential threats to many natural areas around the world. It can put enormous pressure on an area and lead to impact such as soil erosion, increased pollution, discharges into the sea, natural habitat loss, increased pressure on endangered species and heightened vulnerability to forest fires. It often puts a strain on water resources, and it can force local populations to complete for the use of critical resources.

## Physical Impacts:

Attractive landscape sites, such as sandy beaches, lakes, riversides and mountain tops and slopes, are often transitional zones, characterized by species-rich ecosystems. Typical physical impacts include the degradation of such ecosystems. An ecosystem is a geographic area including all the living organisms (people, plants, animals, and micro-organisms), their physical surroundings (such as soil, water and air) and the natural cycles that sustain them. The ecosystems most threatened with degradation are ecologically fragile areas such as alpine regions, rain forest, wetlands, mangroves, coral reefs and sea grass beds. The threats to and pressures on these ecosystems are often severe because such places are very attractive to both tourists and developers.

## Conclusion:

1. The growth of coastal tourism has been rapid and uncontrolled.

2. The seasonal nature of tourism has led to swings in employment and income most markedly in the small sector and to the unskilled worker.

3. The principles of sustainability and the norms related to the conservation of the environment and ecology are generally ignored; the coastal environment is becoming irreversibly degraded as evidenced by the concretization of beaches.

4. A huge environmental impact on coastal tourism of Goa.

5. Beaches developed due to natural and physical environment over the coast of Goa.

6. A large number of foreign tourists visited to Goa beaches due to the ideal environmental condition of the Goa and that types of tourist also create environmental pollution on the coastal area of the Goa.

7. Policies which recognize the type of interconnections among tourism, local communities and the environment, to ensure that tourism contributes to sustainable development agenda.

8. An environmental impact assessment and studies of Goa's coastal stretches including estuaries and backwaters.

### References:

1. Chawla Romila. (2004): Coastal Tourism and Development, Sonali Publications, New Delhi.

2. Kumar Ravi Bhusan (1995): Coastal Tourism and Environment, APH Publishing Corporation, New Delhi.

3. Sati V.P. (2001): Tourism Development in India, Pointer Publishers Jaipur, (Raj.)

4. Dr.Pratap Rana, Dr. Prasad Kamla. (2005): Tourism Geography, Shree Publisher and Distributors, New Delhi.

5. Alvares, C.(1993): " Fish, Curry and Rice: A Citizens report on the state of the Goan Environment" Ecoforum Goa, pp 260.

6. Ghosh P. Kumar and Datta Debajit (2012) : Coastal tourism and beach sustainability- An assessment of community perceptions in Kovalam, India, Malaysia Journal of Society and space 8 issue, pp 75-87.

7. Sawkar Kalidas and Noronha Ligia (2014): Tourism and the Environment Issues of concern in the coastal zone of Goa.
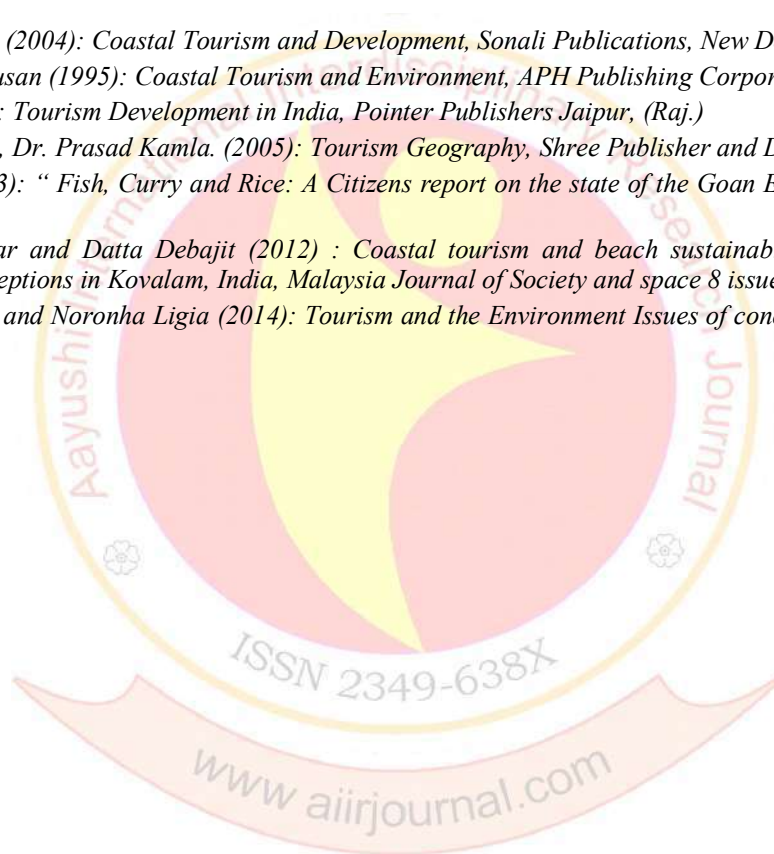
# A Study of Rural -Urban Population Growth and Distribution in Raigad District (2001- 2011): A Geographical Analysis

**Dr. B. P. Shendge**
Department of Geography,
B.Raghunat ASC College,
Parbhani.

**Prof. S. A. Patil**
Department of Geography
Sheth J.N.P.College Pali,
Sudhagad,Disr.Raigad

**Abstract:**

　　　The term growth of population is used in its broadcast critical to cover change in number of people in habiting territory during a specific period of time Change may be in positive or negative form. Population growth of an area depends upon various aspects such as economic development, social awakening, cultural background, historical events and political setup of an area. The special variations in population growth are controlled by physical condition of an area; Growth of population in any area is thus correlates not only understanding of in the rent corrections between various dangerous phenomena and non demographic phenomena. Hence the study of population growth is very essential. In this paper an attempt has been made to study the decadal population distribution, growth of Raigad District of Maharashtra. This study is focused on secondary data from District census Handbook; on one hand the Population of Raigad is highly concentrated in some pockets such as a highly urbanized and industrialized area and high agricultural productivity. While on the other part of District Sluggish Population growth was high maintains, thickly forested area and some remote corners of the study regions.

　　　Such a situation in this District affected the geographical, historical social, technological development. Government policy play a vital role in the distribution of population major factor influencing the distribution and density of Population are described as under. According to the 2011 census the total Population of Raigad district is 2634200(Rural- 1664005 and Urban-970195) It is also necessary to understand the system both endogenously as well as exogenously so that a theoretical formulation can be made possible. It is a mechanical exercise for the study of a phenomenon.

**Keywords:** Population distribution and growth, Density, rural and urban area, percentage of urban population and sex ratio.

## Introduction:

　　　This is a Paper on decadal population distribution and growth in Raigad district. Population was change for the year 2001-2011 has been traced. In this attempt more detailed information on population change and its count is presented the discussion is based on the change of population in size as obtained from the census data, and it is assumed that the figures at two points comparable. In the séance, that the area covered and the methods of enumeration are remaining same for the Tow census.

　　　Population change in any place is measured by computing the differed between the population sizes at two dated. The phrase population change is very often used as synonymous to population growth mainly because most of the countries in modern times have experienced growth in there population size population change. However means an increase of decrease in the size of population. It is customary to denote population decrease of increase is minus of plus this data.

## Objective:

　　　The objective of this Paper is to analyze the decadal year 2001-2011 Population growth rural and urban distribution in Raigad District.

## Data base and Methodology:

　　　This paper is the secondary data of year 2001-2011 are used and compare the change during the last 10 years period. Measurement of finding out the differences in the population size as obtained from the two census operation in Raigad district. The absolute number of population change is obtained by subtracting the population of an earlier date from that of the later date. Relative change is calculated by dividing the absolute change by the population at an earlier census date It is customary to denote the relative change in the percentage change. In that case the change is multiplied by 100 the formula for obtaining the percentage change in the population size is as.

The decadal variation in population ratio formula.

$$r = P1 / P0 \times 100$$

Where:- r = growth of population

　　　$P_o$= two census earlier census population

　　　P1= two census later census population

　　　　　Percentage of urban population PU= U/P X 100

　　　U=Urban population

　　　P= total population

**Study Area:**

Raigad district is situated in the western part of Maharashtra. This is a coastal district situated on the west coast. It spread between $17^0 51$' to $19^0 10$'north latitudes and $72^0 47$' to $73^0 40$' east longitudes. It is surrounded by Thane district to the North and Ratnagiri district to the South. Pune district lies to its East and Satara district to its South-East. On the west the district is bounded by the Arabian Sea.

The headquarters of the district is located at Alibag. A coastal town with a population of 41,686 as per the 2011 census. This headquarters is well connected by roads to Mumbai The main commercial center of the country and other parts of the state. Kankan railway passes through the district.

The initial provisional data released by census India 2011, shows that density of Raigad district for 2011 is 368 people per sq. km. In 2001, Raigad district density was at 309 people per sq. km. Raigad district covered 7,152 square km. of areas.

In 2011, Raigad had population of 2,634,200 of which male and female were 1,344,345 and 1,289,855 respectively. In 2001 census, Raigad had a population of 2,207,929 of which males were 1,117,628 and remaining 1,090,301 were females. Raigad District population constituted 2.34 percent of total Maharashtra population. In 2001 census, this figure for Raigad District was at 2.28 percent of Maharashtra population.

There was change of 19.31 percent in the population compared to population as per 2001. In the previous census of India 2001, Raigad District recorded increase of 20.99 percent to its population compared to 1991.

**Distribution of Population in Rural and Urban Areas:**

According of Raigad district is (2,634,200) with (1,344,345) males and (1,289,855) females. It has 2.34 percent of the state population speared over 21.0 percent of its area. Among the 15 Tashil of the district, Panvel Tashil (750,236) is the most populous and Tala Tahsil (40,619) the least. Other Tahsil in order of their Population are i) Alibag (236,167) ii) Karjat (212,051) iii) Khalapur (207,464) iv) Mahad (180,191) v) Pen (195,454) vi) Roha (197,110) vii) Uran (160,303) viii) Mangaon (159,613) ix) Srivardhan (83,027) xi)Murud (74,210) xii) Sudhagad (62,380) xiii) Mhasla (59,914) xiv) Poladpor (45,464) Out of the total 2,634,200 Population of the district. 1,664,005 persons constituting 63.17 percent of total population is concentrated in rural areas and 970,195 persons (36.83 percent) are residing in urban areas.

Thus whereas in Maharashtra state, 42.4 percent of the total Population is Urban, in Raigad district 24.2 percent of the total population is Urban. It is below the state average. The average number of towns per hundred inhabited villages is often considered as an index of urbanization.

In the Raigad district there are 15 towns Raigad district is thus one of less urbanized district the state. These district 1859villages are inhabited among 1859 village in 15 Tahsil. The average number of inhabited villages per Tahsil comes to about 123.93.Panvel is the largest Tahsil in terms of total population. Alibag Tahsil has the highest number of villages 189 accounting for 10.17 percent of the total inhabited villages. With regard to rural population, Panvel Tahsil leading among the 15 Tahsils accenting for 13.04 percent of the rural population of the district. In terms of number of villages Alibag Tahsils second place rural population is distributed among the 14 units are Tashil Place town. The average size of an urban centre of the district Roha is large Population 11153 per sq km.

**Population Growth:**

The total Population to 2001 census of district was **2,207,929** persons and in 2011 population were **2,634,200** persons. During the 2001-2011 decade there has been net addition 4, 26,271 persons. The decadal growth of the district work out16.18 percent and is lower compared to the state average 21.0 percent.

The average growth rates for the rural -0.5 percent and urban areas of the district are 81.4percentage Tahsil Tala have no urban area. In the rural areas of the District Panvel Tahsil recorded the highest rural growth rate of 15.7percent and Poladpur Tashil recorded the lowest rural growth rate 11.4 percent. Uran Panvel, Pen, Alibag, Murud Tahsil are above the district average 911.8 percent and remaining Tahsil i.e. Karjat, Khalapur, Roha, Sudhagad, Mangaon, Tala, Shrivardhan, Mhasla, Mahad and poladpur are below the district average.
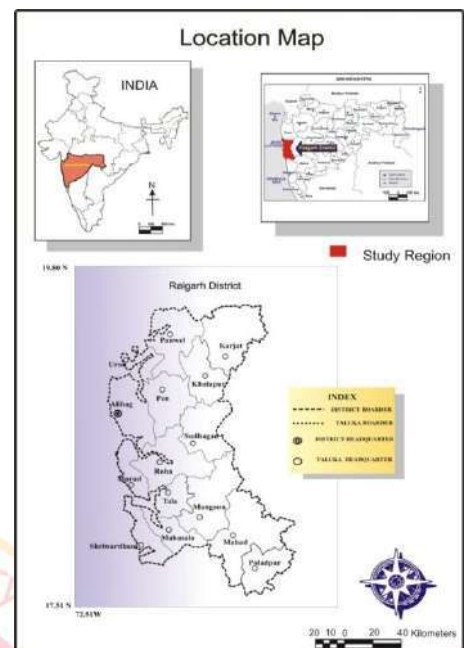
### Table 1: Decadal change in population of Tahsils by residence, 2001-2011

| Sr. No. | Tahsil | Population | | | | | |
|---|---|---|---|---|---|---|---|
| | | 2001 | | | 2011 | | |
| | | Total | Rural | Urban | Total | Rural | Urban |
| 1 | Uran | 140,351 | 109,177 | 31,174 | 160,303 | 90,828 | 69,475 |
| 2 | Panvel | 422,522 | 218,186 | 204,336 | 750,236 | 252,477 | 497,759 |
| 3 | Karjat | 184,420 | 139,011 | 45,409 | 212,051 | 159,566 | 52,485 |
| 4 | Khalapur | 183,604 | 109,407 | 74,197 | 207,464 | 111,500 | 95,964 |
| 5 | Pen | 176,681 | 146,480 | 30,201 | 195,454 | 148,824 | 46,630 |
| 6 | Alibag | 221,661 | 202,165 | 19,496 | 236,167 | 194,481 | 41,686 |
| 7 | Murud | 72,046 | 59,494 | 12,552 | 74,207 | 61,991 | 12,216 |
| 8 | Roha | 161,750 | 127,405 | 34,345 | 167,110 | 119,775 | 47,335 |
| 9 | Sudhagad | 62,852 | 54,680 | 8,172 | 62,380 | 53,204 | 9,176 |
| 10 | Mangaon | 152,270 | 138,111 | 14,159 | 159,613 | 141,078 | 18,535 |
| 11 | Tala | 42,869 | 42,869 | 0 | 40,619 | 40,619 | 0 |
| 12 | Shrivardhan | 85,071 | 69,885 | 15,186 | 83,027 | 60,952 | 22,075 |
| 13 | Mhasla | 61,010 | 52,247 | 8,763 | 59,914 | 50,235 | 9,679 |
| 14 | Mahad | 186,521 | 154,973 | 31,548 | 180,191 | 138,955 | 41,236 |
| 15 | Poladpur | 54,301 | 49,004 | 5,297 | 45,464 | 39,520 | 5,944 |
| Raigarh Total: | | 2,207,929 | 1,673,094 | 534,835 | 2,634,200 | 1,664,005 | 970,195 |

*Source: District census handbook 2001-2011.*

In urban areas of the district Roha Tahsil recorded the highest growth rate of 131.6 percent and Alibag Tashil recorded the lowest growth rate 19.6 percent. Panvel Karjat, Khalapur, Roha, Mangaon and Mahad Tahsil are above the district average (62.7 percent) and remaining Tahsil i.e. Uran Pen Alibag Murud, Sudhagad, Shrivardhan and Mhasala are below the district average.

The proportion of urban to total Population in Raigad district stands at 24.2 Percent in census 2001 as against 18.0 percent in 1991 indicating a slow pace of urbanization in the district.



Decadal change in population of Tahsils-2001-2011

**Index**
- 2001 Total
- 2001 Rural
- 2001 Urban
- 2011 Total
- 2011 Rural
- 2011 Urban
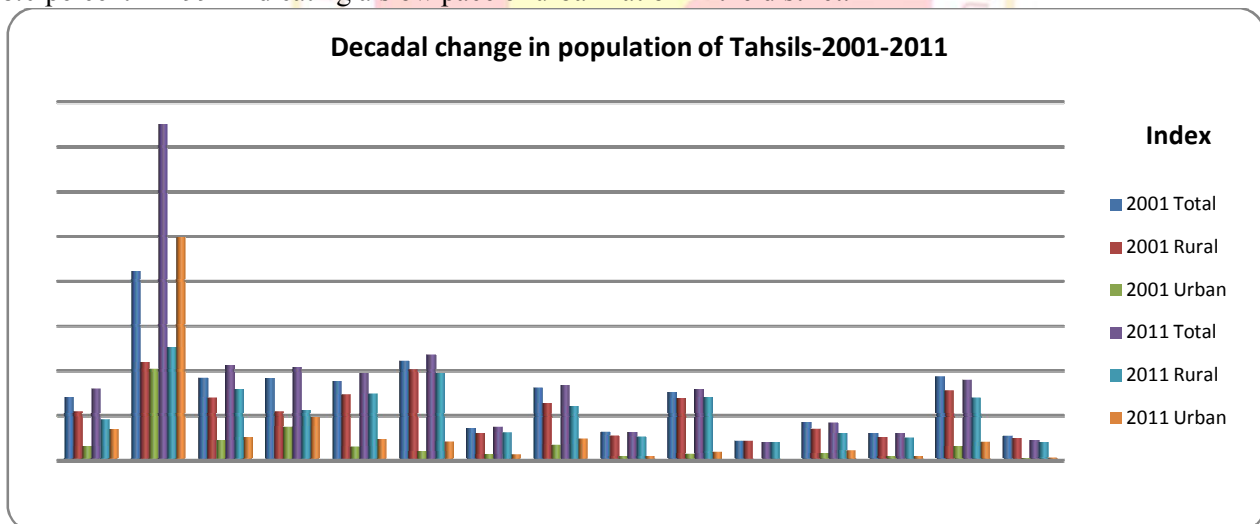
### Sex ratio in Raigad:

Out of the total Raigad population for 2011 census, 36.83 percent lives in urban regions of district. In total 970,195 people lives in urban areas of which males are 507,349 and females are 462,846. Sex Ratio in urban region of Raigad district is 912 as per 2011 census data. Similarly child sex ratio in Raigad district was 913 in 2011 census. Child population (0-6) in urban region was 112,011 of which males and females were 58,562 and 53,449. This child population figure of Raigad district is 11.54 % of total urban population. Average literacy rate in Raigad district as per census 2011 is 90.55 % of which males and females are 93.58 % and 87.23 % literates respectively. In actual number 777,103 people are literate in urban region of which males and females are 419,991 and 357,112 respectively.

As per 2011 census, 63.17 % population of Raigad h districts lives in rural areas of villages. The total Raigad district population living in rural areas is 1,664,005 of which males and females are 836,996 and 827,009 respectively. In rural areas of Raigad district, sex ratio is 988 females per 1000 males. If child sex ratio data of Raigad district is considered, figure is 949 girls per 1000 boys. Child population in the age 0-6 is 188,804 in rural areas of which males were 96,875 and females were 91,929. The child population comprises 11.57 % of total rural population of Raigad district. Literacy rate in rural areas of Raigad district is 78.83 % as

per census data 2011. Gender wise, male and female literacy stood at 86.43 and 71.17 percent respectively. In total, 1,162,891 people were literate of which males and females were 639,701 and 523,190 respectively.

| Table 2: Sex ratio by Sub-District, 2011 | | | | |
|---|---|---|---|---|
| Sr. No. | Name of Tashil | Sex ratio | | |
| | | Total | Rural | Urban |
| 1 | Uran | 934 | 952 | 912 |
| 2 | Panvel | 889 | 895 | 885 |
| 3 | Karjat | 966 | 967 | 963 |
| 4 | Khalapur | 899 | 899 | 900 |
| 5 | Pen | 963 | 966 | 953 |
| 6 | Alibag | 980 | 987 | 951 |
| 7 | Murud | 1039 | 1039 | 1039 |
| 8 | Roha | 951 | 964 | 921 |
| 9 | Sudhagad | 977 | 982 | 951 |
| 10 | Mangaon | 1021 | 1029 | 965 |
| 11 | Tala | 1111 | 1111 | 0 |
| 12 | Shrivardhan | 1156 | 1195 | 1055 |
| 13 | Mhasla | 1166 | 1194 | 1035 |
| 14 | Mahad | 1031 | 1059 | 941 |
| 15 | Poladpur | 1103 | 1124 | 970 |
| | **District: Raigarh** | **959** | **988** | **912** |

**Concluding remarks:**

This is a present paper has been brought out the decadal population distribution growth and density for the entire Raigad district. The quantitative analysis through statistical interpretation has help to understand the decadal population distribution Growth and density. The tabular data has shows the decadal percentage variation in population. The results obtained can serve as useful input for better management and planning strategies for Raigad district in the future as well.

**References:**

1. *S. Alizad. T. M. Varat. Population, Nirali Prakashan Pune 1993 P 46.*
2. *District census handbook,Raigad, Census of India, 2001(CD Version)*
3. *District Statistical Abstract of Raigad, 1991,2001,2011*
4. *Deccan Geographer Vol-38 2009.*
5. *D.S. Narkhede,(2011), Agricultural Landuse and Land Degredation in Raigad District(Maharashtra)-A Geographical Perspectives.*
6. *Yusuf Khan Sadullabax (1990): "Western Maharashtra, A Study in Population Geography", Department of Geography, University of Pune. P. 244.*
7. *Mishra V.C. and Sharma S.K. (1983): "Population Growth and Agricultural Changes in Madhya Pradesh, Spatial Analysis of their correlates", Vol.No. XVIII No. 2, P. 141.*
8. *Maharashtra State Gazetteer, Raigad district,1993*
9. *15.Negi  Human Geogaphy*
10. *S.M.Deshmukh, Aasa Ha Raigad, SudhanshPrakashan, Alibag, Raigad, Maharashtra.*
11. *Published Books and Newspapers,Magazine.*
12. *Internet Website: www.Raigad.gov.nic.in , www.konkanyatra.com,*
13. *www.mahatourism.gov.in www.ktdc.ac.in*

# Causes of Ground Water Pollution around Industrial Clusters in MIDC Areas of Aurangabad City (Maharashtra): A Case Study

**Prof. Dr. O. V. Shahapurkar**
H.O.D, Department of Geography,
Rajarshi Shahu Mahavidyalaya, Latur.

**Miss. Ashlesha Baburao Birajdar**
Department of Geography,
Rajarshi Shahu Mahavidyalaya, Latur.

**Abstract:**

The water is used for domestic and drinking purpose. The suitability of water quality for domestic and potable uses was studied by analyzing samples from different bore wells and wells, located in and around industrial areas in Aurangabad. The physico-chemical parameter of above sampling sites indicates that, domestically used water is more polluted than drinking water. Maximum samples taken have high EC, TDS, TH, TA, $Cl^-$, $Ca^{++}$, and COD. All these values are exceeding the permissible limits for drinking purpose. It is observed that the main sources of the pollution are industrial waste water, municipal sewage and lack of sanitation.

**Key words:** Physico-chemical parameters, water quality

## Introduction:

Water is one of the most important and abundant compounds of the ecosystem on Earth. No living organism can grow and survive without water on earth. Water covers about 71% of the earth's surface. But due to increased industrialization spread around the globe, the problem of pollution happens. Therefore it is necessary that the quality of drinking water should be checked at regular time intervals, because due to use of contaminated drinking water, human population suffers from various water borne diseases.

The aim of the study is to assess the impact of industrialization and rapid growing developmental activities in the study area on the quality of water and to locate various sources and types of pollutants which are responsible for changes in ground water quality. To assess the ground water quality, water samples from twelve sampling stations (bore wells and wells), which are scattered in the main areas of Waluj MIDC and Chikhalthana MIDC have been collected in 2017.

## Study Region:

Aurangabad is one of the 36 districts of Maharashtra state in western India. Aurangabad District is located mainly in the Godavari River Basin and partly in the Tapi River Basin. The entire city is situated at the latitude of 19°53'50" N and longitude of 75°22'46" E. It is located 512 meters above Sea Level. The city is surrounded by hills of the Vindhya Ranges and the river Kham passes through it. The district covers an area of 10100 km² area. According to 2011 censes, Aurangabad district has a population of 3695928. Population of Aurangabad city in 2011 is 1171330.

The district is bounded by Jalgaon district in north by Nashik district in West, Ahmednagar and Beed districts in south and Parbhani and Buldhana districts in east. It is the Capital of Marathwada Region of Maharashtra is famous for its rich cultural heritage. The famous Ajanta Caves, Ellora Caves, Daulatabad Fort, Bibi-ka-Makbara are world famous Tourism centre. Being located in centre of Maharashtra it is one of the rapidly developing cities in the State and also in Asia. It is also hub for Automobile industries and Pharmaceutical Industries.

The area taken up for water pollution study covers Waluj MIDC and Chikhalthana MIDC of Aurangabad District. Waluj MIDC is located about 12 km south west on Aurangabad-Pune Highway while Chikhalthana MIDC is located east of the main Aurangabad city and on Aurngabad-Jalna Highway. The area covers about 400 sq. km. The villages Chikhalthana Naregaon, Brij Wadi, Rajangaon Senpunji, Waluj, Padampur, Bhasnthpur and Ghanegaon constitute the study area. The main industries located in the area are Pharmaceuticals, automobiles, Pulp & Paper, paper products, Distilleries and Metal, Aluminium, Metal engineering, Tyre, Biotech, Pesticides etc.
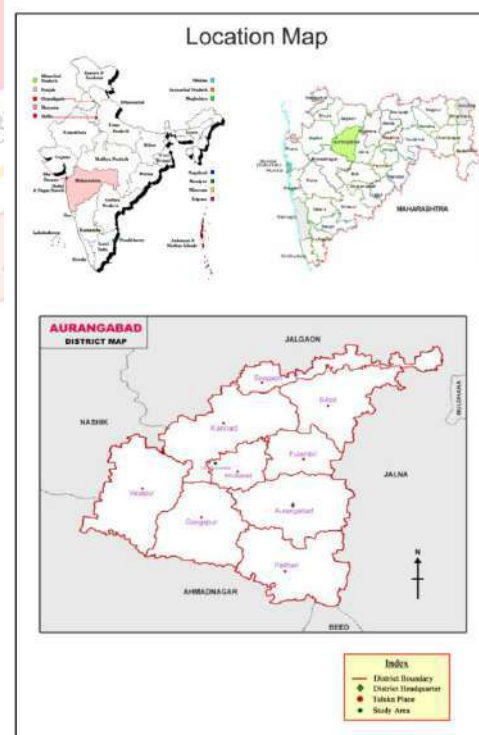
### Details of Industrial Cluster of Aurangabad:

Aurangabad is one of the critically polluted industrial clusters identified by CPCB.

| Sr. no. | Name of industrial cluster | Distance from Aurangabad city | Area in Hectares | Remarks |
|---|---|---|---|---|
| 1 | Shendra MIDC area, | 15 Km | 600 | New developing area SEZ unit |
| 2 | Railway Station MIDC area | Within AMC area | 20 | Very small industrial area also having many sick units |
| 3 | Chikalthana MIDC Area | Within AMC area | 400 | Old industrial area having mostly sick units |
| 4 | Waluj MIDC Area | 12 Km | 1520 | Major Industrial area near Aurangabad city |

### Industrial Classification:

| Sr. No. | MIDC | Red Category | Orange Category | Green Category | Total |
|---|---|---|---|---|---|
| 1 | Shendra MIDC | 07 | 04 | 15 | 26 |
| 2 | Chikalthana MIDC | 24 | 11 | 181 | 216 |
| 3 | Waluj MIDC | 257 | 181 | 962 | 1400 |
| 4 | Railway Station MIDC | 5 | 05 | 14 | 24 |
| | | 293 | 201 | 1172 | 1666 |

### Aim and Objectives:

The present study will be conducted by following objectives:

1) To find out various causes for ground water pollution in MIDC area Aurangabad city.
2) To study impact of industrial waste material on ground water in MIDC area in Aurangabad city.

### Data Base And Methodology:

The aim of the study is to assess the impact of industrialization and rapid growing developmental activities in the study area on the quality of water and to locate various sources and types of pollutants which are responsible for changes in ground water quality. The data for the present study have been collected from various government and nongovernment organizations, town planning reports and water sample analysis report.

### Details of Water Polluting Industries In The Area/Cluster:

In the Chikalthana MIDC area/ cluster, there are 21 water polluting industries. Total quantity of domestic effluent generated is 0.5 MLD. All the effluent generating industries have their own ETP facilty.

In Waluj MIDC area, there are 105 units which are water polluting. Out of 105 industries about 45 industries generate industrial effluent more than 10 CMD. Total quantity of industrial effluent generated from Waluj MIDC area is 10.72 MLD and total domestic effluent generated is 3.928 MLD.

All the large, medium and small scale industries generating industrial effluent have the facility of ETPs. A few of the industries have also provided Chrome recovery plants.

### Causes of Water Pollution Around Industrial Area:

1. Bypass of laws of pollution control board by many industries which resulted in mass scale pollution that affected lives of many people and also cause the extensive pollution of land.
2. Leakages, seepages and spillages from very old ETPs also pollute the land and water n industrial area.
3. Industrial wastewaters are usually high in their organic or inorganic waste like highly toxic and hazardous waste like heavy metals, carcinogenic chemical and radioactive waste.
4. Unscientific disposal of treated effluent on land is another major cause of ground water pollution. It is observed that some industries don't care about this.
5. Due to use of outdated technologies many industries produce huge amount of waste products, so there is need to use recent technologies which produce less amount of waste products.
6. Unplanned industrial growth in most industrial township is also responsible for with both air and water pollution.
7. Bulk Drug units are also responsible for huge waste products due use of many solvents.
8. Small scale cottage type water polluting industries are unable to provide ETPs due to lack of finance and cause ground water pollution by discharging substandard effluent on land.

### Conclusion:

In Chikhalthana and Waluj MIDC, there are more than 210 industries. To assess the ground water quality, water samples from twelve sampling stations (bore wells and wells), which are scattered in the main areas of Waluj MIDC and Chikhalthana MIDC have been collected. The chemical analysis of these water samples shows following results.

1. In the study area, the PH of ground water shows that water is alkaline n nature. PH range 8 to 8.2 indicates the alkaline nature of ground water.
2. Due to poor drainage and improper sewage disposal, Nitrate contents are more than the normal range.

3. (TH)Total Hardness in ground water lies in the range of 230 to 1120 mg/L. This shows that ground water is very hard.
4. Fluoride content in the ground water, observed within the maximum permissible limit (1.5 mg/l, BIS) for drinking water.
5. Iron content of 7 water samples in ground water is not seen within the permissible limit (1.0 mg/l).
6. Lead contents in eight water samples is found to be in high concentrations.
7. The EC (Electrical Conductivity) values of the water samples collected from hand pumps and dug wells in the MIDC area indicate that the ground water pollution is at moderate level.
8. Manganese concentration in the ground water is in the range of 0.024 to 1.0, n two water samples it is more than the normal range.

**References:**

1. *Ground water pollution around industrial clusters in MIDC areas, Aurangabad district.*
2. *Maharashtra (AAP 2010-11), Govt of India, Ministry of Water Resources, Central Ground Water Board.*
3. *Proposed Action Plan for Industrial Clusters at Aurangabad, Maharashtra pollution control board, Mumbai.*
4. *Aurangabad District environmental Report 2012-2013.*
5. *www.census2011.co.in*
6. *Aurangabad Vision 2020.*

# Trends of Population Growth in Washim District: A Spatial Analysis

**Dr. S. B. Ashture**
Research Guide,
S. K. College, Ausa.

**Miss. S. P. Rayamale**
Research Fellow,
M. B. College, Latur.

## Introduction:

Population is essentially required for relation to the availability of natural resources. In this context India is already over populated 102.8 million (2001 census) populations explosion had badly affected the economic development. The rapid growth has created many problems rather than a resource has become a burden. Therefore till today India is under developing country. The population studies have been gained a paramount important all over the globe because of a greatest complicity and varieties in terms of culture, attitude, and social, economic.

The huge population in the country may be useless but quality of people is important for socio economic development. Population growth is an index of its economic development, social awakening, and cultural background historical event. In this paper the attempt made to analyses the growth and all the components and structure of population in Washim district considering the spatial aspect the study sets slight on correlation between various demographic phenomenon and non-demographic phenomenon

## Study Area:

The present study deals with geographical perspectives of the population growth inWashim district. The Washim district is bounded by

The total geographical area of Washim district is 5150 sq.km. Divided into Tahsil the population is 17.68 lack in 2011 census with 6 towns and 790 villages. It is bounded Akola to north Yavatmaland Amravati District to east, Hingoli and Parbhani District to south and Buldhana District to west.

## Objectives:

1) To Know population growth from 2001 - 2011 in study area
2) To Know the population trend and structure in Washim District
3) Influencing factors of population growth in the region.

## Methodology:

The present study is based on primary and secondary data collected from various sources. Secondary data was collected from district statistical office.

Analysis of the Text:

The dynamic population growth mainly depend upon two forces namely natural increase in population and migration natural increase in population is the result of the difference between the number of birth and deaths , birth rate exceeds the deaths rate results in population increase and vice versa. The second force is due to migration of the people.

Taluka wise Growth of Population:

### Table No. 1: Talukawise Growth of Population 2001-2011

| Sr. No. | Tahsil | 2001 Census | % | 2011 Census | % | Decadal Growth |
|---------|--------|-------------|-----|-------------|-------|----------------|
| 1 | Washim | 212644 | 20.84 | 255188 | 21.31 | 20.3 |
| 2 | Malegaon | 156922 | 15.38 | 189051 | 15.79 | 20.47 |
| 3 | Mangrulpir | 188540 | 18.48 | 213824 | 17.86 | 13.41 |
| 4 | Karanja | 149855 | 14.68 | 175208 | 14.63 | 16.91 |
| 5 | Risod | 177123 | 17.36 | 207545 | 17.33 | 17.17 |
| 6 | Manora | 135132 | 13.24 | 156344 | 13.05 | 75.69 |
| | Total | 1020216 | | 1197160 | | |

**Table No. 1** Show the growth of population in two periods 2001 and 2011 census. The maximum population growth is seen in Washim till 2011 because this is a administrative area and place of the district there fore Washim area is leading in its population growth after Mangrulpir in second place , Risod in third place ,Malegaon in fourth Place .The Population growth respecting because of the geographical area and

irrigation area is more and practicing of commercial agriculture  slow growth  of population  recorded  in Manora and Karanja takukas because of less employment opportunities.

**Variation of Rural and Urban Population:**

Urban and rural relationship is an important component of the population. The distribution of rural and urban ratio in the region is studied to understand the degree of rate of growth of population varying from rural to urban and urban to rural . It is also assumed that increase in population is largely.

Added by the rural inhabitants rather than urban areas because of illiteracy and non- adaptation of family planning  table No. 02 shout the spatial variations of rural and urban population  in 2001 to 2011 census in the district .Improvements in the medical facilities and process of urbanization have  witnessed increase the high rate of births. In 2001 the decadal variation in urban population slightly increased by due to migration from village to towns in the district and vice – versa in rural areas.  According to 2011 census highest rural population found in Malegaon taluka (189051) followed by Washim, Risod, Manora, Taluka. The Mangrulpir talukas registered the lowest rural population.

**Table No. 2: Taluka wise Spatial Variation of Rural and  Urban  Population 2001-2011**

| Sr. No. | Taluka | Population 2001 | | | | Population 2011 | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | Rural | % | Urban | % | Rural | % | Urban | % |
| 1 | Washim | 149688 | 17.78 | 62956 | 35.28 | 176801 | 17.93 | 78387 | 37.07 |
| 2 | Malegaon | 156922 | 18.64 | -- | -- | 189051 | 19.17 | -- | -- |
| 3 | Mangrulpir | 122040 | 14.49 | 27815 | 15.58 | 144225 | 14.63 | 30983 | 14.65 |
| 4 | Karanja | 135132 | 16.05 | -- | -- | 156344 | 15.86 | -- | -- |
| 5 | Risod | 149607 | 17.77 | 27156 | 15.21 | 173409 | 17.59 | 34136 | 16.14 |
| 6 | Manora | 128382 | 15.25 | 60158 | 33.71 | 145917 | 14.80 | 67907 | 32.12 |
| Total | | 84177 | | 178445 | | 985747 | | 211413 | |

**Density of Population:**

The density of population is the indicator of human concentration and given some indication regarding the extent of population per square km. High density of population will imply greater economic activities and also by number of social economic and spatial processes like industrialization, urbanization and regionalization  linked with distribution of population has been affected by geo-economical factors .

The density of population of the district is 1385 persons per sq. Km. in 2011 as against 1181 in 2001. Table No. 3 indicates the variation of the density from 173 to 228 and 200 to 274 in 2011 persons per sq. km. in both the year highest density of population is  found in washim (228 and 274) because of industrial commercial, administrative , education and high cost facilities are more than followed by Karanja (244), Risod (234) and Mangrulpir (222) talukas , The lowest  density of population is found in Manora (200) The density of population  in above said talukas descending order because of less number of the above mentioned facilities.

**Talukawise Density of Population in Washim 2001-2011**

| Sr. No. | Taluka | Area in Sq. Km. | 2001 Density | 2011 Density |
| --- | --- | --- | --- | --- |
| 1 | Washim | 931.8 | 228 | 274 |
| 2 | Malegaon | 898.0 | 175 | 211 |
| 3 | Mangrulpir | 790.3 | 190 | 222 |
| 4 | Karanja | 874.6 | 216 | 244 |
| 5 | Risod | 888.4 | 199 | 234 |
| 6 | Manora | 782.0 | 173 | 200 |
| Total | | 5165.1 | 1181 | 1385 |

**Sex Ratio :**

**Table No. 4: Talukawise Sex Ratio in Washim District 2001-2011**

| Sr. No. | Tahsil | Sex Ratio 2001 | | | Sex Ratio 2011 | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | Male | Female | Female (per 1000) | Male | Female | Female (per 1000) |
| 1 | Washim | 109624 | 103020 | 940 | 132758 | 122430 | 922 |
| 2 | Malegaon | 80819 | 76103 | 942 | 98035 | 91016 | 928 |
| 3 | Mangrulpir | 77851 | 72004 | 925 | 90882 | 84326 | 928 |
| 4 | Karanja | 96967 | 91573 | 944 | 109763 | 104061 | 948 |
| 5 | Risod | 90923 | 86200 | 948 | 107933 | 99612 | 923 |
| 6 | Manora | 69910 | 65222 | 933 | 80931 | 75413 | 932 |
| Total | | 526094 | 494122 | 939 | 620302 | 576858 | 930 |

Sex ratio is an index of the socio-economic condition prevailing in area and is an useful tool for regional analysis. Table no 04 shows talukawise sex ratio highest female population is found in Karanja (948) talukas which accounts for 948 female per 1000 males followed by Manora, Mangrulpir and Malegaon talukas

of the district. This is because of migration of male population in search of jobs and slow death rates of female. The lowest female ratio is found in Washim and Risod talukas on accounts of migration of males in search of jobs.

**Conclusion:**

The talukawise population growth from 2001 to 2011 is the maximum growth of population found in washim and it is followed by Mangrulpir and Risod talukas .This is because in different

Sector such as Industries, commerce, transport, printing press, education and other administrative establishments in which thou sand of people gets jobs. As a result of which thousands of people migrated from agrarian society and hence the population has increased from decade to decade.

**References :**

1. *Population Geography –J.P.Yadev*
2. *R.C.Chandana (2007)*
3. *Washim District census handbook 1991, 2001, 2011*
4. *Rathod .H.B(2012)SSS*

# RS and GIS Applications for Mapping and Spatial Modelling

**Mr. Balaji Bhimrao Waghmare**
Research fellow

**Mr. Raju B. Zore**
Research Fellow

**Abstract:**

   Biological invasions form a major threat to the sustainable provision of ecosystem products and services, both in man-made andnatural ecosystems. Increasingly, efforts are made to avoid invasions or eradicate or control established invaders. It has long beenrecognized that remote sensing (RS) and geographical information system (GIS) could contribute to this, for instance throughmapping actual invader distribution or areas at risk of invasion. Potentially GIS could also be used as a synthesizing tool formanagement of interventions aiming at invasive species control. This paper reviews the application of remote sensing and GIS inmapping the actual and predicting the potential distribution of invasive species. Distinction is made into four categories of invasivespecies based on whether they appear in and dominate the ecosystem canopy or not. We argue that the possibility to apply RS to mapinvaders differs between these categories. Our review summarizes RS techniques applied in here and outlines the potential of new RStechniques. It also demonstrates that RS has so far been applied predominantly to canopy dominant species. This contrasts withecological databases revealing that the large majority of invasive species do not dominate the canopy. The mapping of these invadersreceived little attention so far. In this paper we will review various possibilities to map non-canopy invader species. The paper alsoreviews techniques used to map the risk of invasion for areas not invaded so far.

**Key Words:**GIS and remote sensing, Mapping techniques, Canopy cover classification

**Introduction:**

   Invasive species are a current focus of interest of ecologists,biological conservationists and natural resources managers dueto their rapid spread, threat to biodiversity and damage toecosystems. Invasions may alter hydrology, nutrientaccumulation and cycling, and carbon sequestration ongrasslands (Pulley et al., 1997). The global extent and rapidincrease in invasive species is homogenizing the world's floraand fauna (Mooney & Hobbs, 2000) and is recognized as aprimary cause of global biodiversity loss (Czech &Kraus man,1997; Wilcove & Chen, 1998). Bio-invasion may be consideredas a significant component on global change and one of themajor causes of species extinction (Drake et al., 1989).

   This article attempts to provide a review of several studies thatassess the utility of remote sensing (RS), or remote sensingcoupled with geographical information system (GIS), inmapping and modelling the distribution of invasive species. Theterm invasive species is also more or less synonymouslyreferred to as aliens, barriers, naturalized species, invaders,pests, colonizers, weeds, immigrants, exotics, adventives,neophytes, xerophytes, introduced species or transformers(Heywood, 1989; Richardson et al., 2000). These terms comefrom studies having different viewpoints on the problem but inthe context of this paper they should be considered as similar.

**Application of RS and GIS Techniques in Mapping:**

   Remote sensing technology has received considerable interest inthe field of biological invasion in the recent years. It is a tooloffering well-documented advantage including a synopticview, multispectral data, multitemporal coverage and costeffectiveness (Stomps& Estes, 1993; Soule & Kohm, 1989; Vander Meer et al., 2002). It is now widely applied on collectingand processing data. It has proved to be a practical approach tostudy complex geographic terrain types and diverse inaccessibleecosystems. It provides a wide range of sensor systemsincluding aerial photographs, airborne multi-spectral scanners,satellite imagery, low and high spatial and spectral resolutionand ground based spectrometer measurements.

   Remote sensing technology has many attributes that would bebeneficial to detecting, mapping and monitoring invaders.Spatial heterogeneity complicates the study of seasonal andlong-term trends of biological invasion. Remote sensing,however, with its broad view has the potential to deliver therelevant information. Satellite imagery is available for most ofthe world since 1972. The MultiMate nature of satellite imagerypermits monitoring dynamic features of landscape and thusprovides a means to detect major land cover changes andquantify the rates of change.Integrated GIS and remote sensing have already successfullybeen applied to map the distribution of several plant and animalspecies, their ecosystems, landscapes, bio-climatic conditionsand factors facilitating invasions (Stow et al., 1989, 2000; Loset al., 2002; Haltuch et al., 2000; McCormick, 1999; Rowlinsonet al., 1999). An increasing number of publications (Graph 1) isdealing with the application of remote sensing and GIS in thedata collection and analysis of invasive animal and plantspecies, their abundance, distribution, mapping, modelling andfactors influencing their distribution.

   Mapping the type and extent of bio-invasions, the impact of invasions or potential risks of invasions requires accurateassessment and modelling species distributions. So far nosynoptic literature review has been published in the field ofmapping invasive species. To sketch the possibilities,limitations and challenges of remote sensing techniques inmitigation of invasive species, this paper provides an overviewof the application

of remote sensing and GIS technologies inmapping biological invasions. We addressed the followingquestions.

1. What mapping techniques have been used to map and predict the potential distribution of invasive species?

2. What sensors and what image processing and classification techniques have been used to map the actual distribution of invasive species?

3. For what species groups (canopy versus non canopymembers, plant versus animal species) has successfulmapping been reported? Is there any evidence that thereported successful applications tend to be biasedtowards any particular species groups?

4. To what extent has sensitivity to scale and thereliability of the mapping product been addressed?

5. Which available mapping techniques so far notapplied to invaders could be used to improve themapping of invasive species?

We also searched other sources suchas scientific abstracts, worldwide web, CD ROMs and librarieswithin the Netherlands. Several experts were contacted whoprovided additional references.

## Mapping Actual and Potential Distribution:

### From global to local scale:

At national or continental level, maps of invasive speciesdistribution are mainly interpolations from recordedobservations compiled and stored in herbaria, zoologicalcollections and research institutes. Maps are often generated bymanually drawing polygons (boundaries) around areas wherethe species is known to occur or alternatively using someautomated interpolation procedures. For example thedistribution map of Chromolaena odorant, one of the world's worst invaders is displayed in Figure 1. The map displays thedistribution as a continuous surface. This suggests that thespecies occurs throughout the area represented by the mappolygons. In reality, species are not homogeneously distributedacross their distribution range. Instead they prevail in certainenvironments while they are absent from others. Maps showingdiscontinuous patches would more realistically represent such adistribution pattern.
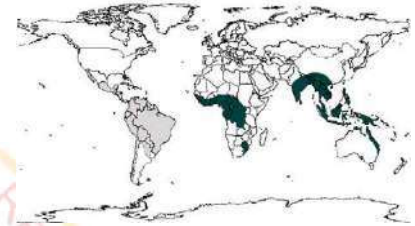
**The world distribution of Chromolaena odorata: areaunder infestation (Black) and native range (Grey). Source: mapdrown by the author based on global invasive species database(ISSG, 2004)**

The need to display the discontinuity and patchiness indistribution patterns emerges while moving towards largerscales. Here, it would be impractical to derive maps throughinterpolation, because it would require sampling every patch, acostly operation particularly when larger areas are to bemapped.

## Remote Sensing Techniques:

Remote sensing gives a synoptic view of the surface of theearth. Aerial photography is the oldest remote sensing technique(Sabins, 1987; Lillesand & Kiefer, 1994). There is a widechoice of films and spectral sensitivity (visible part of thespectrum versus those that include the infrared). Aerialphotography has been used to assess vegetation and plantspecies attributes such as canopy architecture, vegetativedensity, leaf pubescence and phonological stage (Everitt et al.,2001). Digital camera photography and videography arerecently introduced as cheap, easily available and flexiblealternatives to standard photography, particularly when the dataare to be transferred onto a computer system. There are systemsavailable that cover the near infrared (NIR) and infrared (IR) aswell. Multispectral scanners register reflectance in a number ofspectral bands throughout the visible, near- to far-infraredportions of the electromagnetic spectrum. Broad-band scanners have few spectral bands of one hundred or more nm wide.

Hyperspectral scanners have more (tens up to several hundreds)but narrower (from tens to a few nm wide) spectral bands.Broad-band scanners have been successfully applied todiscriminate between broad land cover types such as forestversus bare soil and built up area. The higher spectral resolutionof hyperspectral scanners allows discrimination of more subtledifferences such as those between individual species.

**Electromagnetic spectrum and spectral reflectanceprofiles for different species (adopted from the spectral library of the Environment for Visualizing Images software(ENVI, 2003)**

The signal noise (s/n) ratio of scanners depends on the photonflux received from the earth surface. This is influenced byatmospheric conditions. Also reductions in spectral (bandwidth) and spatial (pixel size) resolution negatively influencethis ratio. Today's SPOT HRIV and Landsat TM scannersmaintain acceptable s/n ratios with pixel sizes in the range of 10- 20 m for spectral resolutions in the order of 50 - 100 nm. A1m resolution is obtained for panchromatic satellite imagerysuch as IKONOS. In order to maintain acceptable signal noiseratios for hyperspectral scanners one has the choice to eitherreduce flying height (airborne instead of spaceborne) orincrease pixel size.
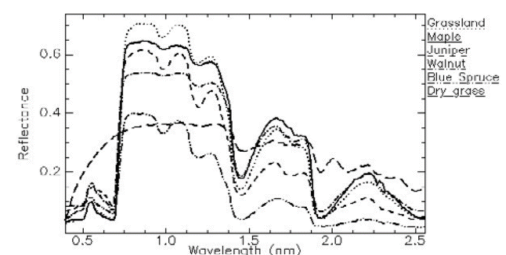
Airborne hyperspectral scanners, therefore,combine high spectral and spatial resolution. Spacebornehyperspectral scanners such as the MODIS, record high spectralresolution information at pixel sizes of 250 meters.

## Classification of Invasive Species:

The data captured by remote sensing devices will be mostdirectly related to the properties of that canopy. We introduceda classification of species based on their remotely sensedcanopy reflectance response (Figure 2). It is the canopy of anecosystem (be it vegetation or fauna) that reflects the electromagneticradiation that is captured by remote sensing devices.
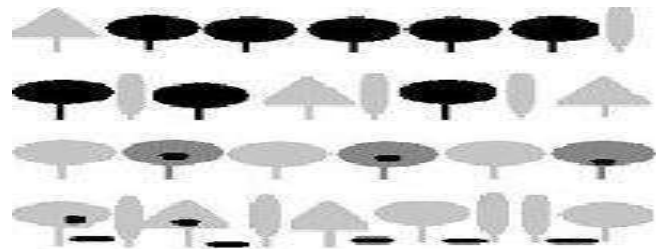
**Application of remote sensing in detecting individualinvasive species (may be an animal or plant) as represented inblack colour. Class I: Canopy dominating species (top row),class II: Mixed canopy dominant species (second row), class III:Invaders influencing canopy dominant species (third row) andclass IV: Understory species (bottom row)**

Class I includes species dominating the canopy and forminghomogeneous single species stands. Class II includes speciesthat are members of a multi species canopy and directly reflectselectro-magnetic radiation. Class III includes species notreflecting, but influencing the reflective properties of canopymembers belonging in class II and I. Class IV finally includesall species that neither reflect light nor influence the reflectiveproperties of other species in class I and II.

## Canopy Dominating Species:

Several invasive speciesdominate the canopy of the earth surface forming homogeneoussingle species stands that extend over larger areas. Included area large number of tree species such as Melaleucaquinquenervia, Miconia calvescens, Tamarix ramosissima,Acacia mearnsii, Ardisia elliptica, Cecropia peltata, Leucaenaleucocephala, Spathodea campanulata, Ligustrum robustum,Morella faya, Pinus pinaster and Prosopis glandulosa. Canopydominance among invaders is not restricted to tree species, italso occurs in grasses (e.g. Arundo donax, Spartina anglica),floating water hyacinth (Eichhornia crassipes) and submergedaquatic vegetation (Caulerpa taxifolia, Undaria pinnatifida,Oscillatoria sp.) and among colonial animals such as zebramussels (Dreissena polymorpha). Detection of invasiveProsopis glandulosa var. torreyana and P. velutina using TMimages (Harding & Bate, 1991), Gutierrezia sarothrae withNOAA-10 low resolution spectral image (Peters et al., 1992),Kalmia angustifolia (Franklin et al., 1994), Imperata cylindricawith multispectral high-resolution visible (HRV) images(Thenkabail, 1999), Carpobrotus edulis, Cordateria jubata,Foeniculum vulgare and Arundo donax using high spatialresolution (~4m) AVIRIS data (Ustin et al., 2002), Cynodondactylon with aerial video and colour-IR photographs (Everitt& Nixon, 1985a), Populus tremuloides clones using hand-heldvideo (Stohlgren et al., 2000) are some of the examples ofmapping canopy dominating species.

## Mixed canopy dominant species: Plant characteristics:

Such as life form, leaves, flowers etc determine reflectance. If aspecies is dominant enough in the canopy and characteristicscan be distinguished from other species, than it is possible todetect such individual species based on spectral reflectance. Theability of high spectral and spatial resolution sensors todiscriminate between invasive and native species depends onintra-specific variability in spectral reflectance. Everitt & Nixon (1985) demonstrated that a family of spectra can represent aparticular species, and invasive species are easily separatedusing low altitude aerial photographs or field spectrographs.

They quantitatively distinguished Heterotheca subaxillaris fromother rangeland vegetation using spectroradiometric plantcanopy measurements. Everitt et al. (2001) detectedHelianthus argophyllus, and Astragalus mollissimus var. earleiusing aerial photography. Menges et al. (1985) found colour IR(CIR) aerial photography to be useful for detectingSarcostemma cyanchoides; Parthenium hysterophorus;Sorghum halepense; Sisymbrium irio and Amaranthus palmeriin different crops. Young et al. (1976) detected growth timingof Chrysothamnus viscidiflorus using colour photography.Abdon et al. (1998) discriminated areas with predominance ofSalvinia auriculata and Scirpus cubensis using Landsat TM andHRV-SPOT digital images. Feyaerts & van Gool (2001)proposed an online system that distinguishes crop from weedsbased on multispectal reflectance gathered with an imagingspectrograph.

## Invaders influencing canopy dominant species:

Numerous investigators have worked on developing techniquesfor using multispectral data in invasive species mapping anddetection (Eav et al., 1984; Zhang et al., 2002; Medlin et al.,2000; Vrindts et al., 2002). Analysis of hyperspectral data hasproduced encouraging results in the discrimination of healthyand infected canopy dominant species infected by variousfungus such as Batrachochytrium dendrobatidis, Cryphonectriaparasitica, Ophiostoma ulmi, Phytophthora cinnamomi andPentalonia nigronervosa (Banana

bunchy top virus). Usinghabitat type, condition and soil type as the delineatingparameters, Bryceson (1991) located Chortoicetes terminifera(Australian plague locust) by using Landsat-5 multispectralscanner data. Kharuk et al. (2001) analysed large-scale outbreakof the Dendrolimus sibiricus (Siberian moth) in the forestsusing NOAA/AVHRR imagery and found that the imagerycould be used for detecting dying and dead trees. Rencz &Nemeth (1985) detected the red stage of Dendroctonusponderosae (pine beetle) infestation using different ratio ofmultispectral scanner bands. Epp et al. (1986) were able todetect white spruce stands damaged by Choristoneurafumiferana infestation using an airborne pushbroom scannerand Thematic Mapper data. Using principal component andcluster analyses Zhang et al. (2002) used spectral ratio analysisbased on principle component analysis and clustered analysis.

They observed that the sensitive spectral wavelengths andreflectance values enabled them to discriminate Phytophthorainfestants infection on tomatoes. Fouche (1995) identifiedrootrot-infested cashew nut trees, Phytophthora cinnamomiinfestation in avocado orchards and infected citrus trees. Theycould be differentiated from their healthy neighbours, usinglow-altitude aerial colour infrared (CIR) imagery.

## Understory species:

Few researchers have pointed outthe possibilities of application of remote sensing in studyingunderstory invasives. Plant species such as Chromolaenaodorata, Ulex europaeus, Clidemia hirta, Lantana camara,Mimosa pigra, Psidium cattleianum, Rubus ellipticus, Schinusterebinthifolius and most of the invasive animal species areexamples of this category. May et al. (2000) quantified remotelysensed airborne data into physical and ecological variables,obtaining an improved spatial and temporal representation ofthe dynamics of native and exotic plant communities.

Most of the invasive animals, lower flora, herbs, shrubs andfauna are found to be understory vegetation, making detectionusing direct remote sensing techniques almost impossible.Nevertheless a combination of remote sensing techniques, GISand expert knowledge still offer potential to detect understoryinvasion through development of models and risk maps. Thesecan help predicting the probability of actual and potential sitesand areas where environmental conditions are susceptible toinfestation.

## Monitoring and prediction of invasionrisk:

Predicting the probability of biological invasion and probableinvaders has been a long-standing goal of ecologists. A majorchallenge of invasion biology lies in the development of pre andpost predictive models and understanding of the invasionprocesses. Introduced species vary in their invasive behaviourin different regions (Krueger et al., 1998). Prediction is moredifficult than finding an explanation. Predicting the ecologicalbehaviour of a species in a new environment may be effectivelyimpossible (Williamson, 1999). The consequence of a givendisturbance depends on the properties of the ecosystem orcommunity. There is a need to evaluate disturbances not interms of the elements of a given regime, but rather in terms ofecological effects.

## Issues of spatial and temporal scale andAccuracy:

Allobservations depend upon the spatial scale, size of the studyarea investigated and resolution of the remote sensor. Habitatevaluation of a species is influenced strongly by spatial scale(Cogan 2002; Trani, 2002). There is no "correct" scale; itdepends on survey purpose (Trani, 2002). The variations in thelandscape patterns are scale-dependent (Rescia et al., 1997).However, in most of the cases, landscape scale is used as anappropriate scale for modelling.McCormick (1999) pointed out the importance of scale andcolour infrared-photographs while mapping Melaleucaquinquenervia. Carson et al. (1995) found that the LANDSATTM and SPOT data with ground resolution of 30 and 20 metersrespectively, are not considered useful for mapping at specieslevel, unless the stand of an invasive species is large enough.

Lass et al.(2000) tested accuracy of detection of a homogenous populationof Centaurea solstitialis at different spatial resolution. Theirresult showed a low commission and ommission errors with0.5m spatial resolution than 4.0m. Very-high spatial resolution(0.5 m) colour infrared (CIR) digital image data from colourinfrareddigital camera imagery showed potential fordiscriminating Acacia species from native fynbos vegetation,other alien vegetation and bare ground (Stow et al., 2000). Incases where different spatial resolutions resulted in equaldetection accuracy, the larger spatial resolution was selecteddue to lower costs of acquiring and processing the data.

However, the information reaching the remote observer will beminimum. Other factors like atmospheric noise, humidity,shadow, contribution from soil add to the confusion and thechance of discrimination of separate species low (Price 1994).Furthermore, variation in orientation of leaves, age of a leaf,variation in leaf area index, different slopes of the locationswhere the individuals are found could make the spectralsignature of a species difficult to define. It is not howeverpractically feasible to determine the ideal wavelengths fordiscrimination when large numbers of invasive species arepresent. Furthermore, if the presence of number of invasivespecies per pixel increases, the difficulty in identifying theindividual components that contribute to the mixed spectrumalso increases. These problems will be further aggravated ifspecies variability in spectral signatures is high. For large scaledirect remotely sensed monitoring of several

invasive species,the possibility of correctly identifying all individuals throughdirect mapping thus appears doubtful.

**Summary:**

In this article, we attempted to evaluate the potential of remotesensing and GIS techniques for the critical task of invasionmapping. Although the use of RS and GIS techniques formapping invasive species and invaded ecosystems is increasingrapidly, the literature on means and methods for invasivespecies mapping remains scattered and often contradictory. Most of the IUCN's worst invasive species fall under our classIV species, in which straightforward application of remotesensing is almost impossible. Recent remote sensing and GISapplications on detecting invasive species were mainly dealingwith species belonging to class I For instance, most of the understory species that have been declared as the world's worst invaders by the ecologists have not caught the attention of remote sensing experts. In the same way species such as Melaleuca quinquenervia or Tamarix ramosissima, which dominate entire ecosystems forming a monotypic dense canopy, do not necessarily need the use of high spectral resolution imagery and vice versa. It is not clear whether RS and GIS techniques will prove equally strong for mapping mobile invasive species such as Acridotheres tristis (Bird), Aedes albopictus (mosquito) or Boiga irregularis (snake). This needs further testing in the near future.

The status of many exotic species with respects to their invasiveness is not well documented. Therefore the ability of remote sensing and GIS techniques to monitor changes in different ecosystems may be crucial if the effect as well as the cause of rarity are to be assessed. Cases of actual applications are still not much more than the traditional investigations. Rapidly shifting interest in remote sensing and IGIS of bioinvasion mapping has resulted in the development of a diverse range of mapping techniques. But, the technology needs further development in terms of real world applications in the mappingof invasive species. Moreover, mapping, modelling and predicting biological invasion will still be a major challenge for ecologists because the biological processes involved are very complex. This complexity makes it difficult to retrieve or delineate invasions which occur in diverse ecosystems. As Specter and Gayle (1990) pointed out the proliferation of new technologies does not guarantee their application to real world problems.

Although restricted to few taxa, studies revealed the potential of remote sensing and GIS application in mapping and modelling invasive species. Possibly, the greatest impacts of invaders are caused by plant species that come to dominate entire ecosystems as remarked by Simberloff et al. (1996). There are possibilitiesof generating in-depth information in detecting, mapping andanalyzing the impact of invasion on an area or entire ecosystemand species level properties. To enhance the result of invasion mapping, there is a clear need of combined use of remote sensing, GIS and expert knowledge. Management dealing with invasive species requires accurate mapping and modelling techniques at relative low costs. Development of those will be a valuable step towards conservation of native biodiversity.

**References:**

1. Allen, T. R., & Kupfer, J. A., 2000. *Application of spherical statistics to change vector analysis of landsat data: Southern appalachian spruce - Fir forests.*
2. Anderson, G. L., Everitt, J. H., & Escobar, D. E., 1996. *Mapping leafy spurge (Euphorbia esula) infestations using aerial photography and geographic information systems. Geocarto International.*
3. Anderson, G. L., Everitt, J. H., Richardson, A. J., & Escobar, D. E., 1993. *Using satellite data to map false broomweed (Ericamera austrotexana) infestations on south Texas rangelands. Weed Technology.*
4. Barrett, E. C., 1980. *Satellite monitoring of conditions conducive to the upsurge of insect pests. in: Satellite remote sensing. Applications to rural disasters. Proc. Joint ESA/FAO/WMO training course, Rome.Bell, C., 1995. GRAPES project prepares California vineyard managers for insect infestation. Geo Info Systems.*
5. Benton, A. R., Jr., & Newnam, R. M., 1976. *Color aerial photography for aquatic plant monitoring. J. of Aquatic Plant Management.*
6. Bren, L. J., 1992. *Tree invasion of an intermittent wetland in relation to changes in the flooding frequency of the River Murray, Australia. Australian J. Ecology.*
7. Bryceson, K. P., 1991. *Likely locust infestation areas in western New South Wales, Australia, located by satellite. Geocarto International.*
8. Budd, J. W., Drummer, T. D., Nalepa, T. F., & Fahnenstiel, G. L., 2001. *Remote sensing of biotic effects: Zebra mussels (Dreissena polymorpha) influence on water clarity in Saginaw Bay, Lake Huron. Limnology and Oceanography.*
9. Carson, H. W., Lass, L. W., & Callihan, R. H., 1995. *Detection of yellow hawkweed with high resolution digital images. Weed Technology.*
10. Cogan, C. B., 2002. *Biodiversity conflict analysis at multiple spatial scales in: J. M. Scott, P. J. Heglund, and M. L. M. e. al, editors. Predicting species occurrences, issues of accuracy and scale. Island Press, Washington. Czech, B., & Krausman, P. R., 1997. Distribution and causation of species endangerment in the United States. Science.*

# A Study of Tahsil Wise Density of Population in Hingoli District

**Dr. Vaijnath K. Chavan**
Dept. of Geography,
Sant Tukaram Arts & Science College,
Parbhani.

**Dr. Vishnudas R. Rathod**
Head &Research Guide
Dep. Of Geography,
Vasantrao Naik Mahavidyalaya,
Vasarni, Nanded.

**Abstract :**

The concepts of distribution and density of population, though not identical, are so intimately related to each other that there is a genuine reason to discuss them simultaneously under the same chapter. This chapter deals with the analysis of density and distribute of population of the study region. The analysis of population distribution and density holds immense significance for population geographers, as its successful understanding holds the key to the analysis of entire demographic character of an area.

The analysis of the patterns of population distribution is fundamental to the understanding of population geography of an area; because it is the patterns of population distribution and density with which all other, characteristics of population are intimately related. The land and people constitute the two significant elements of an area, and therefore the ratio between these two is fundamental interest to all scholars concerned with population analysis.

**Introduction:**

A comprehensive understanding of changes in various significant attributes of population demands the study of prevailing patterns of its distribution. It reveals as how to man has attributed himself, at a particular point of time in the context of his physical environment, type of economy, cultural patterns and history. The distributional patterns of population are, in fact an eloquent expression of the analysis of all geographic phenomena operating in an area. Geographer's goal is to understand the regional differences of people on the earth's surface, which varies from one locality to another and from region to region. Thus, it has been considered as simple but extremely useful measure of population-resource relationship. However, it cannot be treated as a measure of population pressure on land because it merely spells out a simple quality.

It is necessary not only to describe how population distributed spatially in terms of density, composition and dynamics, but also to seek reasons for the patterns of this distribution and for spatial changes in these patterns, if any. A study of population distribution is thus descriptive as well as analytical. The concept of population distribution and density is a very useful tool for the analysis of mans distribution in space. One of the important indices of population concentration is the density of population. The analysis of population distribution and density holds immense significance for population geographers, as its successful understanding holds the key to the analysis of entire demographic character of an area.

**Study Area:**

Hingoli district is situated in Northern part of Marathwada in state of Maharashtra it is bordered by Akola and Yavatmal District on the northern side, Parbhani is the estornside and Nanded district in the south eastensided and lies between 19 $^{o}$20 N to 20$^{o}$00 N and 76$^{o}$20 to 78 $^{o}$0.0 E Respectively. The district of Maharashtra in one of the newest district in the state. It comes into existence as a result of the division of parbhani district in i$^{st}$ may 1999 it consists of two sub division mainly Hingoli and Basmat and five talukos, Hingoli, kalamnuri, sengaon, aundha nagnath, and basmat.



**Objectives:**

1. To study of Tahsilwise Density of Population in Hingoli District 2001.
2. To study of Tahsilwise Density of Population in Hingoli District 2011.

**Source of data:**

For the period 2001-2011 The data collected from various secondary sources. The data is assembled from secondary sources were processed and presented by statistical and cartographic techniques not only basis of secondary data but with the help of various statistical and cartographic methods and techniques.

Secondary data from socio economic review district census handbooks gazetteers density of population present research work author has been used the following formula to calculate different aspect.
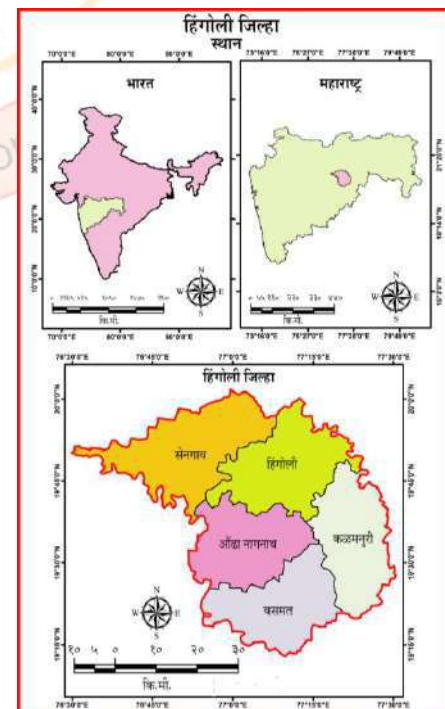
$$Density\ of\ population = \frac{Total\ population}{Total\ Area\ Sq\ km}$$

**Explanation:**

Table No. 1.1 General condition of the population shows by density of population. Crude density means a simple Arithmetic Ratio which is computed by dividing total population by total Geographical area the crude density of population in Hingoli District was 175 persons per square kilometers, while it was 210 persons per sq. km in 2001-2011 and in year 2011 The highest density of population was recorded in Basmat (212) Tahsil and the lowest density of population was found in Hingoli (149) Tahsil during the period 2001. in while 190 persons in kalamnuri tahsil. The density of population was found in Audha Nagnath (182) and sengaon (150) Tahsil during the period 2001. The highest density of population was Recorded in Bamat (244) Tahsil and the lowest density of population was found in Hingoli (193) tahsils in the period 2011. While (222) in kalamnuri 217 Aundha nagnath and 182 persons persons per sq km in sengaon Tahsil during the period in 2011.

**Table No 1.1 Population, Area, Density in Hingoli District**

| Name of Tahsil | 2001 | | | 2011 | | |
|---|---|---|---|---|---|---|
| | Population | Area in sq. km | Density | Population | Area in sq km | Density |
| Hingoli | 141822 | 953 | 149 | 184443 | 953 | 193 |
| Kalamnuri | 176760 | 931 | 190 | 206775 | 931 | 222 |
| Sengaon | 169247 | 1124 | 150 | 204122 | 1124 | 182 |
| Aundha Nagnath | 152178 | 835 | 182 | 181148 | 835 | 217 |
| Basmat | 193123 | 912 | 212 | 222124 | 912 | 244 |
| Hingoli District | 833130 | 4755 | 175 | 998612 | 4755 | 210 |

*Source :Socio-Economic Reviews & District Statistical abstracts of Hingoli District.*

**Graph No A**                                   **Graph No B**
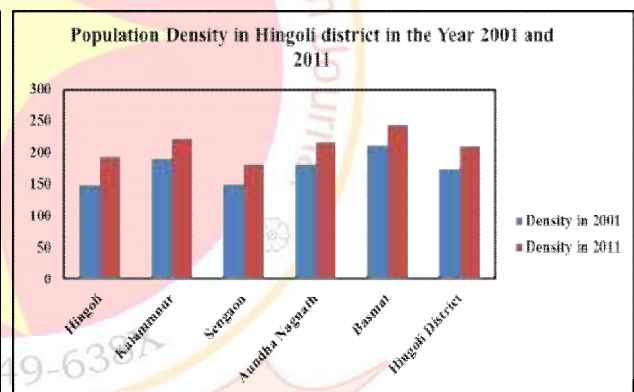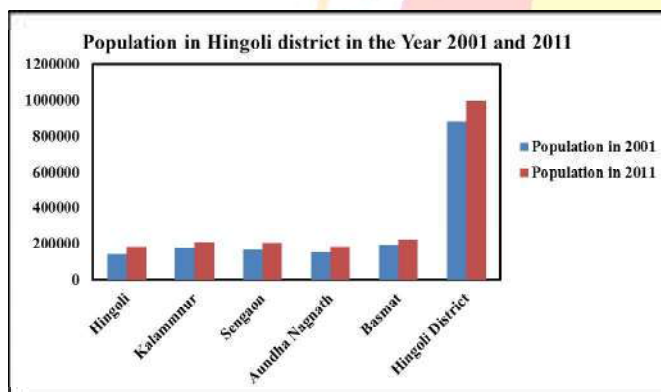


**Conclusion:**

In the year 2001-2011 density of population in Hingoli District density of population has increased in All Tahsil in Hingoli District during the period 2001 and 2011. The higest density of population was recorded in basmath tahsil in the during period 2001 and 2011. Because a higher density of population will also imply greater economic Activities and oblivious urge and improved standard of living a greater struggle for existence and contentions competition. The lowest density of population was found in Hingoli Tahsil in the during 2001 to 2011.

**References:**

1. Chandna, R.C. and Sidhu, M. S. (1980) : "Introduction to Population Geography", Kalyani Publishers, New Delhi.
2. Chandna, R. C. (2001) : " Geography of Population", Kalyani Publishers, New Delhi.
3. Anjana, Desai (1985) : "Spatial Aspects of Settlement Patterns", A Study of the Narmada Command Area of Maheshana District, Gujarat, Concept Publishing Company, New Delhi, P. 43.
4. Clarke, J. I. (1971) : " Population Geography and Developing Countries", Pergamon Press, Oxford.
5. Ritchard J. M (1974 : " Population Geography", J. M. Dent and Sons Ltd. London. Pp. 1-2.
6. Socio-Economic Reviews & District Statistical abstracts of Hingoli District 2010 and 2013.

# The Role of Forest Labour Co-Operative Society in Study Region (1948 -1956)

**Dr. A. K. Hange**
Assit. Profesor,
Shivaji college, Renapur,
Ta. Renapur, Dist. Latur.

**Mr. Vitthal M. Patil**
Ph.D. Research Student,
Mahtma Basweshwar Mahvidhyalya,
Latur.

## Introduction:

India is considered to be an Anthropological laboratory because of its ethnic, racial, regional, religious & linguistic diversities. It has always attracted the attention of the world as being one of the oldest civilizations with kaleidoscopic variety of rich cultural heritage.

Adivasi Communities all over the world have very closely associated with forests. They are still depending on forest for a major part of their means of livelihood and have cultural links with forest. Deforestation and increasing restrictions imposed upon the uses of forest resources by the government have adversely affected the lives of tribal communities. This has led to different conflicts and has happened also in the state of Maharashtra and a brief review of these events is attempted here.

Initially, the subject 'Forest' was included in the seventh schedule of provincial legislative list referred to in Section 100 of the Government of India Act, 1935. The administration of the Forests in the then Bombay Province was entirely under the control of the Provincial Government Act and was dealt with the Agriculture and Forest Department of the Secretariat. The subject has been included in the concurrent list in 1976, as per $42^{nd}$ amendment to the Constitution of India. The subject is now being dealt with the Ministry of Environment and Forests in the Government of India and by Revenue and Forest Department of the Government of Maharashtra.

Being forest as a main abode, these tribals once upon a time were called **'Jungalache Raje' (The Kings of Forest).** Therefore aptly the considerable proportion of tribal live in forest areas, so that the manner in which forest resources are exploited has a great deal of bearing on their welfare and matter of concern to stop their exploitation through middleman, 11 Forest Labour Co-operative Societies were established and necessary, assistance and guidance was provided during 1947 to 1948.

## Objectives of the Study:

1. To study the concept of Forest Labour Co-operative Society.
2. To study the history of Forest Labour Co-operative Society in study region.
3. To study the contribution of Forest Labour Co-operative Society in study region.

## Methodology:

The study is mainly based on secondary data and information collected from books, Government Report, Government Letter etc.

## Study region:

Chandgad taluka is situated in the southern most part of Kolhapur district. It is one of the 12 talukas of Kolhapur district. Chandgad was a part of Belgaum administration in the Bombay Presidency. It was transferred to Kolhapur in 1958(census 1991) after the reorganization of Maharashtra state in $1^{St}$ May, 1960 Chandgad taluka was included in Kolhapur district.

Chandgad taluka has area of 952.20 sq.km. and one of the second largest talukas of Kolhapur district after Shahuwadi. It is situated $15^0$ 45' 16" North Latitude to $16^0$ 03' 21"North Latitude and $74^0$ 01' 12" East Longitude to $74^0$ 27' 38" East Longitude. The height of the taluka above mean sea level is 800 mtr.

This part of Maharashtra has very good summer with temperature rising of maximum $35^0$-$36^{0c}$ you can see large number of cashew nut tree plantation here; climate is cool and fantastic like Mahabaleswar. So it is called 'prati-mahabaleswar,'swapnwel point, kille Pargad, Kalanadigad, Gandharvgad Mahipalgad, Ravalnath temple, Vaijnath temple (a worshipping place of people of study region) are the famous tourist spots in Chandgad taluka.

Rice, Potato, Sweet potato, Sugarcane, Cashew nuts, Ragi are the major crops in study region. The surrounding of Chandgad taluka is having biodiversity. Recently the study region has been declared as 'world heritage' by UNESCO. Variety of new species is found in study region. Ghataprabha and Tamraparniare the biggest rivers of Chandgad taluka, so many dams are constructed in the basin of both rivers. Major Dam in Chandgad taluka is Jangamhatti.

The major geographical border touched with Karnataka state. Chandgad taluka is surrounded by Ajara and Gadhinglaj taluka of Kolhapur district. Sawantwadi taluka of Sindhudurg district of Maharashtra state lies in the west while Belgaum and Hukkeri talukas of Belgaum district of Karnataka lies in the south and south east.
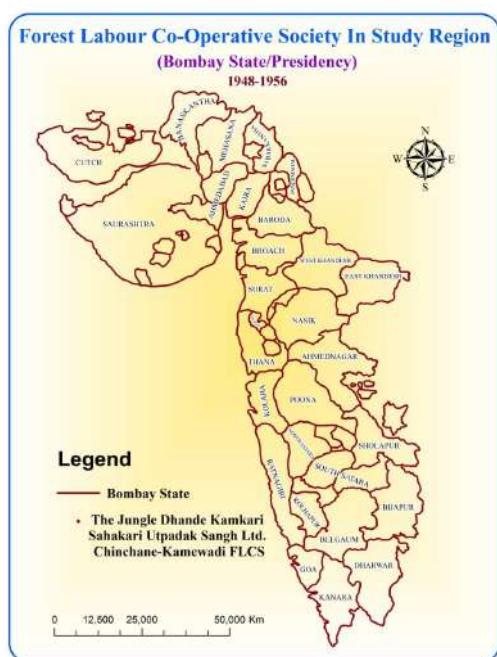
Map No.1                                    Map No.2 Present location map of the study region
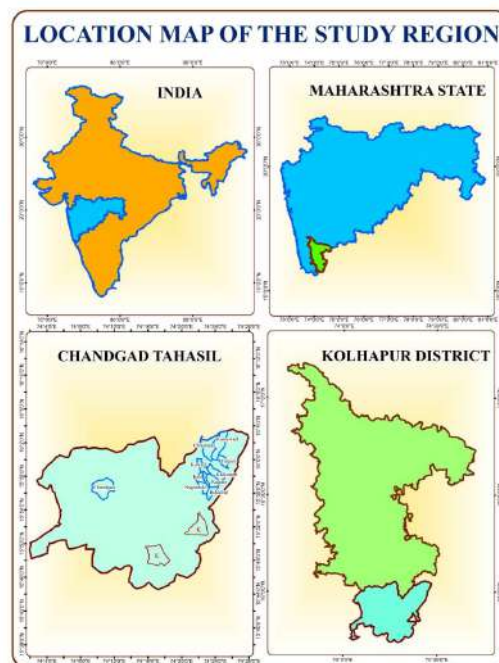




## Concept of Forest Labour Co-operative Society:

**"Forest Labour Cooperative Society" means,** 'A society which undertakes collection of minor forest products and other forest products, exploitation of forest coupes and other incidental operations, through its members and make arrangement for marketing of such products.' The introduction of the forest labour co-operative societies is a unique achievement of the Government. This system has eradicated the ruthless exploitation of the Adiwasis and other forest labourers by the forest contractors and has greatly improved their living conditions. In short, the introduction of co-operation in forestry has brought about a great social change amongst the most backward and uncivilized section of the society.

## History of Forest Labour Co-operative Society in study region:

In the year 1947, the first ever experiment made for organization of forest labour societies the act of government has proved encouraging and the movement is being gradually extended over all districts of the state. The main objective of these societies is to ameliorate the conditions of the Adiwasis whose labour is exploited by forest contractors for their own gain. The aim of society was not only at giving the Adiwasis full remuneration for the labour put in by them, but also to train them in business affairs. The societies are sponsored by social service organizations which are engaged in improving social and economic conditions of the forest dwellers. Steps taken to ameliorate the conditions of the Adiwasis through the organization of Forest Labourers' Societies deserve special mention. The Adiwasis who have been working under the Forest Contractors were entitled only to a minimum wage for work in the Forests. The object underlying the scheme is to give the Adiwasis full remuneration for the work they do during the season without fear of being cheated and enable them to earn profits which have in the past been going into the packets of the contractors, to end the interference of middlemen in the regular transactions of Forest labour co-operative societies. The establishment of forest societies on the basis of Co-operative was necessary. As a result steps were undertaken to organize Adiwasis on a Co-operative basis, 11 forest Labourers' Societies were formed 3 in Thana, 4 in Kolaba, 3 in Nasik and 1 in Belgaum (South Division).

Late pt. Jawaharlal Neharu, the first Prime Minister of Independent India has taken the note of most improved financial status of Forest Labour Society, 'The Jungal Dhande Kamkari Sahakari Kamkari Sangh Ltd, Chinchane - Kamewadi of Belgaum (South Division) for the society having the largest profit. This fact is mentioned in the novel 'The Aakrosh' by the late Bhimrao Ghasti the winner of Presidential Medal.

In term of allotment of coups negotiation has been conducted by Late. Ningappa Laxman Gunjagi, The secretary of 'The Jungal Dhande Kamkari Sahakari Sangh Ltd. Chinchane - Kamewadi of Belgaum'which is one of the Forest Labour Co-operative Societies in Study region.

While addressing the conference on Forest Labour Co-operative Societies at Mumbai, Shri B.G. Kher who was the then premier (Chief Minister) of Bombay Province announced at a conference of the Adiwasis held on April 1947 at Mahalaxmi hall in the Thana District, a scheme to organize Forest Labourers' Co-operative Societies with the active assistance of social workers and to allot coupes to such Societies on Reasonable terms as a part of a comprehensive programme for alround development of the Adiwasis. This

was how the Forest Labourers' Co-operative Societies Movement was inititated in the Bombay State. Therefore, the popular Government came into power in 1946. It reviewed the situation and came to a decision that for the upliftment of the Adiwasis. it is necessary to do away with the agency of contractors i.e middlemen and in its place organize the forest workers into cooperative societies for working the coupes on contract basis. This could be expected to establish a direct relationship between the Government on the one hand and the Adiwasis on the other. Shri B. G. Kher who was then the premier of the Bombay Province, announced this policy of the Government to organize the forest workers into cooperative societies at a conference of the Adiwasis held on 5th April 1947, at Mahalaxmi hall in Thana district. It is seen that circular is served upon The Chairman'The Jungal Dhande Kamkari Sahakari Sangh Ltd. Chinchane - Kamewadi of Belgaum', the Society in a study region to attend the meeting and send their representations with tribal crafts at Mahalaxmi hall Mumbai. This was how the forest worker's cooperative movement got initiated for the first time in the old Bombay Presidency.

**The contribution of Forest Labour Co operative Society in study region:**

The social service organisations, working amongst the inhabitants of the forests and sponsoring their societies are expected to play an increasingly important part in the development of this movement. No coupe is allotted to a society unless it is sponsored by such a recognised social service institution. They are responsible to see that the working of these societies is conducted on proper guide lines.

The Sanchalak of Sarvodaya Kendras as moniterlng agency, who can sponsor the forest labour co-operative societies within their respective areas. In study region, the name of the Social Service organisations and the number of societies sponsored by study region during the year.

**Table No. 1**

| Sr. No. | Name of the social service Organization | No. of societies sponsored |
|---------|-----------------------------------------|----------------------------|
| 1. | Sarvodaya Kendra , Narashinhpur | 5 |

Information regarding forest labour co-operative societies in Bombay State within the study region is as follows:

**Table No. 2: Belgaum District Jungle Dhande Kamgar Sahakari Utpadak Sangh, Ltd, Chinchane - Kamewadi**

| Sr. no. | Year | Name of the spon soring Agency | Name of the chief social worker | Date of regis tration | Audit classifi- Cation | No. of members | Net profit / loss |
|---------|------|-------------------------------|--------------------------------|----------------------|------------------------|----------------|-------------------|
| 1. | 1949-50 | Sanchal Sarvodaya Kendra, narsinhapur. | Shri. Shrirang kamat | 17/01/1948 | A | 86 | +12,073/- |
| 2. | 1950-51 | -II- | -II- | -II- | B | 86 | +17,727/- |
| 3. | 1951-52 | -II- | Shri. Jaydevrao Kulkarni | -II- | B | 110 | +56,763/- |
| 4. | 1952-53 | -II- | -II- | -II- | B | 151 | +49,350/- |
| 5. | 1953-54 | -II- | -II- | -II- | B | 153 | +55,420/- |
| 6. | 1954-55 | | | | B | 355 | +65,510/- |
| 7. | 1955-56 | -II- | -II- | -II- | C | 94 | +78,501/- |

'The Chinchane - Kamewadi Forest Labour Co-operative Society' took private coupes also for extraction at moderate prices & the large portion of the Profit is accountable to such coup. The contribution of FLC'S in study region is as under:

1. Tree plantation   2. Medical aid   3. Welfare work   4. Social education

**Suggestion:**

1. To bring the financial stability among the tribals in study region and avoid the ongoing deforestation, The Jungle Dhande Kamkari Utpadak Sangh Limited Chinchane Kamewadi of 1948 has to be revived by the initiative of department of co- operation of government of Maharashtra.
2. To execute the various development schemes in study region awareness compaign should be under taken. Because may it be any scheme without participation of local tribal it will be merely paper work.
3. The study region is one of the largest hub of natural flora isnd fauna and the region has declared as world heritage, it requires to begin Cancer Center based on naturopathy
4. Being the area abundantly found with titaniferous magnetite, the area is ennched with cashew production hence, cashew processing mills should be opened in study region.

5. Once upon a time the study region was popularly known for the production of sandalwood which is one of the important commercial production now a day, bringing a awareness among the local tribals, it is needed to set up a "sandalwood conservatory."

6. The number of peacocks are be found in the study region, as peacocks is a national bird, the study region should declare as "National Bird Sanctuary for peacocks Chinchane Kamewadi" for the preservation of national flora founa.

7. In a study region, number of valuable mineral most importantly sand which is used for construction work is emensly drenched. Now a day to preserve and protect the environmental balance in study region, the review the FLC'S it should be nominated as nodal agency.

**Summary:**

The Forest Labour Co-operative Society was started in study region with a view mainly to ameliorate the conditions of the Adiwasis whose labour was exploited by the forest contractors for their own benefit. This scheme to organise Co-operative Societies of the Adiwasis with the help of social workers.As a part of a comprehensive programme for the all round development of the Adiwasis in study region.

**References:**

1. Kulkarni, S. K, (2015), 'Co-operative Development', Phadake Prakashan, Kolhapur.
2. Mohite, Y. J, 'The Co-operative Movement in Maharashtra State A Reappraisal', Printed at the Govt. Central Press, Bombay.
3. Muranjan, S. W, (June 1974 V 16 N 2), 'Exploitation of Forests through Forest Labour Co- operatives in Maharashtra', Arth Vijnana.
4. Chavan, S. (1961), 'Jungal Kamgar Chalval Anubhav va KahiVichar', Prakashak
5. Natavadkar, J. G, adhyksh, samnvay samiti Jungal Kamgar Sangh, Dhule.
6. Gare, G. M, (1984), 'Aadivasi Vikasachya Vividh Yojana', Maharashtra Shasan, Aadivasi Sanshodhan v Prashikshan Sanstha, Pune.
7. Nargolkar Kusum v Nargolkar Vasant, (1955), 'Jungalche Raje', MouniVidhyapeeth Prakashak, Kolhapur.
8. Annual Administration Report, Backward Class Department, (1954-55, 1955-56), Government of Bombay, Bombay.
9. Annual Administration Report on the Working of the Co-operative Societies for the Year (1947-48), (1949-50 Volume – I) (Text & Appendix), Government Central Press, Bombay.
10. Co-operative Societies in Maharashtra State Poona, (1960), Government of Maharashtra, Government Press Nagpur.
11. Report of the Commissioner for Scheduled Castes & Scheduled Tribes, Year 1955, 5[th]Report, By L. M. Shrikant.
12. Report of the Committee on Forests & Tribals in India, Dr.B.K. Roy Burman Committee, (September, 1982), Bhanage, N. P. Director- Tribal Research &Training Institute, Pune.
13. Report of the Special Committee to Study the Impact of Co-operative Movement on the Socio, Economic Conditions of Adiwasi, Tribal Research & Training Institute, Pune.
14. Report on the Working of the Backward Class Department For the Year (1947-48, 1948-49, 1949-50, 1950-51, (1951-52), (1952-53), (1953-54), (1955-56), (1958-59), Printedat the Yervada, Prison Press, Poona.
15. Sarvodaya Schemes in Bombay State 4th Annual Report for the Year ended the 31st March 1953, Printed at the Government Central Press, Bombay.
16. Sarvodaya Schemes in Bombay State 5th Annual Report for the Year ended the 31[st]March 1954, Printed at the Government Central Press, Bombay.
17. Towards A Co- operative Socialist Commonwealth, by Vaikunth L.Mehata, Published by Maharashtra State Co-operative Union, 9, bakehouse Lane, Fort, Bombay.

# Application of Agriculture Technology for Drought Prone Areas to the Development of Paranda Tahsil : A Case Study

**Prof. Dr. H. B. Rathod**
Principle & Research Guide,
Gramin Mahavidyalaya, Vasantnagar, Kotgyal
Tq. Mukhed Dist. Nanded (M.S.)-India

**Abhaykumar Vijay Dharashive**
Research Scholar
Shri Hawgiswami Mahavidyalaya,
Udgir Dist. Latur (M.S.) India.

## Introduction:

The Deccan plateau constitutes 50 percent of the Drought-prone area of the state. 12 percent of the population lives in drought prone area. Once in 5 years, deficient rainfall is reported. Severe drought conditions occur once every 8-9 years. The 1996 drought affected 7 districts and 266.75 Lakh people. The 1997 drought affected 17 districts. In 2001, droughts affected about 20,000 villages in 23 districts; 28.4 million people and 4.5 million hectares of crops in the State. Rainfall is considered as principle source of water. The success or failure of crops particularly under rain fed conditions is closely linked with the rainfall patterns. Frequent dry spells are common phenomena during the monsoon season. In rain fed agriculture, the adequacy of rainfall to meet the water requirements of crops and other consumptive and non-consumptive water needs is a basic requirement as well as highly application of agriculture mechanizations. Therefore, here an attempt has been made to examine the role of agriculture technology for the development of drought prone area.

**Keywords:** Agriculture Technology**,** Drought Prone level of agricultural technology and level of agricultural performances, irrigation etc**.**

## Objective:

To identify the various levels of agriculture technology and their performance in Drought Prone Area.

## Study Area:

Paranda tahasil is an administrative headquarter which is situated on 18°18′N to 18°30′N and 75°29′E to 75°48′E of Osmanabad district of Marathwada region in Maharashtra. Paranda is a major drought prone tahasil in Osmanabad district. The average annual rainfall is 367 mm and temperature is $27^0$C. Due to irrigation facility farmers are using agriculture technologies various.



Location Map of Paranda Block

## Methodology:

The present paper is based on the secondary data. The following methodology has been employed for the present paper.

1. **Levels of Agricultural Technology:**

For the computation of the levels of technology the equation evolved by Dutt and Sen Gupta (1969) which further modified by Jasbir Singh (1994) is employed here and composite index values have been derived. The equation is an under.

$$\text{Ite} = \frac{\text{Ie}}{\text{Ir}} + \frac{\text{Te}}{\text{Tr}} + \frac{\text{Toie}}{\text{Toir}} + \frac{\text{Poie}}{\text{Poir}} + \frac{\text{Fe}}{\text{Fr}} + \frac{\text{Pe}}{\text{Pr}} ...$$

Where,
Ite = implies the composite index of the level of agricultural technology.
I = means percentage of irrigated area to total cropped area.
T = abbreviates tractors per 1000 hectares of cultivated area.
Toi = means tractor operated implements per 1000 hectares cultivated area.
Poi = power operated implements 1000 hectares cultivated area.
F = stands for fertilizer consumption per 1000 hectares cultivated area.
P = means pesticide consumption per 1000 hectares cultivated area.
e and r subscripts symbolize respectively the Revenue circles and the entire region (Tahsil).

The above procedure is adopted to compute the index value of each Revenue circle. To sum up index value of all parameters then multiplied by 100 to derive the Degree of agricultural technology. The Index value of agriculture parameter is sum up multiplied by 100 to derive the degree of agriculture technology.

$$\text{Degree of agricultural technology} = \frac{\Sigma \text{LQs}}{\text{N}} * 100$$

Here, N specifies the number of parameters of agricultural technology.
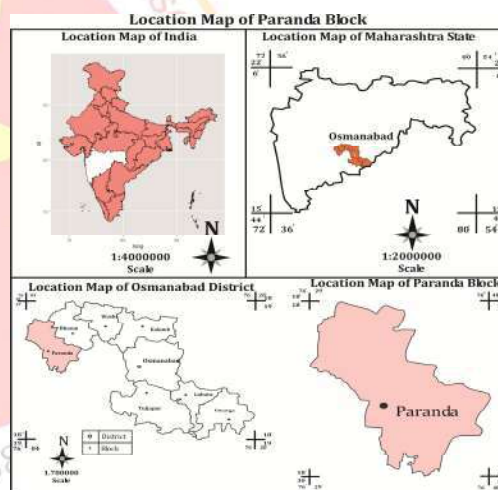
## 2. Level of Agricultural Performance:

$$VW = \frac{Yae}{Yar} + \frac{Pae}{Par} + \frac{Ybe}{Ybr} + \frac{Pbe}{Pbr} + \frac{Yce}{Ycr} + \frac{Pce}{Pcr} + \ N = \Sigma LQS/N \ ...$$

Where,

VW – denotes weighted composite index of regional inequality in agricultural Performance.

P - implies cropland occupancy of crop 'a' in kilograms per hectare. a, b and c subscripts denote crops considered, e and r subscripts denote Revenue Circle and Tahasil respectively.

N - is number of crops holding more than 5 per cent of the total cropped area.

LQS – means location quotients in the present study the crops like Jowar, Wheat, Maize, Bajra, Sugarcane etc. are selected as they have occupied cultivated area significantly.

The summed up location quotients (LQS) were divided by the number of crops considered in the Revenue circle and multiplied by 100 to obtain the weighted composite index for the level of agricultural performance.

Thus, weighted composite level of agricultural performance $N = \frac{\Sigma LQS}{N} * 100$

### Result Discussion:
### Irrigation Potential of Paranda Tahasil:

| Block | Total cultivable Area (ha.) | Total Irrigated Area (ha.) | Surface Irrigation (ha.) | Ground Water Irrigation (ha.) |
|---|---|---|---|---|
| Paranda | 47165 | 20179 | 18995 | 1184 |

*Source: Comprehensive District Agriculture Plan (2015), Agricultural Dept., District Osmanabad.*
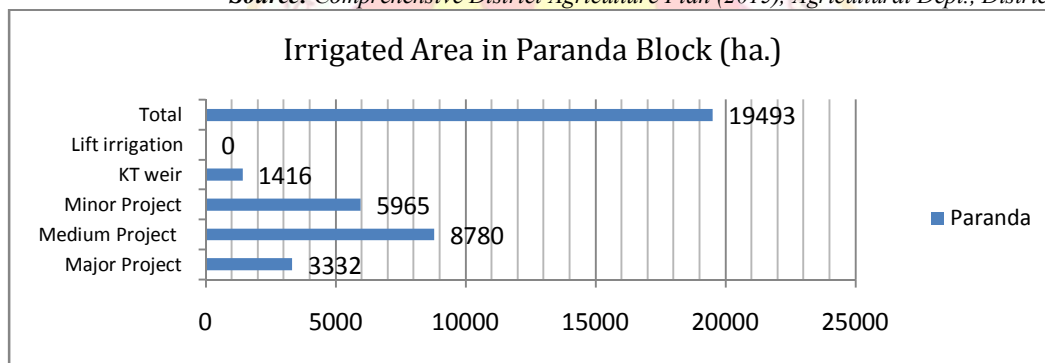


*Source: District Handbook (2015), Water Resource Department, District Osmanabad.*

**Graph 1.1**

As per graph no. 1.1 the distribution of irrigation in the tahasil, reveals the status. It also explains that irrigation through medium project is high and total irrigation covers 42 percent area in Paranda tahasil.

### Levels of Agricultural Technology in Paranda Tahasil (2015):

Regional inequalities in the level of agricultural technology are responsible for regional imbalances in the levels of agricultural performance. Therefore an attempt has been made to measure and maps the regional inequalities to identify backward and advanced areas in terms of agricultural technology which is responsible for agriculturally developed in Paranda Tahsil.

### Spatial variations in the levels of Agricultural Technology:

The study reveals that there are three different zones are formulated.

| | | |
|---|---|---|
| >100 | - | High |
| 65 t0 100 | | Medium |
| < 65 | | Low |

High level of Agricultural technology Region- above 100, Moderate level of Agricultural Technology Region- between 65 to 100 and Low level of Agricultural Technology Region bellow 65. High level of Agricultural technology Region- above 100 It includes Paranda tahasil which have recorded high 124.82(above 100 index value) level of Agricultural technology in year 1990.

As fallowed as in 2015 after the calculation of index values classified with the help of standard deviation method can conveniently be described into three different zones, High level of Agricultural technology Region- above 100, It includes Paranda tahasil which have recorded high 147 (above 100 index value) level of Agricultural technology in year 2015.

The study identifies three level of Agriculture Technology Region which is prepared as follows 1.High level of Agricultural Technology Region above 100, 2 Medium level of agricultural technology region 65 to 100. Paranda tahasil is recorded 124.82 in application of agricultural technology in the year 1990 and 147 in 2015 it is due to assured irrigation facilities i.e. canal irrigation substantial development of agro-industries like sugar industries are also plying vital role for promoting the use of new agricultural technology, high literacy rate of tahasil the forward looking attitude of farmers. Substantial income from sugarcane

farming and positive role of cooperative has regarding financial assistance to farmers. All these have led to high level of agricultural technology.

**Equation Ex.:**

$$Ite = \frac{Ie}{Ir} + \frac{Te}{Tr} + \frac{Toie}{Toir} + \frac{Poie}{Poir} + \frac{Fe}{Fr} + \frac{Pe}{Pr} = \frac{\Sigma LQs}{N} * 100$$

$$Ite = \frac{4.23}{1.97} + \frac{3.20}{1.51} + \frac{8.34}{11.14} + \frac{37.81}{44.90} + \frac{1.86}{1.63} + \frac{130.62}{131.93} + \frac{2.6}{3.3} = \frac{8.73}{7} * 100 = 124.82$$

**Level of Agricultural Performance in Paranda Tahasil (2015):**

Agricultural productivity is a measure of overall performance of an region, which is quite useful in planning for the development programmers of rural areas. The proportion of cultivable land per man has been decreased considerably during the recent past. The increase in crop production is must in India since the areal spread of crop land has almost reached its saturation limit (vidyanath, 1985). It needs, therefore to improve the agricultural productivity. Agricultural productivity is a function of various factors like physical, socio-economic technical and organizational. The level of agricultural productivity as a concept means the degree to which the economic, cultural, technical and organizational variables are also to exploit the biotic resources of the area for agricultural production (Singh, J. 1984).

**Regional pattern of the levels of Agricultural Performance:**

It is examined with the help of composite index values. It is clarified that the composite index values and the level of agricultural performance is positively correlated.

**High level of Performance Region** (above 600 index value), **Moderate level of Performance Region** (between 200 to 600 index value), **Low level of Performance Region** (below 200 index value). It includes Paranda,Tahasil. This has been characterized by assured supply of water mainly from Major, minor irrigation projects. As a result of this zone possesses high level of agricultural performance. In this zone grapevine cultivation is dominant and grape growers have adopted modern technology. This has led to high level of performance of agriculture. Framers accepted new techniques and different crops in deferent session so overall impact of performance is indicating to using agricultural technology. Therefore Paranda tahasil is a drought prone area but the efficiency and application of agricultural technology is positively correlated in removal of agriculture drought prone area on the earth.

**Relationship Between, levels of Agricultural Technology and levels of Agricultural Performance in Paranda Tahasil**

| Levels of Agricultural Technology | Level of Agricultural Performance | Block |
|---|---|---|
| High | High | Paranda |

*Source: Compile by Author.*

**Conclusion:**

Agricultural change cannot be understood separately from general process of development. The agro-technical determinants are playing vital role in agricultural development. There are different technologies used with varied intensities leading to variations in agricultural efficiency per unit of time and space. With insufficient supply of water to agriculture it is very essential to adopt new micro irrigation techniques and farmers of the Paranda tahasil change their old farming and adopted new as well as scientific methods of farming, so it is supported for the agricultural development of drought prone area.

The application of agricultural technology reveals that substantial income from sugarcane, grapevine, green gram, bajra farming with forward looking attitude of farmers where less of important role of co-operative societies, factories etc.. It also proves that the levels of agricultural Performance is high i.e. above 100 percent are confined in Paranda having assured supply of water, dominance of all crops and pomegranate cultivation. There is sufficient technology available for increasing productivity in drought prone.

**References:**

1. Dutta, A.k And Sen Gupta R (1969): An Assessment of Agricultural Development in West Bengal. The Journal of Tropical Geography, Vol. 128.
2. Vidyanath V. (1985) Agricultural Productivity in Andhra Pradesh, the National Geographical Journal of India, Vol. 31 No. 3.
3. Report on development of drought prone areas, National committee on the development of backward areas,September, 1981.
4. Tipe H.B. (2009) 'Geographical Analysis of Agricultural Technology in Solapur District', Unpublished Ph.D. Thesis submitted to Dr.B.A.M.University, Aurangabad.
5. Central ground Water Board, Ground Water Information, Osmanabad District, Maharashtra.
6. District socio-economic review District Osmanabad.
7. Comprehensive District Agriculture Plan, Osmanabad.

# Application of RS and GIS in Landuse and Landcover Mapping of Solapur City

**Dr. N. G. Mali**
Head and Research Guide,
Department of Geography (UG & PG),
M. B. Mahvidyalaya, Latur.

**Dr. D. N. Ligade**
Assistant Professor,
Department of Geography (UG & PG),
Walchand College of Arts and Science, Solapur

**Abstract:**
  *Landuse and Landcover is result of natural and manmade features covered on the Earth surface. There were some fundamental differences between Land use and land cover. Land use refers to the purpose the land serves (recreation, wildlife habitat or agriculture) which does not describe the surface cover on the ground i.e. a recreational land use could occur in a forest, scrubland, grasslands or on manicured lawns. And other hand, Land cover commonly defined as the vegetation (natural/planted) or manmade constructions which occur on the Earth surface. Landcover refers to the surface cover on the ground, whether vegetation, urban infrastructure, water, bare soil or other; it does not describe the use of land, and the use of land may be different for lands with the same cover type.*

  *As per getting information through sentile-2 image, in Solapur city highest area covered by agricultural land which is 64.11sq.km. and lowest area covered by water bodies (1.12 sq.km.). Eastern and middle part of Solapur city covered by built up area and south, west and north area by agricultural and waste land.*

**Keywords:** Remote Sensing, GIS, Landuse and Land Cover.

**Introduction**:

  Land cover is the observed physical properties cover on the earth's surface. The terms LU and LC is often used interchangeably, but each term has its own unique meaning. Land coverrefers to the characteristics and surface cover of Earth's Surface, as represented by natural elements like natural or planted vegetation, water, bare earth, impervious surface and other physical features of the land. Identification of land cover establishes the baseline information for activities(Hematic mapping and change detection analysis). Land use refers to the activity, economic purpose, intended use, and/or management strategy placed on the land cover types by land managers. When used together the phrase Land Use / Land Cover generally refersto the categorization or classification of human activities and natural elements on the landscape within a specific time frame based on established scientific and statistical methods of analysis of appropriate sourcematerials. Land cover is the physical material at the surface of the earth and Land use is the description of how people utilize the land for the socio-economic activity urban and agricultural land uses are two of the most commonly recognized highlevel classes of use. Remote Sensing data and techniques and Geographical Information System (GIS) provide efficient methods for analysis of land use and land cover aspects and tools for Land Use and Land Cover planning and modeling.

**Objectives:**

  The objective of present study is mapping of land use and land cover using Remote Sensing and Geographical Information System.

**Study area:**

Solapur city is a located south-western region of the Indian state of Maharashtra. It located on major highway, rail routes between Mumbai, Pune.

  Bangalore and Hyderabad. It covers 180.7sq.km. geographical area and 1.25 million population in 2018. The Solapur city of Maharashtra state is located between $17^O34'35"N$ to $17^O44'10"$ N latitudes and $75^O48'50"$ E to $75^O57'35"$ E longitudes. In the SOI toposheet, it covers parts of $47\frac{O}{13}$ and $47\frac{O}{14}$ (Fig No.1).

**Materials Used:**

  The Sentinel-2 data is used for the acquiring Landuse and Landcover classification of Solapur city dated by 01 February 2019.Sentinel-2 is multispectral data which covers 13 bands (443 nm to 2190 nm) in the visible, near infrared and short wave infrared of the spectrum. Following is detail information of the Data.

- Date Taken:- 01/02/2019
- ID:-1C_T43QEV_A009955
- Tile No:- 43 QEV
- Platform Sentinel:- 2B



LOCATION MAP OF STUDY REGION
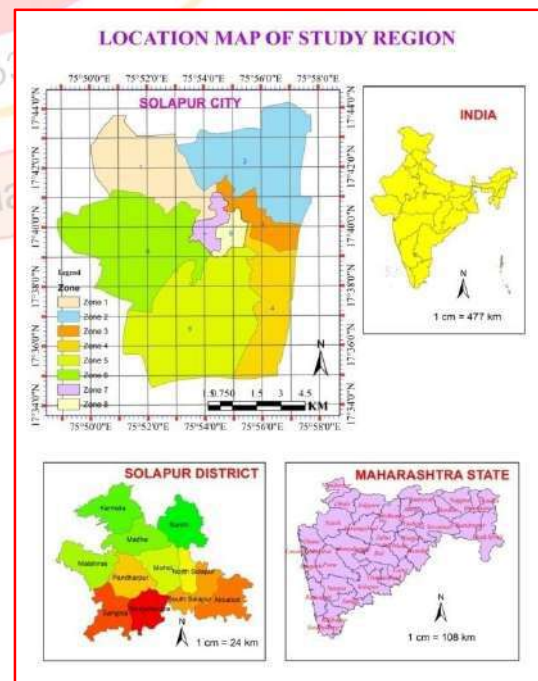
- Orbit No:- 62
- Resolution:- 10, 20 and 60 meter.
- Band 2(Blue), Band 3(Green), Band 4(Red): Resolution 10m.

The survey of India (SOI) toposheets $47\frac{O}{13}$ and $47\frac{O}{14}$ of 1:50000 scale to study landuse and landcover and also for field check and ground truth verification.

**Methodology:**

Landuse/Landcover mapping is carried out with the help of Sentile-2 satellite image. The supervised classification and ground truth verification method used for the preparation of landuse and landcover map. Various features are identified and distinguished using interpretations key such tone, texture, size, shape and association are used to interpret landuse pattern. The Saga Software is used for image processing such as image rectification and Q GIS software is used to prepare land use and land cover map and to calculate the area under various features.

Toposheet ⟶ Georeference ⟶ Satellite Image ⟶
Rectification ⟶ Clipping ⟶ Supervised Classification ⟶
Field check ⟶ Landuse and Land cover Map
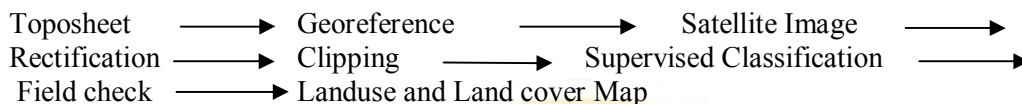
**Fig No.2 Flow diagram of Workflow**

**Explanation:**

Land use and Land cover is important component in understanding the human activity with the environment and thus it is necessary to simulate changes. Lanuse refers to man's activities and the varied uses which are carried on over land and land cover refers to natural vegetation, water bodies, rock/soil, artificial cover and others noticed on the land (NRSA, 1989).

In Solapur city most of the land is under agricultural land which includes, Jawor, wheat, vegetable, cotton and other cash crops. Built up area includes settlement and transport including (Road and Rail). Forest and water bodies area covers only 1.79 and 1.12 respectively. In water body it includes Nala, lake and other streams. In Study region, built up area covered in the middle part of the map. Fig No.4 shows the detail information of Landuse and Landcover in Solapur city.

Fig No.3 Image Classification
**Fig No.4 Landuse and Landcover Classification using Sentile-2 image**
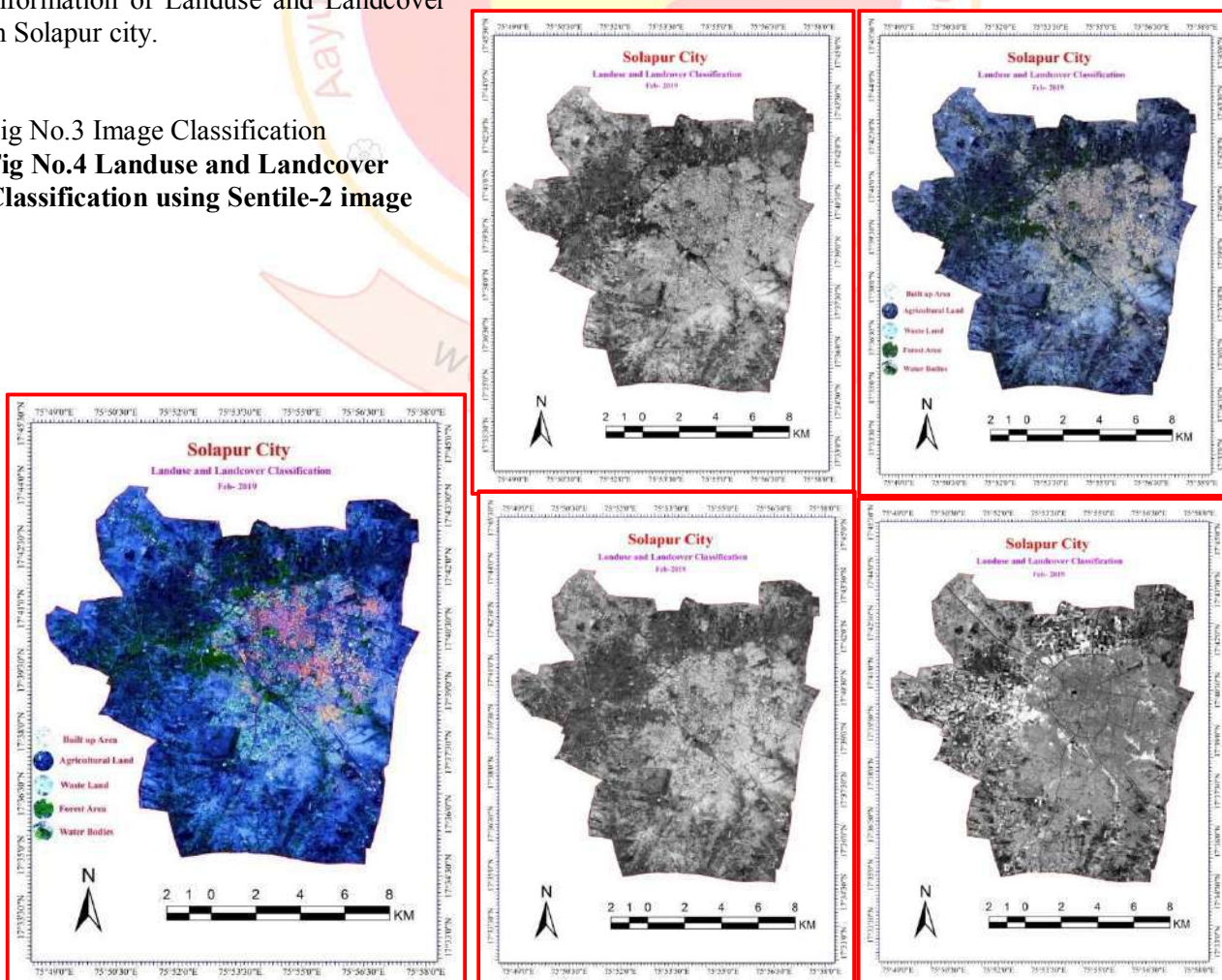
**Table No.1 Land Use and Land Cover Classification (Sentile-2)**

| Sr. No. | Land use Land Cover | Area (sq.km.) |
|---------|---------------------|---------------|
| 1 | Built Up Area | 63.04 |
| 2 | Waste land | 50.68 |
| 3 | Agricultural Crop Land | 64.07 |
| 4 | Forest Land | 1.79 |
| 5 | Water Bodies | 1.12 |
|   | Total | 180.7 |

*Source: Sentile-2 Satellite Image.*

**Conclusion:**

Optimal utilization of land resources is essential for sustainable development in any region. Landuse describes how a parcel of land is used such as for agricultural, settlements/industry, where as landcover refers to the material such as vegetation, rocks or water bodies that are present on the Earth surface. In Solapur city, western part of the region covered by the cash crops i.e. sugarcane and southern part by jawor, sugarcane and other crops. Agricultural land is useful for the production of various crops. Around the 64 percent area of agriculture land witnessed the maximum people of this region also work in agricultural sector.So, GIS and RS techniques are effective tool in landuse and landcover mapping.

**References:**

1. AgarwalC.S.andP.K.Grag, (2000), "Remote Sensing in Natural Resources Monitoring and management", Wheeler publishing, New-Delhi, India.
2. Burrough, P.A., (1986). Principles of Geographic Information Systems for land Resources Assessment, Oxford: Clarendon Press.
3. E.F Lambin, M.D.A. Rounsevell, and H.J.Geist, (2000), "Are agricultural land-use Models able to predict changesin land use intensity", Agriculture, Ecosystems and Environment, Vol 82, PP.321– 331.
4. FeiYuan, Kali E Sawaya,. Brian C. Loeffelholz, Marvin E. Bauer (2005), "Land cover classification and Changeanalysis of the Twin Cities (Minnesota) Metropolitan Area", By multitemporal Landsat remote Sensing, RemoteSensing of Environment, Vol. 99, August, pp. 317-327.
5. http//www.nrsc.gov.in
6. Ligade D.N. &Dande V.C. (2018) "Estimation of Landuse and Landcover mapping Remote Sensing and GIS in Donaj Village", Historicity International Research Journal, Special Issue, Pp.110-115
7. Lillesand, T.M. Kiefer, R.W. and Chipman, J.W. (2007). Remote Sensing and ImageInterpretation. (5th ed.). New Delhi: Wiley India Pvt. Ltd.
8. O.S. Olokeogun, O.F.Iyiola and K.Iyiola: "Application of Remote Sensing and GIS in land use/land coverMapping and change detection in shasha forest reserve", Nigeria, IAPRSSIS, Vol.XL-8, Dec.2014
9. S.V.Hwan, Dr.Eun-Kyung JO: "Survey of Land use and Land cover change detection using Remote Sensing" SSRG-IJGGS Vol.I, Issue.II, 2014.

# Impact of Climate Change on Indian Agriculture and their Remedies

**Nitin P. Patil**
Asstt. Prof. & I/C Head,
Dept. of Water & Land Management,
Dr. B.A.M.U., Sub-campus, Osmanabad

**Pratima P. Patil**
Asstt. Teacher,
Shri Swami Samarth Junior College,
Yeoti, Ta. & Dist. Osmanabad

**Introduction:**

Agriculture is the backbone of Indian economy which in turn relies on the monsoon season. Climate change is defined as change in climate over time, whether due to natural variability or as a result of human activity. Adaptive capacity is the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, to cope with the consequences. India is home to extraordinary variety of climatic regions, ranging from tropical in the south to temperate and alpine in the Himalayan north, where elevated regions receive sustained winter snowfall. The nation's climate is strongly influenced by the Himalayas and the Thar Desert. Four major climatic groupings are defined on the basis of temperature and precipitation. Rising global temperature is not only causing climate change but also contributing to the irregular rainfall patterns.

Climate change is the most important global environmental challenge facing humanity with implications for natural ecosystems, agriculture &health . The perusal of general circulation models (GCM s) on climate change indicate that rising levels of greenhouse gases (GHGs) are likely to increase the global average surface temperature by 1.5-4.5°C over the next 100 years. The difference of average temperature between the last ice age and present climate is 6°C. This will raise sea-levels, shift climate zones pole ward, decrease soil moisture and storms. Uneven rainfall patterns, increased temperature, elevated $CO_2$ content in the atmosphere are important climatic parameters which affect the crop production. Global warming is predicted to affect agricultural production. It is predicted that increase in temperature will show overall negative effect on agriculture in the world.

**Impacts:**

**Table 1. Rice yield in MT (Source-USDA, Foreign Agricultural Service)**

| Country | 1999-2000 | 2000-2001 | 2001-2002 | 2002-2003 | 2003-2004 |
|---|---|---|---|---|---|
| India | 89, 700 | 84, 871 | 91, 600 | 80, 000 | 87, 220 |
| China | 138, 936 | 131, 536 | 124, 320 | 123, 200 | 119, 187 |
| Bangladesh | 23, 066 | 25, 086 | 25, 500 | 26, 000 | 28, 230 |
| Australia | 787 | 1, 259 | 930 | 965 | 895 |
| World Total | 409, 200 | 397, 354 | 396, 588 | 394, 407 | 390,270 |

**Table 2. Year wise average yield of wheat and rice at all level (Kgs per hectare) (Source-USDA, Foreign Agricultural Service)**

| Year | Wheat | Rice |
|---|---|---|
| 1999-2000 | 2778 | 1986 |
| 2000-2001 | 2708 | 1901 |
| 2001-2002 | 2762 | 2079 |
| 2002-2003 | 2610 | 1744 |
| 2003-2004 | 2713 | 2077 |

In India the direct impact of climate change would be effect plant growth, development and yield due to change in rainfall and temperature.Increase in temperature would reduce crop duration, increase crop respiration rate change the pattern of pest attack and new equilibrium between crop and pest hasten mineralization in soil and decrease fertilization use efficiency. All these could considerably affect crop yield for long run. More detailed analysis of rice yields by the International Rice Research Institute forecast 20% reduction in yields over the region per degree celsius of temperature rise. Rice becomes sterile if exposed to temperatures above 35 degrees for more than one hour during flowering and consequently produces no grain. The rising temperatures will adversely affect the world's food production and India would be the hardest hit, according to the analysis by the Universal Ecological Fund (FEU-US). The crop yield in India, the second largest world producer of rice and wheat, would fall up to 30 percent by the end of this decade. Carbon dioxide ($CO_2$) is the most important anthropogenic gas the growth-rate of which was larger during the last 10 years at the rate of 1.9 ppm per year. At present, the amount of $CO_2$ in the atmosphere is 387 ppm. In

comparison, the amount of oxygen is 210, 000 ppm. Some other gases that contribute to warming include methane, nitrous oxide and chlorofluorocarbons. The GHGs once emitted stay in the atmosphere for decades.

Some predict positive impacts on agriculture from climate change like increased temperatures and higher carbon dioxide levels. Increased concentrations of $CO_2$ may boost crop productivity, only where moisture is not a constraint. Higher levels of $CO_2$ can stimulate photosynthesis in certain plants (30-100 per cent). Experimental observations confirm that when plants absorb more carbon grow bigger and more quickly. This is particularly true for C3 plants (so called because the product of their first biochemical reactions during photosynthesis has three carbon atoms). Increased $CO_2$ tends to suppress photo-respiration in these plants, making them more water-efficient. Moreover, the protein content of the grain decreases under combined increases of temperature and $CO_2$. For rice, the amylase content of the grain-a major determinant of cooking quality-is increased under elevated $CO_2$. With wheat, elevated $CO_2$ reduces the protein content of grain and flour by 9-13%. Concentrations of Fe and Zn which are important for human nutrition would be lower.

The agricultural sector is a driving force in the GHG emissions and land use effects. The three major causes of the increase in GHGs observed over the past 250 years have been fossil fuels, land use and agriculture. The agricultural processes (rice cultivation, enteric fermentation in cattle) comprise 54% of methane emissions, 80% of nitrous oxide emissions and major percentage of carbon dioxide.

The Intergovernmental Panel on Climate Change (**IPCC**), an international body of over 3000 experts, indicates that rice and wheat production of India will drop significantly because of climate change. A 1.5°C rise and two mm increase in precipitation could result in a decline in rice yields by 3-15 per cent. In its Fourth Assessment Report (AR4), published in 2007, the IPCC projects that, without further action to reduce GHG emissions, the global average surface temperature is likely to rise by a further 1.8-4.0°C this century, and by up to 6.4°C in the worst case scenario. The ultimate impact of loss of food grain production would be to use hard currency to increase food imports. Food insecurity and malnutrition will affect the overall health status of millions of people, with implications for infant mortality in large number. Increased human interference in modern technology based agriculture has resulted in decrease in diversity at all levels in agro ecosystem.

The most serious climate change risk to the Indian economy and its people is the increased intensity, frequency and geographical coverage of drought. Higher temperatures, increased evapo-transpiration and decreased winter precipitation may bring about more droughts. The possibility of winter drought will increase in certain areas. Climate change is expected to increase the severity of flooding in many Indian river basins, especially those of the Godavari and Mahanadi along the eastern coast. The third most important risk is that of cyclonic storms, storm surge and coastal inundation. A sea surface temperature rise of 2-4°C, as anticipated in the Indian ocean over the century, is expected to induce a 10-20 percent increase in cyclone intensity (National Disaster Management Authority, Government of India). The 1999 Odisha super-cyclone killed more than 10, 000 people and devastated buildings across 10 coastal and 6 inland districts. This disaster was due to the combination of storm surge, cyclonic winds and coastal flooding. The cyclone dumped heavy torrential rain over southeast India, causing record breaking flooding in the low-lying areas. The storm surge was 26 feet (8 meters). struck the coast of Odisha, traveling up to 20 km inland. 17,110 km² (6,600 mi²) of crops were destroyed, and an additional 90 million trees were either uprooted or had snapped.

The climate change mitigation generally involves reductions in human emissions of GHGs which can be achieved by increasing the capacity of carbon sinks. Use of renewable energy and nuclear energy and expanding forests are the mitigating priorities. Prof. Sir Nicholas Stern in his review predicts that living conditions and livelihood opportunities of millions of people may be affected by climatic variability and hence biodiversity loss. Stern also forecasts that sea level rise could cause major displacement of people from coastal areas. Climate change demands an international response, based on a shared understanding of long term goals and agreement on frameworks for action.

**Effect of increasing Temperature:**

Rise in global temperature would affect the Indian agriculture. In India, 17% of the years during 1901-2010 were reported as drought years, which result into severe impacts on agriculture, water resources, food security, economy and social life in the country. Several factors which affect agricultural productivity are heat waves, heavy and prolonged precipitation, high temperature and excess cold. Varied nature of such weather events tends to affect the crop growth cycle and plant physiological processes. The variation in temperature and precipitation above threshold level may affect photosynthesis and transpiration in crops. A small rise in temperature (1 - 2 °C) especially in the seasonally dry tropical regions would decrease the crop yield. Decline in agricultural productivity leads to increase in food prices at all the levels. Hence, temperature could be one of the significant factors which results into greater instability in agriculture of India.

**Effect on Monsoon/rainfall:**

A 10-15% increase in monsoon precipitation in many regions, a simultaneous precipitation decline of 5-25% in drought-prone central India and a sharp decline in winter rainfall in northern India are also

projected. This implies changes in output of winter wheat and mustard crops in northwestern India. A decrease in number of rainy days (5-15 days on an average) is expected over much of India, along with an increase in heavy rainfall days in the monsoon season (Indian Institute of Tropical Meteorology, Ministry of Earth Sciences, Government of India). These changes are expected to increase the vulnerability of Indian agriculture. This is particularly important in India, where agriculture is highly sensitive to monsoon variability as 65% of the cropped area is rain-fed. Changes in temperature and precipitation could have a significant impact on more than 350 million people who are dependent on rain-fed agriculture. A significant increasing trend in rainfall was reported along West coast, North Andhra Pradesh and NW India while, significant decreasing trend was observed over parts of Gujrath, Madhya Pradesh, Kerala and North East India.

## Available Water

India is a large country with a diverse climate. Diverse seasons mean diverse crops and farming systems. There is a high dependency of agriculture on the monsoon rains and a close link exists between climate and water resources. Two thirds of the area is rain dependent.Agriculture of any kind is strongly influenced by the availability of water. Climate change will modify rainfall, evaporation, runoff and soil moisture storage. Changes in total seasonal precipitation or in its pattern of variability are both important. The occurrence of moisture stress during flowering, pollination and grain-filling is harmful to most crops and particularly so to corn, soybean, and wheat. Increased evaporation from the soil and accelerated transpiration in the plants themselves will cause moisture stress; as a result there will be a need to develop crop varieties with greater drought tolerance. The use of micro-irrigation methods for irrigating the crop is the best option to reduce the moisture stress and increase in yield.

## Pests and diseases

Conditions are more favorable for the proliferation of insect pests in warmer climates. Longer growing seasons will enable insects such as grasshopper to complete a greater number of reproductive cycles during the spring, summer, and autumn. Warmer winter temperatures may also allow larvae to winter over in areas where they are now limited by cold, thus causing greater infestation during the following crop season. Altered wind patterns may shift as the timing of development stages in both hosts and pests is altered. Live stocks diseases may be similarly affected. The possible increases in pest infestations may bring about greater use of chemical pesticides to control them, a situation that will require the further development and application of integrated pest management techniques.

## Sustainability and food security

Climate change can impact agricultural sustainability in two interrelated ways: first, diminishing the long-term ability of agro-ecosystems to provide food and fiber for the world's population; and second, by inducing shifts in agriculture regions that may encroach upon natural habitats, at the expense of floral and faunal diversity. Global warming may encourage the expansion of agricultural activities into regions now occupied by natural ecosystem such as forests, particularly at mid- and high-latitudes. Forced encroachments of this sort may thwart the process of natural selection of climatically-adapted native crops and other species.While the over-all, global impact of climate change on agricultural production may be small, regional vulnerabilities to food deficits may increases, due problems of distribution and marketing food to specific regions and group of people. For subsistence farmers and more so for people who now faces a shortage of food, lower yields may results not only in measurable economic losses but also in malnutrition and even famine. In general, the tropical regions for several reasons. On the biophysical side, temperature $C_3$ crops are likely to be more responsive to increasing levels of $CO_2$. Second, tropical crops are closer to their high temperature optima and experience high temperature stress, despite lower projected amounts of warming. Third, insects and diseases, already much more prevalent in warmer and more humid regions, may become even more widespread.

## Inferences

1. $Co_2$ and$CH_4$ are increasing.
2. Earth atmosphere system temperature and surface temperature is increasing
3. Extreme temperature increasing,more intense and longer droughts
4. Atmospheric water vapors content and frequency of heavy precipitation events is increasing.
6. Tropical cyclone intensity increasing.

## Mitigation Strategies:

Need to develop crops and varieties that fit into new cropping systems and seasons.   Need to develop varieties with changed duration and varieties for high temperature, drought, inland salinity and submergence tolerance. We also need to select crops and develop varieties that tolerate coastal salinity and seawater inundation and varieties which respond to high $CO_2$. Lastly, we need varieties with high fertiliser and radiation use efficiency.Stress should be given on the importance of germplasm. Wild and extant varieties have traits tolerant to high temperature, elevated $CO_2$ etc. These might have been discarded in the past due to

low yield potential but can be made use of today as parents for the breeding of tolerant varieties to climate change. There is a need to revisit gene banks with a view to search for unique traits required for climate change. In this search, indigenous knowledge and farmer's wisdom have immense value.

Better management practices hold the key to adaptation and mitigation. For example, there is raised-bed planting of wheat in the Indo-gangetic plains which entails 20-25% saving in irrigation water and is suitable for mechanical weeding, and results in reduced herbicide use. We also need better water management and nutrient management of rice paddies.

The Indian Council of Agricultural Research has in fact started the "National Initiative on Climate Resilient Agriculture" (NICRA). The objectives of the programme are to enhance the resilience of Indian agriculture to climatic variability and climate change through the development and application of improved production and risk management technologies. This programme has three components: strategic research, technology demonstration and capacity building. The strategic research will focus on crops, natural resource management, horticulture, livestock and fisheries and aspects of climatic resilience in the production systems of the northeastern region. The demonstration will be of existing management practices for enhancing resilience of crops/livestock to current climate variability in 100 most vulnerable districts. The capacity building will be of scientists and other stakeholders in climate resilient agricultural research and its application.

## Conclusions:

1. It is estimated that India needs 320 MT of food grains by the year 2025. For a country like India, sustainable agricultural development is essential not only to meet the food demands, but also for poverty reduction through economic growth by creating employment opportunities in non-agricultural rural sectors.
2. Plantation should be increasing on the foot of Himalaya, Sahyadri ranges, costal area and barren land. With reference to Gujarat forest area should increase from 9.5% to 20% in next decade or by 2020 AD.
3. For controlling methane emission from the paddy field, the appropriate water saving technology should be used instead of transplanting and submerged paddy cultivation method.
4. Shelter belts should be created near sea shore to check salinity and salt nuclei in atmosphere, which changes rainfall pattern.
5. The simulation results indicate that increasing temperature and decreasing solar radiation levels pose a serious threat in decreasing growth and yield of agricultural crops. Increasing $CO_2$ levels are expected to favor growth and increase crop yields and therefore, will be helpful in counteracting the adverse effects temperatures rise in future.
6. Implementation of watershed development programme, integrated nutrient management, integrated pest management, efficient water management practices like drip, sprinkler and micro-sprinkler systems and the conjunctive use of surface and groundwater resources is essential to cope up with the effects occurring from climate change.
7. Noteworthy interventions to reduce adverse impacts of climate change include:
   • Improvement in forecasting & early warning systems
   • Establishing hazard & vulnerability mapping
   • Augmenting public awareness
   • Creating community-based forest management and afforestation projects
   • Improvement in irrigation

## References:

1. Parikh, J K & Parikh, K (2002), Climate change: India's perceptions, positions, policies and possibilities, OECD, Paris.
2. Senapati, M.R. (2009),"Vulnerabilities to climate change", Kurukshetra, A Journal published by Ministry of Rural Development, Govt. of India.
3. Mendelssohn, Robert et al. (1994), "The impact of climate change on agriculture: A Ricardian Analysis," American Economic Review Vol 84, No4, pp 753-771.
4. Chang, J H (1987),"The Indian summer monsoon" Geographical Review 57(3):373-396.
5. Zickfeld, K et al. (2005), "Is the Indian summer monsoon stable against global change?" Geophysical Research Letters Vol 32, L 15707.
6. Gosain, A K et al. (2006), "Climate change impact assessment on hydrology of Indian river basins", Current Science Vol 90, No 3, 10 February 346-353.
7. Rosenzweig, C & Parry, M.L. (1994) "Potential impact of climate change on world food supply", Nature, 367 (6450), pp 133-138.
8. www.sternreview.org.uk

# Social Problems of Low Sex Ratio in India

**Mr. Vithal G. Chavan**
HOD. Dept. of Geography
Mahatma Phule College , Kingaon.
Tq. Ahmedpur Dist. Latur .

**Dr. Darshana Kanwate**
Dept. of Geography
Mahatma Phule College, Kingaon.
Tq. Ahemdpure Dist. Latur.

## Introduction:

All things being equal, women would outnumber men; the girl child is more likely to survive in infancy than the boy. But in India, according to a Youth in India report brought out by the ministry of statistics and programmer implementation, the sex ratio is declining steadily. From 939 women to 1,000 men in 2011 it is projected to fall to 898 by 2031. This should set off alarm bells in the government, civil society groups and the law. This ratio is man-made through selective sex determination with the aim of getting rid of the girl child, early death due to neglect and infanticide. But there is no reason why things cannot be set right.

The consequences of a falling sex ratio are already evident and none of it is good news. The shortage of women has led to a sharp rise in violence against them. This has led to a situation where, apart from the ingrained son preference, people don't want girls all the more as they feel that it is difficult to keep them safe. In a study done by the Centre for Social Research in Haryana, fear of violence is a cause for female feticide. Also the women who produce daughters face much more domestic violence which makes them complicit in getting rid of the girl child. The ugly social practice of polygamy has made a comeback in certain areas as well as forcible marriages of widows and purchasing of brides from poor areas. With the advances in technology, sex determination has become easier very early on in pregnancy with fatal consequences for the girl child.

The economic consequences are grave for this means that a huge proportion of the productive population is missing and also the lack of women impairs the ability of men to work. The declining sex ratio calls for much greater political will and the willingness to take the help of powerful organized entities like the clergy and of course civil society groups. The Sikh clergy took the lead earlier when it said that anyone found guilty of female feticide would be ex-communicated. This worked in favour of the girl child. The government has a master communicator in the form of the prime minister who has taken up the cause of girls in his Beti Padhao, Beti Bachao programmer. But, a stronger message would be in order – let the girl child be born and let her live up to her full potential.

The recently released final Census data for 2011 reveal two interesting facts relating to women in India, one good and the other mixed. The good news is that the rate of increase in literacy rate of females during 2001 to 2011, at 10.9 per cent, was nearly twice the 5.6 per cent in the case of males. There is substantial research showing gender equality, particularly in education and employment, to be contributing to economic growth. Therefore, it can be assumed that higher female literacy rates in India would eventually lead to their better employability and higher professional independence, thereby helping the cause of growth.

The mixed news has been that though the population growth rate in respect of males was lower at 17.1 per cent, when compared with 18.3 per cent for females — implying some correction in the overall sex ratio — the child sex ratio (for the age group from zero to six years) deteriorated over the decade, from 927 to 919 females for every 1000 males. The persistence of an adverse sex ratio — seen particularly in the children's age group — is mainly because of a high preference in Indian society for sons. Until that preference is addressed, the sex ratio would be difficult to change, despite concerted measures on the part of the Government. The reasons for high sex ratio (more males than females) have been examined empirically by many researchers. Lena Edlund, an economist at Columbia University, has shown that in addition to traditional factors, social mobility could also be a driving force behind the increasing sex ratio in India.

Gender imbalance in India is mainly caused because of strong cultural preference for son's .Such preference is very strong in the western, northern and north central regions of India.

## Aims and Objective:

A sincere and extensive effort was put under this study are.
1) To highlight exact problem of gender imbalance in India.
2) TO study sex -ratio for last hundred years in India.
3) To study various resins leading to gender imbalances.
4) To find out some conclusions of this study and give some suggestions.

## Hypothesis:

1) Sex -ratio improves with an important in female literacy rate.
2) Increase female workforce can improve the sex ratio.
3) There is a significant relation between sex ratio and cultural and social background.

**Database and Methodology**:
1) The study is based on secondary data only.
2) The study is based on data available in census of India reports

**Sex Ratio in India during Last Hundred Years:**

Gender equality is a core development objective in its own right. It is also smart economics. Greater gender equality can enhance productivity, improve development outcomes for the next generation, Sex ratio is used to describe the number of females per 1000 of males. Sex ratio is a valuable source for finding the population of women in India and what is the ratio of women to that of men in India. In the Population Census of 2011 it was revealed that the population ratio in India 2011 is 940 females per 1000 of males. The Sex Ratio 2011 shows an upward trend from the census 2001 data. Census 2001 revealed that there were 933 females to that of 1000 males. Since decades India has seen a decrease in the sex ratio 2011, but since the last two of the decades there has been in slight increase in the sex ratio. Since the last five decades the sex ratio has been moving around 930 of females to that of 1000 of males.

It was the highest in Mizoram at 971, closely followed by Meghalaya (970), while at the rock bottom was Haryana with 830 and Punjab with 846. At the district level, Lazuli and Spite in Himachal Pradesh had the highest sex ratio in the age group of 0-6 at 1,013, while in Twang (Arunachal Pradesh), it was 1,005. It was shamefully low in Jhajjar and Mahendragarh (Haryana) at 774 and 778. The census figures indicate an increase in sex ratio in 29 States and Union Territories, with women outnumbering men in Kerala. There were 1,084 women against 1,000 men in Kerala, followed by Pondicherry where the figure was 1038.Daman and Diu has a sex ratio of 618, next only to Dadra and Nagar Haveli at 775. Among the districts, Mahe (Pondicherry) has the highest sex ratio of 1,176, followed by Almora in Uttarakhand, where it is 1,142. In Daman, it is the lowest at 533, and in Leh of Ladakh, it is 583.

The three major States of Jammu and Kashmir, Bihar and Gujarat have shown a decline in the sex ratio compared with the figures of Census 2001, while 29 States and Union Territories have shown an increase. The decline in child sex ratio (0-6 years) from 945 in 1991 to 927 in 2001 and further to 914 females per 1.000 males in 2011—the lowest since independence—is cause for alarm, but also occasion for serious policy re-think. Over the last two decades, the

The major cause of the decrease of the female birth ratio in India is considered to be the violent treatments meted out to the girl child at the time of the birth. The Sex Ratio in India was almost normal during the phase of the years of independence, but thereafter it started showing gradual signs of decrease. Though the Sex Ratio in India has gone through commendable signs of improvement in the past 10 years, there are still some states where the sex ratio is still low and is a cause of concern for the NGO organizations. One of the states which is showing a decreasing trend in the population of women 2011 and is a cause of concern is Haryana. The state of Haryana has the lowest rate of sex ratio in India and the figure shows a number of 877 of females to that of 1000 of males.

There are also states such as Pondicherry and Kerala where the number of women is more than the number of men. Kerala houses a number of 1084 females to that of 1000 males. While Pondicherry and Kerala are the only two states where the number of female is more the number of men, there are also states in India like that of Karnataka, Andhra Pradesh and Maharashtra where the sex ratio 2011 is showing considerable signs of improvement. Some facts related to the Sex Ratio in India follows, the main cause of the decline of the sex ration in India is due to the biased attitude which is meted out to the women. The main cause of this gender bias is inadequate education. Pondicherry and Kerala houses the maximum number of female while the regions of Daman and Diu and Haryana have the lowest density of female population.

**Cause of low sex ratio in India**:

The major reason for this poor sex ratio is due to some of the below mentioned reasons:

i. Preference of male child over female.

ii. The role of education has a great influence on the sex ratio scenario of India. Child marriages are a common part of the Indian society.

iii. Majority of the places in India follow the patriarchal system. In India, males are considered to be the only bread earners.

iv. Due to female feticide, the sex ratio declines terribly. Maternal mortality also contributes to the declining sex ratio as most of the women die during the childbirth due to improper care and less facilities.

**Problems of Low sex Ratio:**

**1) Sex ratio, crime and growth:**

A high sex ratio can have many implications, including, for example, on crime. Jean Druze and Retake Khera, in a 2000 study, have concluded that murder rates in India are correlated with the female-male ratio; districts with higher proportion of females actually have lower murder rates. The establishment of direct causal link from high sex ratio to crime is, of course, difficult, more so in transitional economies, where so

many other factors, too, play a role. For instance, most of India, especially the northern states, has had a history of high sex ratio for centuries. However, the adverse sex ratio need not necessarily imply 'bare-branches', as men tend to marry women across cohorts, from generally much young to even slightly older in age. Moreover, the adverse relationship between crime and sex ratio in India has also been buffered by the general increase in population, higher emigration of educated and skilled men to other countries, and sourcing of women from other countries/regions. Thus, India could offer a case that differs from the general trend. To illustrate, in a 2010 National Bureau of Economic Research paper, Qingyuan Du and Shang-Jin Wei have argued that high sex ratios lead to higher savings rate, current account surplus and lower exchange rates. The hypothesis here is that men raise their savings rate to improve their relative standing in the marriage market.

In another study, Wei and Xiao Zhang have suggested that high sex ratios have actually stimulated economic growth in China by inducing more entrepreneurship and hard work. But this is not so in India, where despite a persistently high sex ratio, the savings rate continues to be low, the current account in the balance of payments is in huge deficit, and the rupee has not particularly held its own. At the same time, there is robust research to show that high sex ratio increases female bargaining power in the marriage market, shifting resources and family structures in ways that favour women. Similarly, men who face a more competitive marriage market need to be more efficient and invest in characteristics attractive to potential wives. But in sharp contrast, Lena has pointed to scarce women offering larger dowries to attract the most suitable men in marriage. The Government should obviously be wary of this trend.

**Suggestions**:

**1) Policy correctives:**

To correct the persistence in adverse sex ratio, the need is to change the mindset and attitudes of people, especially young adults. The Government should seize this opportunity and intervene to popularize widow remarriages and reduce the menace of dowry, which can be done through the use of mass media campaigns and active involvement of social and religious institutions. To incentivize widow remarriages and dowry-less marriages, the Government could even consider schemes like offering honey-moon packages and concessional houses for such couples. To discourage female infanticide, the Government could consider a 'mothering allowance" to the mother for first six years after the birth of a girl child.

**2) The Feature:**

Although the effects of male surplus will be a major problem for several Asian countries over the next two to three decades, there are indications that the situation may then improve. In South Korea, the sex ratio has already declined, and gender preference data from China are also encouraging. In a recent national survey, 37% of the Chinese women surveyed (predominantly younger, urban women) claimed to have no gender preference, and 45% said the ideal family consisted of one boy and one girl (Table 3). Almost equal numbers of the women expressed a preference for one girl as for one boy.

There are, therefore, clear indications that the essential fundamental change in attitudes is starting to happen. We believe that both the population sex ratio and the sex ratio at birth will gradually decline over the next two to three decades in these high-sex-ratio countries; however, the damage for a large number of today's young men and boys has already been done.

**3) Need for Comprehensive Policy Reforms:**

So what are we doing wrong-both in the discourse we have created and in the policy route we have chosen to walk? To start with, we have chosen to target one symptom (practice of sex selection), instead of evolving a comprehensive national policy response to a deeply resistant ailment (son preference/daughter aversion and low status of women in India).

State policy has, in the main, consisted of seeking to stem the supply of technology that enables sex selection through application of the law – the PCPNDT Act bans the use of diagnostic techniques for determining the sex of a foetus. The rationale (framed within an inverted demand-supply paradigm) is that stopping supply of the technology will reduce the demand – for determining the sex of the foetus and aborting if it is female. So far (not withstanding wide publicity about the PCPNDT Act, including signboards in every clinic, hospital and nursing home), this hasn't panned out as planned. Meanwhile, this singular focus on PCPNDT has triggered an unhealthy discourse beyond what the law actually bans (using medical diagnostics to determine the sex of the foetus) to the next step, i.e. the act of abortion.

Over the last few years, the hunt for aborted female foetuses appears to have become legitimate media pastime and reportage consists chiefly of stories about "fetuses' feticides" and "foetal remains."Clearly, the goriness of the phenomenon meets the media's need for just a tad bit of sensation (foetal remains found in gunny bags outside quack clinics, in the fields, in the dark depths of deep wells, etc.).While national attention on this issue is welcome, this is complex terrain. On the one hand is the right of females to be born, and of society to protect and preserve a gender balance. On the other hand lies a woman's right under the Medical Termination of Pregnancy Act (enacted in 1971, revised in 1975) to have a safe and legal abortion as part of a

whole gamut of reproductive rights. In our zeal to create an environment against one type of abortion (of a foetus only because it is female), we end up stigmatizing all abortions. Access to safe and legal abortion for Indian women is already severely limited, and this environment will not improve things. Indeed the very word 'feticide' i.e. 'killing' of the fetus (used often without the qualifying 'female foeticide') dents abortion rights.

**4) Government Efforts:**

As for tackling the demand side – i.e. addressing the complex reasons that son preference-daughter aversion is so prevalent – our policy response has included marking the National Girl Child Day (declared in 2009) on January 24, sporadically putting up billboards at major intersections telling us to 'love the girl child,' 'beta backhaul', 'stop killing girls', and a slew of ill-conceived conditional cash transfer schemes to incentivize the birth of girls at both the Centre and the State level. A 2010 desk review of 15 conditional cash transfer schemes (Dhan Lakshmi, Ladli, Beti Hai Anmol, Kanyadan, and others) conducted by TV Sekher of MPS for UNFPA is revealing.Most of them promised relatively small amounts at maturity, had complex conditions (immunization, school enrolment, institutional delivery, sterilization, among others), gave cash amounts at the age of 18 (for dowry), and were aimed at poor or BPL families. Quite apart from the objectionable attempt to arm twist every imaginable kind of 'desired' behavior (immunizes, educate, sterilize) in return for small sums of money, the big problem is that these schemes arc targeted largely at poor families. This is not a poor or BPL-only phenomenon. Small cash amounts are unlikely to make an iota of difference to families who have resources to pay for sex selective technology. On this issue, Indian policymakers, accustomed to 'targeting' the poor (i.e. BPL) need to bravely enter the unfamiliar terrain of targeting the not-so-poor, the upwardly mobile, and the wealthy.

**Conclusions**:
1) Insecurity of female will rise and crime against women will be more .Number of females will to shortage of brides which may increase the exposure of man.
2) If there will be no mother for protection of human race, then they very existence of human race will become impossible.
3) It would create awareness about the seriousness of save girl shield.
4) The study would provide workable suggestions to the non government organizations and government agencies working in family welfare sections.

**Reference**:
1. *Jansankhya Bhugol :Dr.Chaturbuj Mamoria &H.S.Garg, SBPD Publication ,Agra*
2. *Advanced Geography of India :Dr. Alka Gautam ,Sharda Pustak Bhawan, Allahabad.*
3. *Manwi wa Loksankhya Bhugol:A.B. Saudi ,Nirali Prakashan,Nagpur.*
4. *https://www.census2011.co.in*
5. *https://www.jagranjosh.com*

# Spatial Distribution of Market Centers in Washim District: A Geographical Analysis

**Prof. H. B. Rathod**
Principal,
Gramin Mahavidyalaya,
Vasant Nagar (Kotgyal),
Dist. Nanded (MS).

**Dr. Nitin.T. Deshmukh**
Associate Professor,
Department of Geography,
Mahatma Gandhi College,
Ahmedpur, Dist. Latur.

**Dr. D. G. Mane**
Assistant Professor,
Department of Geography,
Swami V. College,
S.Tajband, Tq. Ahmedpur.

**Abstract:**

　　*Marketing geography describes the various facts of retailing as aspect of geography which is concerned with territory economic activities and especially the distributive trades. The distribution of market centers is influenced by different physical and cultural factors. rural economy market plays a vital role in the interactions and exchanging the local products through certain norms where 'system of rural market serves as the nodal points for the collection and distribution of large range of goods and services of both local and external origin' Therefore attempt is made here to analyze spatial distribution of market centers in Washim District. The paper is based on secondary data. To analyze spatial distribution of market centers Statisticl techniques i.e. mean and Standard Devivation has been utilized. The study reveals that there is great influence of geographical factors on distribution of market centers in Washim District.*

**Keywords:** Spatial Distribution, Market centers.

**Introduction:**

　　"Marketing geography describes the various facts of retailing as aspect of geography which is concerned with territory economic activities and especially the distributive trades" (Davies, 1976).

　　Geographers are mainly concerned with the spatial distribution of geographical phenomena. The distribution of market centers is influenced by different physical and cultural factors. Each factor has its own influence and affects directly or indirectly on the distribution of market centers (Pawar & Lokhande 2000). There is a great variation also in the distribution of market centers at tahsil level e.g. there are 26market centers in Karanja while they are only 03 in Washim tahsil. The correlation between number of market centers and area, inhabited villages and population etc. may give a more realistic picture (Gharpure & Pawar, 1919).

　　Market centers are the main places of gathering of the famer's societies, the reason behind this is that the main features of internal trade network is the existence of market nodal point to and from which, flows of commodities are directed (Brombley, 1971). In the economy, especially rural economy market plays a vital role in the interactions and exchanging the local products through certain norms where system of rural market serves as the nodal points for the collection and distribution of large range of goods and services of both local and external origin' (Good,1972). Therefore attempt is made here to analyze spatial distribution of market centers in Washim District.

**Objectives:**

　　The main objective of the present study is to analyze the spatial distribution of Market centers in Washim district.

**Data Base and Methodology:**

　　The present research work of spatial distribution market centers has been based secondary data. To fulfill the objective the data regarding number of markets area has been collected from socio-economic reviews and district statistical abstract of Washim district for the year of 2010. After collection of the data, the data is processed to analyze spatial distribution of market centers the density of market center per 100 km$^2$ the markets per 100 habitation villages and markets per 10,000 population has been calculated then on the basis of mean and standard deviation the tahsils of Washim district are grouped into four categories on the basis of these statistical techniques the conclusions are drawn.



Fig. No. 2.1

Source : Survey of India, Location Map, Washim District

**Study Area:**

　　The Washim district is located South-western of Vidhrbha and South-eastern part of Maharashtra state. The absolute location of district is 19°58' to 21°16' north latitude and 76°04' to 77°15' east longitudes. The total geographical area of district is5150 square kilometers, which constitutes 1.65 per cent of the total area of the Maharashtra state. The district has hot and dry climate with average annual rainfall is 970 MM. as per 2011 Census, Washim district has 11, 96,714 population. For administrative purpose the district is divided into 06 tahsils.

**Discussion:**

**Tahsil-wise market centers:**

　　The District as a whole has 71 Market centers in 2011, but spatial distribution of market centers various from tahsil to tahsil on the basis of mean and standard deviation the tahsil of Washim District is categorized into three categories.

**Tahsils of low number of market centers:**

The tahsils which have numbers of market centers below mean minus1 standard deviation are included in this category. The table indicates that low number of market centers is recorded in Washim tahsil in 2011, due to the rugged topography and forested area which resulted into lower development of transportation and low agricultural production.

### Table No. 1: Distributional of Market Centers in Washim district (2011)

| Tahsils | No. of Market Centers | Area Km$^2$ | Density of Markets per 100 km$^2$ |
|---|---|---|---|
| Washim | 03 | 897.23 | 0.33 |
| Risod | 15 | 874.94 | 2.55 |
| Malegaon | 08 | 907.28 | 0.88 |
| Mangrulpir | 09 | 791.44 | 1.38 |
| Karanja | 26 | 865.28 | 0.84 |
| Manora | 10 | 813.83 | 1.23 |
| District | 71 | 5150 | 8.53 |
| Mean | 11.33 | -- | 1.42 |
| SD | 7.26 | -- | 0.82 |

*Source: Compiled By Researcher. On The Basis Of Socio Economic Review & District Statistical Abstract of Washim District 2011.*

**Tahsils of medium number of market centers:**

The Tahsils which have numbers of market centers in between above mean minus1Standard deviation to mean are included in this category. The moderate numbers of market centers are recorded in Malegaon, Karanja and Manora tahsils in 2011.

**Tahsils of high number of market centers:**

The tahsils which have numbers of market centers above mean to mean plus1standard deviation are included in this category. The table exhibits that high number of market centers are found in Risod, and Karanja. Mainly because of these are located in Painganga basin, where fertile soil is available; furthermore these tahsils having high rainfall, both these high rainfall and fertile soils resulted into high agricultural productivity, high density of population and high Accessibility.

**Density of market centers:**

The number of market centers not gives clear idea of spatial distribution therefore attempt is made here to present tahsil- wise density of market centers on the basis of mean and standard deviation. The tahsils of Washim District are divided into three category i.e. tahsil of low, medium and high density.

**Tahsil of low density:**

The tahsils having density of market centers below mean minus 1 standard deviation (below 0.33- per 100 sq. km) are included in this category. The table indicates that there is only one tahsil in washim District, which having low density.

**Tahsils of Medium density:**

The tahsils which having density of market centers above mean minus1 standard deviation to mean (0.33 to 1.23) are included in this category. The table exhibits that medium density is recorded in Malegaon, Karanja and Manora tahsils.

**Tahsils of high density:**

The tahsils which having density of market centers above mean to mean plus 1 standard deviation (1.23 to 2.55 per 100sqkm) are included in this category. The table indicates that high density of market centers per 100 square kilometers is recorded in Mangrulpir and Risod tahsils because these tahsils are situated in plain with fertile soil.

**Conclusion:**

The above discussion indicates that there is great influence of geographical factors on distribution of market centers in Washim District. Low number of market centers in Washim tahsil is a result of rugged topography and forested area. While high number of market centers in Mangrulpir and Risod manly due to their location in Painganga basin leads to high agricultural productivity, development of transportation.

Low density of market centers only in Washim tahsil is mainly due to adverse topography and forest cover. High density of market centers in Mangrulpir and Risod tahsils mainly due to feverable physiography, Soil condition which leads to transportation development and high agricultural productivity.

**References:**

1. *Berry B.J.L., (1967): Geography of Market Centers and Retail Distribution, Englewood Cliffs, N. J.Prentice Hall, pp.5, 74-88.*
2. *Breombely, R. J. (1971): Markets in Developing Countries - A Review; Geography, Vol. 56, pp. 124-132*
3. *Clark, P.J. and Evans, F.C., (1954): Distance to Nearest Neighbor as measure of Spatial Relationship in Populations: Ecology, 35, pp. 445-453.*
4. *Davies R.L, (1976): Marketing Geography, with Special Reference to Relailing London Mathuen p.1.*
5. *Good, C.M., (1975): Periodic Markets and Travelling Traders in Uganda; the Geographical Review, PP.49-72.*

# Application of Geographic Information System (GIS) in Medical Geography

**Dr. B. R. Shinde**
Head and Asso. Professor
Dept of Geography
Adarsh Mahavidyalaya,
Omerga, Dist. Osmanabad (M.S.)

**Dr. F. R. Pawar**
Assistant professor
Dept of Geography
Adarsh Mahavidyalaya,
Omerga, Dist. Osmanabad.

**Dr. R. M. Mugave**
Assistant professor
Dept of Geography
Adarsh Mahavidyalaya,
Omerga, Dist. Osmanabad.

**Abstract:**
　　For the present research paper highlight application of Geographical Information system (GIS) in Medical Geography. Medical researches as well as the study of the Earth's surface, better still, geography are interlinked with each other; their relationship dates from antiquity. Hippocrates was the first to describe the relationship between the geographical characteristics of a place and the inhabitants' health. Hippocrates described all these in his treatise "On Air, Water and Places". As the time goes by, it has become increasingly apparent that the mapping and the geographic information might be both very useful and vital not only for research but also for understanding the processes of diseases.
**Keywords:** GIS, Applications, Medical research and Public health.

**Introduction:**
　　The study of the English Physician John Snow in 1854 was a milestone towards this direction. It led to the detection of the source of infection in a cholera epidemic that broke out in London. Having mapped the locations of those individuals who were affected, he concluded that contaminated water was the cause of the outbreak. This research laid the foundations for both cartographic and geographic applications as a tool in medical science. Nowadays, the rapid development of technology has resulted, among other things, in the creation and deployment of new disciplines that cooperate with both the science of medicine and medical research. The science of Geographic Information Systems and, by extension Geomatics belongs to a discipline which is constantly developing at a global level. This sector has many applications regarding medical / epidemiological research and generally, the social sciences.

　　Geographic Information Systems (GIS) are spatial data management systems. These data are associated with respective geographic features. They are digital systems that can integrate, store, adjust, analyze and arrange geographically-referenced information. Generally, they could be described as smart maps that offer a simulation of the real world to their users. They can also generate interactive spatial or descriptive questions (research that has been created by the user), analyze spatial data, adapt and adopt them in analogue (prints maps and diagrams) or digital media (records of spatial data, interactive maps on the Internet).

**Aims and Objects:**
　　The purpose of this study is to highlight Geographic Information Systems as technology and the various application that they find in the field of medicine, either epidemiological of social research and health care, in general. Furthemore, this discipline my act as a decision making tool in health care and it might contribute to the formulation of policies regarding the health sector.

**Material and Methods:**
　　The method of literature review was used in this study. It also included articles and publications that are related to the theme that happened after sorting out the material which was mainly based on abstracts and their content.

**Definition of Geographic Information System :**
　　The first maps were made due to the fact that people needed to classify the special elements of the earth's surface. These elements relate to spatial distribution as well as the demand for specialized maps regarding the earth's surface. The rapid development of information technology and the extension of the concept of data have led to the need for the creation of electronic maps. Geographic Information Systems came as a natural evolution of cartography.

　　The function of GIS is based on a database which may be used by different users in order to meet various information needs. This database consists of a series of information layers, which refer to the same geographical area. Each of these layers contains either raw data such as topographic or satellite data or thematic data such as health services. All these are strictly oriented towards a common geographic system so as the combination among some of them to be possible according to the user's needs. Geographic Information Systems can convert spatial data into the Geographic or Cartographic or Cartesian coordinate system. A key feature is that spatial data are related to descriptive data. For example, a group of points that represent different areas of different cities that are connected by a table, in which each record except for the exact location, contains information such as name, population etc. Such systems provide pieces of information

regarding the data that are associated with the location for their collection, management, storage, processing, analysis and visualization in a digital environment. These data are usually called cartographic, geographic or spatial ones. Moreover, they may be associated with a series of descriptive data which characterize them as unique.

**Features and Applications:**

The development of GIS over time is proportional to the wide general development of the computer science. The development of Geographic Information Systems has advanced the geographical information systems as we know them today. Geographic Information Systems (GIS) are a set that consists of equipment, software, databases which contain a satisfactory collection, storage, information, management, analysis and presentation of all types of geographic information. GIS could be used as decision-making tools for various problems involving spatial data. GIS can be applied in various sectors such as transport, telecommunications, public utilities, environmental design, and health services; additionally, domains such as Country Planning, Geology, and Soil and Forest science may utilize GIS.

**Geographic Information Systems (GIS) and public health:**

The public health sector is a very complex and controversial field. Professionals who are interested in this domain should have critical understanding as regards the correlation amongst factors that affect health. In recent years, the work of health professionals is constantly becoming more and more effective owing to the use of both various information technology services and software. There are much more problems and challenges in relation to the public health sector, than Dr. Snow faced in 1854 when he introduced mapping in medical research. Recently, the use of GIS and spatial representation of various health issues make professionals arrive at conclusions in a faster and better way in the field of both public health and decision-making.

The use of these systems has a wide impact on the public health and lots of studies are based on them. Prediction as well as simulation models rely on these systems. Additionally, risk assessment models in relation to the contamination of drinking water in London are based on them. Aside from this, other researches that focus en Hepatitis c and intravenous drug use have been displayed with the aid of GIS.

Besides, GIS can contribute to public health in many ways due to the fact that they can provide information on many issues and support correctly the decision making process. They can provide information regarding the distribution of health services. Thus, any growing disparities might be eliminated. Also, policy-makers would make right decisions. Health professionals can easily identify the difficulties and disparities regarding the accessibility to health services; and so, they are able to cope with the current situation. Generally, the planning of health and social care is of major importance since it is a fundamental issue. At the dawn of the 21$^{st}$ century, in the midst of remodeling the entire health care system, the use of new approaches relating to health issues may become useful tools for the providers of these services. The use of GIS so as public health issues to be solved has grown exponentially. Those systems have been vital to both the assessment and treatment of health problems that relate to different areas of land.

As it was mentioned above, epidemiology was one of the fields, in which maps was firstly used on health research. It is essential we be able to understand a disease and how it spreads through human-to-human transmission.

A Geographic Information System can play an important role as regards the surveillance management and analysis of diseases. There seem to be important tools for analysis and ' visualization of epidemiological data. Furthermore, trends and correlations would be difficult to be understood with traditional ways of processing and imaging of these data. Public health services, diseases, and any information regarding health can be displayed on a map and  correlated amongst many pieces of information such as environmental data, elements of health concern and social information.

Thus, it is created a means of monitoring and management of both diseases and health programs. It is necessary we be able to understand, monitor and emphasize on the reasons that may be correlated to the development of a disease. Some of these factors could be the environment, conduct and the socioeconomic level of an area. Should the "source" of a disease is identifiable and its development and transmission are known, helth administrators will able to deal effectively with pandemic outbreaks. A GIS is a tool with great potential that might also contribute to the assessment of environmental risks and people's exposure to them.

**GIS and Healthcare Services:**

The planning of domiciliary care provision is one of the most active applications of GIS. A Geographic Information System is able to organize all the routes that a health care professional has to follow and it can take into account other parameters, too. On the other side, private health services could arrange their extension plan and promote their services. They even make predictions about some services that are in great demand in specific locations. Generally, GIS application areas might be applied towards Strategic Planning, Research and Evaluation, emergency preparedness and both response and location of health care services, too.

Geographic Information Systems provides a tremendous convenience for health care providers as regards the organization and the management of these services. Hence, the organization and coordination of various services would be easier and more efficient. The healthcare provider may direct quickly and efficiently the patient to suitable health care services, Geographic Information Systems provide us with the exact location of specific medical equipment and how somebody may gain the fastest access to it. It is important an insurance institution, when it is requested by the insured, know the nearby location where the insured could gain access to a CT scanner.

## Conclusion :

Technological advances keep up with medical advances. Their common and consistent goal is to secure human existence. We can say with absolute certainty that Geographic Information Systems are important tools in relation to the investigation of health sciences and they have many applications. These systems enable health-related information to be displayed. Hence, the multidisciplinary work is more efficient. Geographic Information Systems enable the visualization and monitoring of infectious diseases. Additionally, these systems record and display the health care needs of the community as well as the available resources and materials.

## References:

1. *Littre E. editor. Oeuvres completes d'Hippocrate. Vol. 2. Paris: Bailliere; 1840. Hippocrates. On Airs, Waters, and Places.*
2. *McLeod KS. Our sense of Snow: the myth of John Snow in medical geography. Social Science & Medicine. 2000;50:923-935. [PubMed]*
3. *Koutsopoulos K. Athens: Papasotiriou Publishing; 2002. Geographic information systems and spatial analyses.*
4. *New York: United Nations; 2000. Department of Economic and Social Affairs, Statistics Division, Studies in Methods. Handbook on geographic information systems and digital mapping.*
5. *Maniatis G. Thessaloniki: Zitis; 2006. Geographic information systems: land registry.*

# नांदेड जिल्ह्यातील ऊस उत्पादकतेचा भौगोलिक अभ्यास

**प्रा. डॉ. बी. एन. नागलगावे**
भूगोल विभागप्रमुख,
पं. दीनदयाल उपाध्याय महाविद्यालय,
देवणी जि.लातूर.

**प्रस्तावना:**

कृषी उत्पादकता ही अनेक घटकांवर अवलंबून असते. त्यामुळे तिच्यावर प्राकृतिक, सामाजिक, आर्थिक, राजकीय आणि तांत्रिक अशा अनेक घटकांचा प्रभाव पडलेला असतो. या सर्व घटकांच्या आंतरक्रियेतून कृषी उत्पादकता निश्चित होत असते. जर या अंतरक्रिया शेतीस अनुकूल असतील तर कृषी उत्पादकता अधिक वाढते. याउलट जर त्या प्रतिकूल असतील तर कृषी उत्पादकता वाढत तर नाहीच पण काहीवेळा घटत सुद्धा असते. म्हणजेच हे सर्व घटक परस्पर संबंधित असतात. त्यामुळे एकही घटक प्रतिकूल असला तरी त्याचा परिणाम कृषी उत्पादकतेवर होतो.

कृषी उत्पादकता ही संकल्पना नसून ही एक भौतिक गोष्ट आहे की ज्यामध्ये भूमी, मजूर व भांडवल यापैकी कोणताही एक घटक आणि प्रत्यक्ष उत्पादन यांच्यामधील बदलत्या संबंधाचा अभ्यास कृषी उत्पादकतेमध्ये केला जातो. थोडक्यात कृषी योग्य क्षेत्राच्या प्रत्येक एककातून निर्माण झालेली कृषी उत्पादन म्हणजे कृषी उत्पादकता होय.

नांदेड जिल्ह्याचा बराच भाग हा गोदावरी नदीखोऱ्यात येत असल्याने तेथे कृषीसाठी पाण्याचा मुबलक पुरवठा होतो. त्यामुळे तेथे जलसिंचनावर आधारित पिकांचे उत्पादन घेतले जाते. यात ऊस हे प्रमुख पीक आहे. जलसिंचनाशिवाय ऊसाचे उत्पादन घेता येत नाही. त्यामुळे गोदावरी नदीच्या क्षेत्रामध्ये ऊसाची उत्पादकता सर्वाधिक तर इतर क्षेत्रात ती कमी असल्याचे आढळते.

**अभ्यासक्षेत्र:**

सदर अभ्यासासाठी महाराष्ट्रातील नांदेड जिल्हा निवडलेला असून राज्याच्या एकूण भूभागापैकी ३.४% भूभाग या जिल्ह्याने व्यापला आहे. या जिल्ह्याचा अक्षवृत्तीय विस्तार १८°१५' ते १९°५५' उत्तर आणि रेखावृत्तीय विस्तार ७६°५६' ते ७८°१९' पूर्व एवढा आहे.

**अभ्यासाचे उद्दिष्ट:**

नांदेड जिल्ह्यातील तालुकानिहाय ऊस उत्पादनाचा भौगोलिक अभ्यास करून त्याची उत्पादकता शोधणे हा या अभ्यासाचा मुख्य उद्देश आहे.

**अभ्यास पद्धती:**

नांदेड जिल्ह्यातील ऊस उत्पादकतेचा अभ्यास करण्यासाठी इ.स. १९९० ते २०१० या वीस वर्षातील आकडेवारीचा वापर केलेला आहे. यासाठी वेगवेगळ्या संदर्भ साहित्याचा वापर केलेला आहे. त्यात नांदेड जिल्हा आर्थिक व सामाजिक समालोचन, जिल्हा गॅझेट्स, कृषी व जलसिंचन विभागातील वार्षिक अहवाल, शासकीय व निमशासकीय कार्यालयातील माहितीचा आधार घेऊन ऊस या पिकाचा अभ्यास केलेला आहे. ऊस उत्पादकता काढण्यासाठी येनेडी या तज्ञानी मांडलेल्या सूत्राचा वापर केलेला आहे.

$$Pn = \frac{y}{yn} \div \frac{T}{Tn} \times 100$$

Pn= Productivity Index
Y= Production of the selected crop in the component arieal unit
Yn= Total production of the selected crop in the entire region
T= Area of the selected crop in component ariel unit.
Tn= Total area of selected crop in the entire region

**नांदेड जिल्ह्यातील ऊस उत्पादकता:**

नांदेड जिल्ह्यात एकूण सोळा तालुके असून यात मोठ्या प्रमाणात कृषीचा विकास झालेला आहे. विशेषतः गोदावरी नदीच्या काठावरील तालुक्यांमध्ये जलसिंचनाचा मोठा विकास झालेला आहे. त्यात ऊस या पिकाचा महत्त्वाचा वाटा आहे. या सोळा तालुक्यातील ऊसाचे उत्पादन इ.स. १९९० ते २०१० या काळात कसे बदलले आहे ते पुढील तक्त्यावरुन स्पष्ट होते.

सन १९९०-९५ मध्ये ऊस पिकाचे सरासरी एकूण क्षेत्र १७१५२ हेक्टर एवढे होते. तर एकूण उत्पादन ८९८४.३० टन होते. या पिकाचा उत्पादकतेचा मध्यांक ९८.७३ व प्रमाण विचलनांक १४.०६ एवढा आहे.

सन १९९०-९५ मध्ये जास्त उत्पादकता गटात $(\bar{x} + 2S.D.)$ भोकर, उमरी आणि देगलूर या तालुक्यांचा समावेश होतो. या तालुक्याचे जिल्ह्याच्या ऊस पिकाच्या एकूण क्षेत्रापैकी ९.८९ टक्के क्षेत्र आहे. तर एकूण उत्पादनांपैकी १०५०.१२ टन (११.६९ टक्के) उत्पादन आहे. याचा उत्पादन निर्देशांक ११७.८९ ते ११८.३७ दरम्यान आहे. मध्यम उत्पादकतेच्या गटात $(\bar{x} + 1S.D.)$ बिलोली, नायगाव, धर्माबाद, कंधार, लोहा या तालुक्यांचा समावेश होतो. या तालुक्याचे जिल्ह्याच्या ऊस पिकाच्या एकूण क्षेत्रापैकी ४५.७७ टक्के क्षेत्र आहे. तर एकूण उत्पादनापैकी ४४०८.०३ टन (४९.०६ टक्के) उत्पादन आहे. याचा उत्पादिन निर्देशांक १०१.६६ ते ११०.७३ दरम्यान आहे.

कमी उत्पादकतेच्या गटात $(\bar{x} - 1S.D.)$ हदगाव, हिमायतनगर, नांदेड, अर्धापूर, मुदखेड आणि मुखेड तालुक्यांचा समावेश होतो. या तालुक्याचे जिल्ह्याच्या ऊस पिकाच्या एकूण क्षेत्रापैकी ४१.२६ टक्के क्षेत्र आहे. तर एकूण उत्पादनापैकी ३३१४.७९ टन (३६.९० टक्के)

उत्पादन आहे. याचा उत्पादन निर्देशांक ८५.९१ ते ९७.३७ दरम्यान आहे. अती कमी उत्पादकतेच्या गटात $(\bar{x} - 2 S.D.)$ किनवट, माहूर या तालुक्याचा समावेश होतो. या तालुक्याचे जिल्ह्याच्या ऊस पिकाच्या एकूण क्षेत्रापैकी ३.०८ टक्के क्षेत्र आहे. तर एकूण उत्पादनापैकी २११.३६ टन (२.३५ टक्के) उत्पादन आहे. याचा उत्पादन निर्देशांक ७६.३७ दरम्यान आहे.

सन २००५-१० मध्ये ऊस या पिकाचे सरासरी एकूण क्षेत्र १३३४० हेक्टर एवढे होते. तर एकूण उत्पादन ९३३१.२ टन होते. या पिकाचा उत्पादकतेचा मध्यांक ९५.८३ व प्रमाण विचलनांक १४.१२ एवढा आहे.

**तक्ता क्र. १.१: ऊस उत्पादकता निर्देशांक (क्षेत्र व उत्पादन टक्केवारीत)**

| अ. क्र. | तालुका | १९९०-९५ | | २००५-१० | | उत्पादन निर्देशांक | | बदल |
|---|---|---|---|---|---|---|---|---|
| | | क्षेत्र | उत्पादन | क्षेत्र | उत्पादन | क्षेत्र | उत्पादन | |
| १ | किनवट | ३.०८ | २.३५ | ०.७५ | ०.६६ | ७६.३७ | ८८.६४ | १२.२७ |
| २ | माहूर | ० | ० | ०.६ | ०.६२ | ७६.३७ | १०३.६५ | २७.२८ |
| ३ | हदगाव | ११.०८ | ९.५२ | १०.३४ | ९.६१ | ८५.९१ | ९.९२ | ७.०१ |
| ४ | हिमायतनगर | ० | ० | ४.८ | ४.१८ | ८५.९१ | ८७.२१ | १.३ |
| ५ | नांदेड | २५.११ | २२.४३ | ८.४ | ९.३६ | ८९.३५ | १११.५१ | २२.१६ |
| ६ | अर्धापूर | ० | ० | २५.६४ | २६.०२ | ८९.३५ | १०१.५ | १२.१५ |
| ७ | मुदखेड | ० | ० | ८.४ | ७.५६ | ८९.३५ | ९०.०७ | ०.७२ |
| ८ | भोकर | ३.८४ | ४.५३ | २.७ | २.१६ | ११७.८९ | ८०.०६ | -३७.८३ |
| ९ | उमरी | ० | ० | १.८ | १.१८ | ११७.८९ | ६५.७६ | -५२.१.३ |
| १० | बिलोली | २७.९७ | ३०.९७ | २.७ | २.६६ | ११०.७३ | ९८.६४ | -१२.०९ |
| ११ | नायगाव | ० | ० | ५.८ | ४.२४ | ११०.७३ | ७८.६३ | ३२.१ |
| १२ | धर्माबाद | ० | ० | १.०५ | ०.९ | ११०.७३ | ८५.७८ | -२४.९५ |
| १३ | कंधार | १७.७९ | १८.०९ | ११.०९ | १३.०१ | १०१.६६ | ११७.२३ | १५.५७ |
| १४ | लोहा | ० | ० | १०.१९ | १०.९३ | १०१.६६ | १०७.२२ | ५.५६ |
| १५ | मुखेड | ५.०८ | ४.९४ | ४.०५ | ४.५१ | ९७.३७ | १११.५१ | १४.१४ |
| १६ | देगलूर | ६.०५ | ७.१६ | २.१ | २.३७ | ११८.३७ | ११२.९४ | -५.४३ |
| | एकूण | १०० | १०० | १०० | १०० | | | |

*स्त्रोत : संशोधकाद्वारा अधिकृत माहितीवर आधारित.*

सन २००५-१० मध्ये $(\bar{x} + 2 S.D.)$ नांदेड, कंधार, मुखेड आणि देगलूर या तालुक्याचा समावेश होतो. या तालुक्याचे जिल्ह्याच्या ऊस पिकाच्या एकूण क्षेत्रापैकी २५.६४ टक्के क्षेत्र आहे. तर एकूण उत्पादनापैकी २५०८.४ टन (२९.२५ टक्के) उत्पादन आहे. याचा उत्पादन निर्देशांक अनुक्रमे १११.५१ ते ११७.२३ दरम्यान आहे. मध्यम उत्पादकतेच्या गटात $(\bar{x} + 1 S.D.)$ माहूर, अर्धापूर, बिलोली आणि लोहा या तालुक्याचा समावेश होतो. या तालुक्याचे जिल्ह्याच्या ऊस पिकाच्या एकूण क्षेत्रापैकी ३९.१३ टक्के क्षेत्र आहे. तर एकूण उत्पादनापैकी ३७५.४६ टन (४०.२५ टक्के) उत्पादन आहे. याचा उत्पादन निर्देशांक ९८.६४ ते १०७.२२ दरम्यान आहे. कमी उत्पादकतेच्या गटात $(\bar{x} - 1 S.D.)$ किनवट, हदगाव, हिमायतनगर, मुदखेड आणि धर्माबाद या तालुक्यांचा समावेश होतो. या तालुक्याचे जिल्ह्याच्या ऊस पिकाच्या एकूण क्षेत्रापैकी २५.३४ टक्के क्षेत्र आहे. तर एकूण उत्पादनापैकी २१३९ टन (२२.९२ टक्के) उत्पादन आहे. याचा उत्पादन निर्देशांक ८५.७८ ते ९२.९२ दरम्यान आहे. अती कमी उत्पादकतेच्या गटात $(\bar{x} - 2 S.D.)$ भोकर, उमरी आणि नायगाव या तालुक्यांचा समावेश होतो. या तालुक्याचे जिल्ह्याच्या एकूण क्षेत्रापैकी ९.९० टक्के क्षेत्र आहे. तर एकूण उत्पादनापैकी ७०८ टन (७.५९ टक्के) उत्पादन आहे. यांचा उत्पादन निर्देशांक ६५.७६ ते ८०.८६ दरम्यान आहे.

सन १९९०-९५ ते २००५-१० या कालावधीत उत्पादन निर्देशांकात सर्वात जास्त वाढ माहूर तालुक्यात २७.२८ टक्के झालेली आहे. तर सर्वात जास्त घट उमरी तालुक्यात ५२.१३ टक्के झालेला आहे. जिल्ह्यातील किनवट, माहूर, हदगाव, हिमायतनगर, नांदेड, अर्धापूर, मुदखेड, कंधार, लोहा आणि मुखेड या तालुक्यात धनात्मक बदल झालेला आहे. तर भोकर, उमरी, बिलोली, नायगाव, धर्माबाद आणि देगलूर या तालुक्यात ऋणात्मक बदल झालेला आहे.

**निष्कर्ष:**

सन १९९०-९५ ते २००५-१० या कालावधीत ऊस पिकाच्या उत्पादन निर्देशांकात सर्वात जास्त वाढ माहूर तालुक्यात २७.१८ टक्के झालेला आहे. तर सर्वात जास्त घट उमरी तालुक्यात ५३.१३ टक्के आढळून येते. जिल्ह्यातील किनवट, माहूर, हदगाव, हिमायतनगर, नांदेड, अर्धापूर, मुदखेड, धर्माबाद, कंधार, लोहा आणि मुखेड या तालुक्यात धनात्मक बदल झालेला आहे. तर भोकर, उमरी, बिलोली, नायगाव, देगलूर या पाच तालुक्यात ऋणात्मक बदल झालेला आहे.

जिल्ह्यात इतर पिकांच्या मानाने ऊस पीक कमी असल्यामुळे या पीकासाठी शासनाने नवीन धोरण राबवून याचे क्षेत्र वाढवावे.

**संदर्भ:**

१) नांदेड जिल्हा सामाजिक व आर्थिक समालोचन इ.स. १९९५ ते २०००. नांदेड जिल्हा गॅझेटिअर.

२) डॉ.सुरेश फुले, कृषी भूगोल, विद्याभारती प्रकाशन, लातूर, पृ.१५८.

३) चव्हाण देविदास, 'नांदेड जिल्ह्यातील जलसिंचन स्त्रोत व बदलत्या प्रमुख पीक प्रारूपाचा भौगोलिक अभ्यास', स्वा.रा.ती.म. विद्यापीठ, नांदेड येथे सादर केलेला अप्रकाशित शोधप्रबंध.

४) रामचन्द्र तिवारी, कृषी भूगोल, प्रयाग पुस्तक भवन, इलाहाबाद, पृ.१३७.

# सागरी प्रदूषण पर्यावरणीय समस्या

**डॉ. टी. एन. महाजन**
भूगोल विभाग,
दयानंद कला महाविद्यालय, लातूर

**प्रस्तावना :**

पृथ्वी वरील जीवन पाण्यामुळे शक्य आहे. जीवन जगण्यासाठी पाणी आणि हवा आवश्यक आहे. या दोन घटका शिवाय पृथ्वीवरील जीवन अशक्य आहे. पृथ्वीचा ७१ टक्के भाग पाण्याने व्यापलेला आहे. पण त्यापैकी ९७.०० टक्के पाणी सागरीभागात आहे. पिण्यायोग्य पाणी ३ टक्के आहे. त्यामुळे सागरी भागातील वाढत्या प्रदूषणाचा अभ्यास करणे काळाची गरज आहे. वाढत्या लोकसंख्येमुळे पाणी टंचाईची समस्या वाढत आहे. त्यामुळे भविष्यात सागरी पाण्यावर प्रक्रिया करून ते पाणी मानवी जीवनास उपलब्ध करून द्यावयाचे असेल तर सागरी जलप्रदूषणाची समस्येचा आढावा घेणे आवश्यक आहे.

**उद्देश :**

१. सागरी प्रदूषणाच्या कारणाचा अभ्यास करणे.
२. सागरी प्रदूषणाच्या परिणामाचा आढावा घेणे.
३. सागरी प्रदूषणावरील उपाय अभ्यासणे.

**अभ्यास पध्दती :**

प्रस्तुत शोध निबंधातील माहिती ही दुय्यम स्रोतावर आधारलेली आहे. संदर्भग्रंथ व वर्तमानपत्राच्या माध्यमातून सागरी जलप्रदूषणाची माहिती संकलित केलेली आहे.

**विषय विवेचन :**

सागरी प्रदूषण ही पर्यावरणाच्या दृष्टीने अत्यंत नुकसानकारक समस्या आहे. याचे प्रमाण दिवसेंदिवस वाढत असलेले आपणास पहावयास मिळते. सागरी प्रदूषणास अनेक घटक कारणीभूत आहेत. हवा प्रदूषण, ध्वनी प्रदूषण, जल प्रदूषण व मृदा प्रदूषण प्रमाणेच सागरी प्रदूषण ही पर्यावरणाच्या दृष्टीने गंभीर समस्या निर्माण झाली आहे. सागरी प्रदूषणाची सुरूवात मानवाच्या अनिबंध क्रियामधून घडून येते जल वाहतुकीमुळे होणारे अपघात, तसेच सागरी भागातील तेलविहीरीचे खोदकाम तेलाचे उत्पादन, शुध्दीकरण, तेल वहातूक या बरोबरच औष्णिक प्रदूषण देखील सागरी प्रदूषणास कारणीभूत मानले जाते. सागरी प्रदूषणाचे प्रमाण वाढल्यामुळे जलचर प्राण्याचे जीवन धोक्यात आले आहे. अशा अनेक गंभीर समस्यांना तोंड द्यावे लागत आहे.

**सागरी जल प्रदूषणाची कारणे :**

'' मानवाने पाण्याचा अयोग्य व अनिबंध वापर केल्यामुळे जी प्रदूषणाची गंभीर समस्या निर्माण झाली आहे. त्याला सागरी जल प्रदूषण असे म्हणतात. '' पाण्याची गुणवत्ता किंवा पाण्याचे गुणधर्म मानवी हस्तक्षेपामुळे बदलून जलसाठ्यातील पाणी कोणत्याही प्रकारच्या वापरासाठी अयोग्य होते तेव्हा पाणी प्रदूषित झाले असे म्हणतात. ते पाणी प्रदूषित होण्यासाठी अनेक कारणे कारणीभूत आहेत. त्यातील प्रमुख कारणाचा आढावा पुढील प्रमाणे घेणार आहोत.

**१. कारखान्यांतील घाण पाणी :**

कारखान्यांतून बाहेर पडणारे अन्नपदार्थांचे कण, कपड्यांच्या गिरण्यातील सांडपाणी, रंग रसायणे, औषधांच्या कारखान्यांतून येणारे रसायनयुक्त पण प्रक्रिया न केलेले सांडपाणी समुहात येऊन मिळाल्यामुळे सागरी प्रदूषणात वाढ होते.

**२. तेलवाहू जहाजे :**

तेलवाहू जहाजाच्या गळतीमुळे तर कधी अशा जहाजाच्या अपघातामुळे तेल सागरी पाण्यात मिसळून सागरी प्रदूषण मोठ्या प्रमाणात होते.

**३. सेंद्रीय पदार्थ :**

पाण्यात सेंद्रिय पदार्थांचे कुजणे किंवा विघटन होऊन सागरी प्रदूषणास चालना मिळते.

**४. जंतुनाशके व किटकनाशके :**

जंतुनाशके, किटकनाशके यांचा भू-प्रदेशाकडून पावसामुळे जलभागात प्रवेश होतो. त्यामुळे सागरी पाण्याच्या प्रदूषण वाढण्यास मदत होते.

**५. रसायनांचा अंतर्भाव :**

सागरी भागात केरकचरा, रासायनिक खते, किटकनाशके, अविघटनशील पदार्थ अशी अनेक जलप्रदूषणे नद्या, नाले. ओढे यांच्या सहाय्याने समुहाला येवून मिळतात आणि तेथील सागरी पाणी प्रदूषित होते.

**६. मानवी क्रिया व औद्योगिकीकरण :**

सागरी प्रदूषण हे प्रामुख्याने मानवी क्रिया व औद्योगिकीकरणाचे फलित आहे.

**७. शहरांचे सांडपाणी :**

सागरी भागाजवळील शहरातील सांडपाणी व मैला सागरात सोडला जातो. त्यामुळे सागरी प्रदूषणाचे प्रमाण वाढत आहे.

**सागरी प्रदूषणाचे परिणाम :**

सागरी प्रदूषणाचा परिणाम सागरातील विविध प्राण्यांवर होतो. तेल तवंगामुळे ऑक्सिजन पुरेशा प्रमाणात पाण्यात मिसळू शकत नाही. यामुळे सागरी जलचरांच्या अस्तित्वाला धोका निर्माण झाला आहे. सागरी प्रदूषणाचे महत्वपूर्ण परिणाम खालील प्रमाणे आहेत.

**१. तापमानात वाढ :**

तेलाच्या तवंगास लागलेल्या आगीमुळे प्रचंड प्रमाणात विषारी वायू तयार होतात. त्यामुळे तापमानात वाढत होते. किनाऱ्या लगतच्या भागात याचे वाईट परिणाम दिसून येतात.

**२. सागरी जीवांचा धोका :**

समुद्रात खोलवर असणाऱ्या किरणोत्तर मुलद्रव्यामुळे सागरी जीवांवर तसेच मानवांवर दूरगामी दुष्परिणाम होत आहेत.

**३. आजारांची निर्मिती :**

अनेक प्रदूषके सागरात नद्यांद्वारे येऊन मिसळतात. कीटकनाशके, तण नाशके, खते यातील रासायनिक पदार्थांचा जलचर जीवनावर परिणाम होतो. डी.डी.टी. किंवा पी.सी.बी. सारखी प्रदूषके अन्न साखळीत प्रवेश करून मानवी शरीरापर्यंत पोहोचतात व आजार निर्माण होतात.

**४. जल परिसंस्थेवर परिणाम :**

औष्णिक सागरी प्रदूषणामुळे नको असलेले शैवाल झुडपे यांची वाढ होते. त्याचा परिणाम जल परिसंस्थेवर झालेला आढळतो.

**५. सुक्ष्म जीवांवर परिणाम :**

काच प्लास्टिक यासारख्या विघटनशील प्रदूषणामुळे सुक्ष्म जीवांवर विपरीत परिणाम जाणवतात.

**६. वनस्पतीचा ऱ्हास, ७. माश्यांच्या अन्नाचा प्रश्न, ८. दुर्गंधीचे प्रमाण वाढते, ९. रोगराईचे प्रमाण वाढते१०. जलचर प्राण्यांवर परिणाम**

**सागरी प्रदूषणावर उपाय :**

सागरी पाण्यात जी दूषितके मिसळतात. ती मिसळू नये, याची आधी खबरदारी घेणे आवश्यक आहे. याबाबत जन माणसात जन जागृतीची नितांत गरज आहे. सागरी प्रदूषण रोखण्यासाठी पुढील उपाय अत्यंत महत्वाचे आहेत.

१. पाणी आडवा, पाणी जिरवा ही योजना राबविणे. २. वृक्ष लागवड करणे. ३. जंगल तोडीवर निर्बंध ४. कचरा प्रदूषण नियंत्रीत करणे. ५. रासायनिक खताचा अनिर्बंध वापर टाळावा. ६. अविघटनशील वस्तूच्या वापरावर निर्बंध. ७. औद्योगिक सांडपाण्यावर प्रक्रिया. ८. शहरातील केरकचऱ्याची विल्हेवाट लावणे. ९. टाकाऊ पदार्थाची योग्य काळजी घेणे. १०. कडक कायदे लादने. ११. लोकसंख्या वाढीवर कडक कारवाई केली पाहिजे. १२. किटकनाशकाचा वापर मर्यादित करावा. १३. आरोग्य विषयक जागृती लोकांत करावी. १४. सागर जलप्रदूषणाचे परिणाम लोकांसमोर सांगून त्याचं महत्व पटवून द्यावे. १५. मृदा संधारण १६. कारखाने नागरी वस्त्यांपासून दूर असावीत. १७. नद्यांवर धरणे बांधावेत १८. सेंद्रीय खताचा वापर अधिक करावा. १९. पाण्याचा अपव्यय टाळावा २०. भाज्या पदार्थ जलाशयात टाकू नये २१. मलमूत्र समुद्रात सोडू नये २२. सागरी प्रदूषणाचे मुल्यमापन करावे  २३. तेल गळती होऊ न देणे २४. तेल तवंग शोधून काढणे २५. काच व प्लास्टिक वस्तू वापरावर बंधने घालावे.

अशा प्रकारे वरील उपायांची अंमलबजावणी केल्यास सागरी प्रदूषण टाळता येऊ शकते.

**निष्कर्ष :**

१. सागरी प्रदूषण करणाऱ्या प्रदूषकांचे प्रमाण कमी करणे आवश्यक आहे.

२. सागरी प्रदूषण करणाऱ्या व्यक्ती व संस्था यांच्यावर कडक कारवाई करणे.

३. सागरी प्रदूषण कमी करून त्यांचे संवर्धन करण्यासाठी जनजागृती करणे तसेच लोकांचा सहभाग वाढवणे आवश्यक आहे.

४. जल कायद्याची अमंलजबावणी व काटेकोर पालन होणे आवश्यक आहे.

५. सागरी भागातील प्रदूषण रोखण्यासाठी सांडपाणी शुध्दीकरण यंत्रणा आणि घन कचरा व्यवस्थापन करणे गरजेचे आहे.

**संदर्भ ग्रंथ :**

१. पर्यावरण शिक्षण - सौ. आशा भराडीया

२. पर्यावरण भूगोल - डॉ. फुले, डॉ. शेटे, डॉ. शहापूरकर

३. पर्यावरण शास्त्र - डॉ. विठ्ठल धारपुरे

४. पर्यावरण शिक्षण - डॉ. नामदेव खंडगावे, नारायण जी. घटकार

५. पर्यावरण शिक्षण आणि आपत्ती व्यवस्थापन - प्रा. डॉ. तुकाराम वराट, प्रा. नारायण गवळी, सौ. लंका गवळी-लवांडे.

# पर्यावरणातील बदलामुळे जलव्यवस्थापन करणे काळाची गरज

**डॉ. संजीव कोळपे**
भूगोल विभाग,
कला, वाणिज्य व विज्ञान महाविद्यालय, गंगाखेड.

**प्रास्ताविक :**

मानव आपल्या मूलभूत गरजांची पूर्तता ही निसर्गाने दिलेल्या साधनसंपत्तीचा वापर करुन करत असतो. नैसर्गिक साधनसंपत्तीपैकी सर्वात महत्वाची संपत्ती म्हणजेच जल हे निसर्गाने मानवासाठी दिलेले वरदान आहे. जल ही जीवन है! म्हणूनच पाण्याला जीवन असे म्हटले आहे. कारण पाण्याशिवाय मानवी जीवन व्यर्थ आहे. पाण्याला मानवाच्या जीवनात अनन्यसाधारण महत्त्व आहे. मानवी जीवनासाठी पाण्याची अत्यंत गरज आहे. पाण्याशिवाय मानव जगूच शकत नाही. पाणी ही पुर्ननवीकरणीय किंवा अविनाशी संपदा आहे. पृथ्वीचा ७१ टक्के भाग हा पाण्याने व्यापला आहे. या भागावर उपलब्ध असलेल्या पाण्यापैकी खा-या पाण्याचे प्रमाण हे जास्त आहे. क्षारयुक्त पाणी प्रत्यक्ष मानवाला उपयोगी नसते. गोड्यापाण्यापैकी केवळ १.६५ टक्केच पाणी हे मानवाला उपयुक्त आहे. गोड्या पाण्याचा मानवाला प्रत्यक्ष उपयोग होतो. म्हणूनच गोड्या पाण्याचा उपयोग व्यवस्थित होणे गरजेचे आहे. पावसाचे पाणी भूपृष्ठावर व भूमिगत भागात उपलब्ध होते. म्हणून उपलब्ध असणा-या पाण्याचे व्यवस्थापन करणे गरजेचे आहे.

अलिकडील बदलत्या पर्यावरणामुळे पाण्याचे नियोजन करणे ही एक महत्त्वाची गरज बनले आहे. कारण पाण्याची असणारी मागणी व त्याची असणारी उपलब्धता यामध्ये असमतोल निर्माण झाला आहे. पाण्याच्या नियोजनाबाबत आपण गंभिर नसतो त्यामुळे जलव्यवस्थापन करणे हे एक जगासमोरचे आव्हान बनले आहे. प्रसिद्ध अर्थशास्त्रज्ञ **ॲडमस्मिथ** यांच्या मते, 'पाण्यावाचुन माणूस तडफडतो परंतु पाण्याला कवडीची किंमत नाही. हि-याचा अजिबात उपयोग नसुन तो अनमोल आहे. हा मानवी संस्कृतीचा क्रुर विरोधाभास आहे.' जगामध्ये पाणी हे गोड्या व खा-या अशा स्वरुपात उपलब्ध आहे. प्रत्येक क्षेत्रामध्ये गोड्या पाण्याची गरज आहे. कृषी, उद्योग, घरगुती वापरासाठी व इतर विविध घटकांच्या विकासासाठी पाण्याची आवश्यकता असते. म्हणूनच पाणी ही एक राष्ट्रीय संपत्ती मानले जाते.

जलतज्ञांच्या मते जगामध्ये पुढील काळात केवळ पाण्यासाठीच तिसरे महायुद्ध होईल. जागतीक बँकेचे उपाध्यक्ष **सेरेगल** यांच्या मते, एकविसाव्या शतकातील पाणीप्रश्न हेच तिस-या महायुद्धाचे कारण असेल. हिवरेबाजारचे सरपंच **श्री. पोपटराव पवार** यांनी म्हटले आहे की, पाण्यासाठी मारामा-या व युद्ध होतील. जलतज्ञ **डॉ. माधवराव चितळे** म्हणतात, 'पाणी हाच मुद्दा आता माणसांमध्ये संघर्ष पेटवणार आहे.' आंतरराष्ट्रीय ख्यातीचे जलतज्ञ व मॅगेसेसे पुरस्कार विजेते **डॉ. राजेंद्र सिंह** यांनी असे मत मांडले की, 'सुरज सबसे बडा चोर है वो बहोत पानी चुराता है' कारण भारतात सुर्याची उष्णता सात ते आठ महिने असते.

पाणी प्रश्नावर सरकारने धोरणात्मक निर्णय घेण्याची गरज आहे. तसेच पाण्याची सध्याची परिस्थिती सुधारायची असेल तर जे पाणी उपलब्ध होते त्याचे योग्य नियोजन करण्याची गरज आहे. पीक पद्धतीमध्येही बदल करण्याची आवश्यकता आहे. पाण्याबाबत जर योग्य उपाययोजना करण्यात आली नाही तर येत्या काही काळात पाण्याच्या बाबतीत महाराष्ट्राचा राजस्थान होण्यास वेळ लागणार नाही. थोर समाजसेवक **आण्णा हाजारे** यांनीही दुष्काळग्रस्त राळेगणसिद्धी येथे जलव्यवस्थापन करुन पाणी संकटावर मात केली आहे. म्हणून पुढील काळात पाण्याचे दुर्भिक्ष्य निर्माण होऊ नये यासाठी आताच त्याचे संवर्धन, व्यवस्थापन करणे आवश्यक आहे. जलव्यवस्थापन व जलसंवर्धनासाठी जनसहभाग हा महत्त्वाचा मुलमंत्र आहे. जलव्यवस्थापनाचे महत्व, प्रचार, प्रसार हा जनसामान्यापर्यंत होणे आवश्यक आहे.

जलव्यवस्थापन या विषयी असे म्हणता येईल की, 'जमिनीमध्ये उपलब्ध असलेल्या जलाशयाचा अंदाज घेऊन वर्षभरासाठी त्याचा कमीत कमी वापर करुन जास्त पिकाचे उत्पादन घेता येईल याचा व्यवस्थित अभ्यास करुन वार्षिक नियोजित आराखडा तयार करणे म्हणजेच जलव्यवस्थापन होय.' किंवा 'उपलब्ध नैसर्गिक जलाचे योग्य नियोजन, भविष्याबद्दलचा अंदाज बांधणे, संघटन करणे, आदेश देणे, समन्वय साधून नियंत्रण ठेवणे म्हणजेच जलव्यवस्थापन होय.'

**अभ्यासाची उद्दिष्टे :**

१. जलव्यवस्थापनाचे स्वरुप जाणून घेणे.
२. जलव्यवस्थापनाचे महत्व स्पष्ट करणे.
३. जलव्यवस्थापनेसाठी करावे लागणा-या उपायांचा शोध घेणे.
४. उपलब्ध जलसंपदेचा आढावा घेणे.
५. पाण्याची व पाणीप्रश्नामुळे उद्भवणा-या संकटाची जाणीव करुन देणे.
६. कृषी, औद्योगिक, घरगुती वापरासाठी होणा-या पाण्याच्या अपव्ययाची जाणीव करुन देणे.

**संशोधन पद्धती :**

प्रस्तुत शोध निबंधासाठी दुय्यम स्त्रोताचा उपयोग करण्यात आला आहे. त्यामध्ये संदर्भ ग्रंथ, संशोधन पत्रिका, मासिके, वर्तमानपत्रे, पुस्तके, इंटरनेट यांचा उपयोग करण्यात आला आहे.

## उपलब्ध पाण्याचा आढावा :

पृथ्वीवर पाण्याचा एकूण साठा १३६ कोटी घन किलोमीटर आहे. त्यापैकी सुमारे १३३ कोटी घन किलोमीटर पाणी सागर, महासागरात उपलब्ध आहे. बर्फाच्या रुपात तसेच नद्या, नाले, तळी, धरण, तलाव, सरोवरे व भूमिगत स्वरुपात सुमारे ०३ कोटी घन किलोमीटर पाणी आहे. जमिनीत मुरलेल्या पाण्याचे प्रमाण ४०,००० घन किलोमीटर आहे. पृथ्वीवर उपलब्ध पाण्यापैकी ६७.४ टक्के पाणी सागर व महासागरात खा-या स्वरुपात असून बर्फाच्छादित स्वरुपात १.६८ टक्के, भूमिगत भागात ०.६० टक्के, नद्या व नाले यामध्ये ०.००१ टक्के, प्राणी, वातावरण व वनस्पती यांच्यात ०.००७ टक्के, मृदा आणि आर्द्रितेत ०.००५ टक्के तसेच तळे व सरोवरात ०.००७ टक्के पाणी उपलब्ध आहे.

## जलव्यवस्थापनाचे मार्ग :

१) जलव्यवस्थापनेसाठी समाजाला जलसाक्षर करणे.

२) लोकांना पाण्याचे व्यवस्थापन करण्यासाठी प्रोत्साहीत करणे.

३) जे पाणी उपलब्ध आहे. त्याचे योग्य नियोजन करणे.

४) पाणी उपश्यावर नियंत्रण ठेवण्यासाठी कडक कायदे करणे व दंडात्मक कारवाई करणे.

५) पाण्याचा अपव्यय कमी करण्यासाठी नवीन पद्धतीचा व तंत्रज्ञानाचा वापर करणे.

६) शेतीसाठी योग्य पद्धतीने पाणी देणे व पीक पद्धतीत बदल करणे.

७) वृक्षलागवड व जोपासनेसाठी प्रशासकीय पातळीवरुन मोठ्या प्रमाणात प्रयत्न करणे.

८) भविष्यातील पाण्याच्या समस्येचा अभ्यास करणे व उपाययोजना करणे.

९) पाण्याची उपलब्धता लक्षात घेवून वापरलेल्या पाण्याचे शुद्धीकरण करुन त्याचा पुन्हा उपयोग करणे.

१०) जलपुनर्भरणासाठी प्रयत्न करणे त्यासाठी नवनवीन तंत्रज्ञानाचा अवलंब करणे.

११) शाळा, महाविद्यालय, सामाजिकसंस्था, बचतगट, शासकीययंत्रणा यांच्यावतीने पाण्याचे व्यवस्थापन करण्यासाठी प्रचार, प्रसार व जनजागृती करणे.

## जलव्यवस्थापनाचे स्वरुप :

प्राचीन काळापासून मानव हा विविध कार्यासाठी पाण्याचा वापर करत आला आहे. नैसर्गिक साधनसंपत्तीपैकी पाणी ही महत्त्वाची संपत्ती म्हणून ओळखले जाते. सजीवाच्या दृष्टीने पाण्याचे अनन्यसाधारण महत्त्व आहे. पण अलिकडे मानवाने नैसर्गिक साधनसंपत्तीचा अतोनात अपव्यय केला आहे. त्याचा जलसंपत्तीवर ही परिणाम झाला आहे. मानवाकडून पाण्याचा मोठ्या प्रमाणात अपव्यय होत असल्याने त्याचे संवर्धन करणे काळाची गरज आहे. जलसंवर्धन म्हणजे जलस्त्रोताचा काळजीपूर्वक वापर व जतन करणे होय. विविध क्षेत्रात पाण्याचा उपयोग केला जातो. त्यामुळे विविध क्षेत्रातील जलव्यवस्थापनाचे स्वरुप समजून घेणे गरजेचे आहे.

## १. कृषी जलव्यवस्थापन :

गोड्या पाण्याचा सर्वात जास्त उपयोग शेतीमध्ये केला जातो. मानवाच्या एकूण वापराच्या ७० टक्के गोडेपाणी हे शेतीसाठी उपयोगात आणले जाते. भारतीय कृषी व्यवसाय हा विविधतेने नटलेला आहे. पण मानवाने वापरलेली चुकीची जलसिंचन पद्धती, कालव्याद्वारे होणारी पाणी गळती, बाष्पीभवनातून होणारा पाण्याचा अपव्यय यासारख्या अनेक चुकांमुळे प्रचंड पाणी वाया जात आहे. हे सर्व थांबवून कृषी क्षेत्रात पाण्याचे व्यवस्थापन करणे आवश्यक आहे.

## अ. बाष्पीभवनाचे प्रमाण कमी करणे :

बाष्पीभवन कमी करण्यासाठी वाळू मिश्रीत मृदेमध्ये स्टार्चचे पॉलिमर आणि अक्रिलोनायट्राईल याचा वापर करावा. कारण त्यातून झरकन पाणी शोषले जाते.

## ब. भूपृष्ठावरील वाया जाणा-या पाण्याचे व्यवस्थापन करणे :

पावसाचे जमिनीवर पडणारे पाणी बरेचसे वाया जाते. जमिनीवरुन वाहणा-या पाण्याला जमिनीत मुरविल्यास वाहत्या पाण्याला अटकाव होईल. त्यासाठी शेती पद्धतीत बदल करणे आवश्यक आहे. म्हणजेच उतारावर पाय-या-पाय-याची शेती करणे, समोच्च रेषेनुसार शेती करणे, पाणी साठविण्याची व्यवस्था करणे, शेतीत पाणी पसरविण्यासाठी खांजण समतल करणे, शेतात पिकांचा उर्वरित भाग पसरविणे, शेतीमध्ये जिप्समसारख्या रासायनिक पदार्थांचा वापर करणे, त्याबरोबरच भारतात व महाराष्ट्रात नद्या जोड प्रकल्प राबवावा.

स्वातंत्र्यप्राप्तीनंतर पाण्याच्या क्षेत्रात सर्वाधिक काम महाराष्ट्रात झाले. सर्वाधिक धरणे महाराष्ट्रातच आहेत. मात्र योग्य नियोजनाअभावी ही परिस्थिती निर्माण झाली आहे. महाराष्ट्रातील धरणे गाळाने भरली असल्याने पावसाचे पाणी झिरपण्याची प्रक्रियाच थांबली आहे. नद्या, विहिरी आणि बोअरवेल्स या कोरड्या पडल्या आहेत. यामुळे पाण्याचे संकट निर्माण झाले आहे.

## क. जलसिंचनातील पाण्याचे नुकसान कमी करणे :

जलसिंचनातील पाण्याचे नुकसान टाळण्यासाठी पिकांना सकाळी किंवा संध्याकाळी पाणी देणे. आधुनिक कृषी पद्धतीचा वापर करणे. ऊस, फळबाग, भाजीपाला व इतर व्यापारी पिकासाठी नवीन तंत्रज्ञानाचा वापर करणे. शेतमध्ये नवीन नवीन तंत्रज्ञानाचा वापर करुन पिकांचे उत्पादन घेणे. ठिबक व तुषार सिंचनाचा वापर करणे. ऊसासारख्या पिकाचे उत्पादन घेताना सुक्ष्म

नलीका (मायक्रोक्युब पध्दत), दाबनियंत्रण नसणारे ड्रिपर्स असणारी पध्दत, फॅनजेट सिंचन पध्दत, लॅटरलचे आत ड्रिपर्स असणारी पध्दत इत्यादी ठिबक सिंचन पध्दतीचा वापर करावा. जेणेकरुन ऊस उत्पादनात वाढ होईल व पाण्याचा अपव्यय टाळता येईल.

शेतीमध्ये शेततळे, पाटबंधारे, विहिरी यासारख्या पाणी साठविण्याच्या सिंचन पध्दती आवश्यक आहेत. कमी पाण्यावर येणा-या संकरित वाणांची लागवड करणे. उपलब्ध पाण्यामध्ये घेतलेल्या पिकांचे उत्पादन वाढवणे. शेतीमध्ये पाण्याचा कमीत कमी वापर करणे. कालव्यातील पाण्याचा पाझरा कमी करण्यासाठी कालव्यांना अस्तर देणे. पर्जन्य हंगामाच्या परंपरागत व अपरंपरागत पध्दतीचा वापर करावा. अशा पध्दतीने जलव्यवस्थापन करणे काळाची गरज आहे.

## २. औद्योगिक जलव्यवस्थापन :

मानव एकूण पाणी वापराच्या २३ टक्के पाण्याचा वापर उद्योगासाठी करतो. पण हे उद्योगधंदे अतिशय मोठ्या प्रमाणात पाण्याचा अपव्यय करत आहेत. औद्योगिक क्षेत्रात पाण्याचा अपव्यय टाळण्यासाठी उद्योगातील शीतजलाचा वापर जलसिंचनासाठी किंवा अन्यत्र करावा, उद्योगधंद्यामध्ये पाण्याचा कमी वापर करणारी शुष्क शितलीकरण प्रणाली स्वीकारावी त्यामुळे पाण्याचा वापर कमी होऊन पाण्याचा अपव्यय टाळता येतो. अशा पध्दतीने औद्योगिक क्षेत्रात पाण्याचे व्यवस्थापन करता येईल.

## ३. घरगुती जलव्यवस्थापन :

मानव एकूण पाणी वापराच्या ७ टक्के पाण्याचा वापर घरगुती कारणासाठी करतो. हे गोडे पाणी वापरत असतांना पाण्याचा मोठ्या प्रमाणात अपव्यय होतो. त्यासाठी झाडांना सकाळी किंवा संध्याकाळी पाणी घालणे, पाईप व नळाद्वारे होणारी गळती बंद करणे, जलप्रवाह कमी असणारी स्वच्छतागृहे वापरणे, तोंड धुतांना पाणी शक्यतो मगामध्ये घेणे, दात घासतांना व दाढी करतांना आवश्यक तेव्हा नळ सुरु करावा, वॉशिंग मशिनमध्ये वापरलेले पाणी झाडांना घालावे आणि स्थानिक स्वराज्य संस्थांनी पाण्याचे मिटर बसवावे. अशा पध्दतीने घरगुती वापरासाठी होणा-या गोड्या पाण्याचा अपव्यय टाळता येतो. त्यातूनच जलव्यवस्थापन होऊ शकते.

गोड्या पाण्याचा घरगुती, उद्योग व कृषी यासाठी होणारा अविवेकी वापर हा मानवासाठी पुढील काळातील एक धोक्याची घंटा आहे. पाण्याच्या स्त्रोताचे जतन व संवर्धन करणे काळाची गरज आहे. कारण दिवसेंदिवस जगाची लोकसंख्या वाढत आहे. अतिशय झपाट्याने वाढणा-या लोकसंख्येला पर्याप्त प्रमाणात गोड्या पाण्याचा पुरवठा होण्यासाठी जलव्यवस्थापन करणे ही काळाची गरज आहे.


## जलव्यवस्थापनाचे उपाय :

१)　पाणी हे अमूल्य आहे तसेच ती एक नैसर्गिक संपत्ती आहे. तिचा सर्वांनी प्रमाणशीर वापर केला पाहिजे.

२)　जमिनीवर वाहणा-या पाण्याचा वेग कमी करुन बांध, बंधारे बांधणे, टिकावू पध्दतीने पाण्याचा वापर करणे, वनराई बंधा-याची कमी खर्चात निर्मिती करणे, शेततळी तयार करणे, मोठ्या धरणाऐवजी छोट्या धरणांची व जलसाठ्याची निर्मिती करणे.

३)　पिण्याच्या पाण्याचा अपव्यय किंवा स्वच्छतेविषयी तांत्रिक ज्ञान देणे गरजेचे आहे. घाण पाणी शुद्ध करुन वापरात आणणे आवश्यक आहे. यासाठी यांत्रिक पध्दतीचा वापर केल्यास पाण्यात मिसळलेले पदार्थ विशेष उपकरणाच्या सहाय्याने वेगळे केले जातात. त्याबरोबरच भौतिक रासायनिक शुद्धीकरण पध्दती, जैविक शुद्धीकरण पध्दती अशा विविध पध्दतीचा वापर करुन पाण्याचा अपव्यय टाळता येतो.

४)　दलदलीच्या प्रदेशाचे संवर्धन करुन धरणासाठी छोटे जलसंधारण प्रदेश निर्माण करुन त्यावर धरणे बांधणे.

५)　पाण्याचे प्रदूषणापासून संरक्षण करणे. कारण अलिकडे उद्योगधंदे, वाहतूक साधनांचा शीघ्र विकास झाल्यामुळे पाण्याचा फक्त उपयोगच वाढला नसून पाण्याचे प्रदूषण देखील मोठ्या प्रमाणात वाढले आहे.

६)　नदीवर बांध बांधून पूरनियंत्रण केले जाते व ते पाणी जलाशयात एकत्रित केले जाते. पुरव्यवस्थापन करुन पुर आलेल्या प्रदेशातील पाणी अवर्षण प्रदेशात वळविता येईल. नद्याजोड प्रकल्पाची मंजूरी घेवून एका नदीतील पाणी दुस-या नदीत टाकून अवर्षणप्रवण क्षेत्राची दुष्काळ सदृश्य परिस्थिती कमी करु शकतो.

७)　पिण्याचे पाणी प्रत्येकाला मिळणे हा त्याचा हक्क आहे. तसेच गरज पूर्ण झाल्यानंतर पाणी वाया न जावू देणे त्यांचे कर्तव्य आहे. 'वाचवील पाणी साठवील पाणी त्यालाच फक्त जगवील पाणी' याविषयी जाणीवजागृती निर्माण करणे आवश्यक आहे.

८)　जलपूनर्भरण कार्यक्रमाअंतर्गत रेन वॉटर हार्वेस्टिंग म्हणजेच टेरेस किंवा छतावर पडलेला पाण्याचा प्रत्येक थेंब साठवून आपल्याच घरातील जमिनीत पाणी मुरविणे गरजेचे आहे, यासाठी पावसाचा प्रत्येक थेंब भूगर्भामध्ये मुरविण्यासाठी प्रयत्नाची पराकाष्टा करणे तसेच देशभरात जलपुनर्भरण कार्यक्रम चळवळ सक्रिय करण्याची गरज आहे.

९)　कारखान्यातून बाहेर पडणा-या दुषित पाण्यावर प्रक्रिया करुन कृषिसाठी उपयोगात आणणे.

१०)　पाण्याला राष्ट्रीय संपत्ती म्हणून जाहिर करणे. त्यामुळे पाण्याचा दुरुपयोग करणा-यास कडक शिक्षा करावी. यासाठी होणा-या दंडाची आणि शिक्षेची लोकांना जाणीव करुन देण्यासाठी प्रसारमाध्यमांची मदत घ्यावी. व पाण्याचे महत्व पटवून द्यावे.

**निष्कर्ष :**

नैसर्गिक साधनसंपत्तीपैकी पाणी ही मानवाला मिळालेले अतिशय महत्त्वाची देण आहे. पृथ्वीच्या पृष्ठावर गोड्या पाण्याचे प्रमाण अतिशय मर्यादित आहे. त्यामुळे त्याचा वारेमाप वापर करता येत नाही. अलिकडे जगातील जलतज्ञांच्या अंदाजानुसार गोड्या पाण्याच्या संपत्तीत घट होत आहे. जनसामान्यात पाण्याविषयी जलसाक्षरता वाढविणे गरजेचे आहे. म्हणूनच प्रत्येकाने जलसाक्षरतेची सुरुवात स्वतःपासून करण्याची वेळ आली आहे.

भारतीय शेतीमध्ये ठिबक सिंचन, तुषार सिंचन, मटका सिंचन यामुळे पाण्याचा अपव्यय टाळता येतो. तरच जलक्रांतीच्या दिशेने मानवजातीची वाटचाल सुरु होऊ शकेल. जगाची लोकसंख्या अतिशय जलद गतीने वाढत आहे. त्यामुळे वाढत्या लोकसंख्येची पाण्याची गरज पूर्ण करण्यासाठी, शेतीवर पाण्याच्या अतिवापराने संकट येऊ नये, त्यातून अन्नाचा व पाण्याचा प्रश्न गंभीररुप धारण करु नये यासाठी पाण्याचे संवर्धन करणे, जलव्यवस्थापनासाठी जलसाक्षर होणे आवश्यक आहे.

म्हणून जलसिंचन व्यवस्थेत पाणी वापराचे योग्य नियोजन व व्यवस्थापन करणे काळाची गरज आहे.

**संदर्भग्रंथ :**

१. *पर्यावरणीय शिक्षण : डॉ.प्रकाश सावंत*
२. *जलस्वराज्य माहिती पुस्तिका : महाराष्ट्र शासन*
३. *साधनसंपत्ती भूगोल : डॉ.विठ्ठल घारपुरे*
४. *भूगोल व कृषी : ए.बी.सवदी*
५. *पर्यावरण भूगोल : डॉ.फुले, डॉ.शेटे, डॉ.शहापूरकर*
६. *अॅग्रोवन व शेतकरी शेती विशेषांक*
७. *समाजप्रबोधन पत्रिका*

# प्राकृतिक भूगोलाचा मानवी जीवनावर पडलेला प्रभाव : एक अभ्यास

**डॉ. दिलीप गो. भोगे**

भूगोल विभाग

आझाद महाविद्यालय, औसा,जि.लातूर

**प्रस्तावना :**

प्रस्तुत शोधनिबंधात प्राकृतिक भूगोलाचा मानवी जीवनावर पडलेल्या प्रभावाचा अभ्यास करताना नैसर्गिक पर्यावरणातील शिलावरण, वातावरण, जलावरण व जीवावरण या चार आवरणांच्या विशेषतेचे विश्लेषण करण्यात आले आहे. मानवाची प्रत्येक कृती निसर्गाने संपन्न केलेल्या सर्व घटकांशी प्रत्यक्ष किंवा अप्रत्यक्षरित्या निगडीत आहे. त्यामुळे मानवी क्रियांचा अभ्यास करताना प्राकृतिक भूगोलाचा अभ्यास करणे आवश्यक ठरते. प्राकृतिक भूगोलाच्या शाखा मानवाच्या प्रत्येक कार्याचा अभ्यास करतात. म्हणूनच प्राकृतिक भूगोल मानवी जीवनाशी निगडीत असून त्याच्या मूलभूत गरजा प्राकृतिक भूगोलाच्या घटकाद्वारेच भागविल्या जातात. मानवी जीवनाच्या दृष्टीने प्राकृतिक भूगोलाचा परिचय व त्याचे महत्त्व जाणून घेण्याची आवश्यकता असल्याने त्याचा अभ्यास केलेला आहे.

**उद्दिष्ट्ये :**

सदरील शोधनिबंधाचा अभ्यास खालील उद्दिष्टांना अनुसरुन केलेला आहे.

१. प्राकृतिक भूगोलाच्या प्रमुख शाखांचे महत्त्व अभ्यासणे.

२. भूरुपांचा मानवी क्रियांवर होणाऱ्या परिणामांचा अभ्यास करणे.

३. हवामानाचा मानवी जीवनावरील प्रभावाचा अभ्यास करणे.

४. सागर क्षेत्राची मानवी जीवनातील उपयुक्तता अभ्यासणे.

५. जैविक घटकामुळे होणाऱ्या मानवी विकासाचा अभ्यास करणे.

**माहिती स्रोत :**

प्रस्तुत शोधनिबंधासाठी आवश्यक असलेली माहिती संकलित करण्याचे स्रोत द्वितीयक स्वरुपाचे आहेत. पुस्तके, साप्ताहिके, वृत्तपत्रे, विविध संशोधन जरनल, इंटरनेट साईट याद्वारे संकलित करण्यात आलेली आहे. या संकलित माहितीच्या आधारे प्राकृतिक भूगोलाचा मानवी जीवनावर पडलेल्या प्रभावाचा अभ्यास करण्यात आलेला आहे.

**अभ्यास क्षेत्र :**

सदरील शोधनिबंधासाठी भूगोलशास्त्राच्या प्राकृतिक भूगोल या आद्य महत्त्वाच्या शाखेची निवड करण्यात आलेली आहे. प्राकृतिक भूगोलात शिलावरण, वातावरण, जलावरण व जीवावरण या प्रमुख घटकांचा समावेश आहे. हा प्रत्येक घटक एक स्वतंत्र अभ्यासविषय झाल्याने त्यांच्या वेगवेगळ्या शाखा निर्माण झालेल्या आहेत. या शाखा मानवाच्या प्रत्येक कार्याचा अभ्यास करतात. प्राकृतिक भूगोलाशिवाय भूगोलाच्या कोणत्याही शाखेचे अध्ययन होऊ शकणार नाही. त्यासाठी प्राकृतिक भूगोलाचे प्राथमिक ज्ञान असणे अत्यंत आवश्यक आहे. प्राकृतिक भूगोलाच्या अभ्यासात भूरुपशास्त्र, हवामानशास्त्र, मृदा शास्त्र, सागरशास्त्र, जैविक भूगोल या महत्त्वपूर्ण शाखांचा अभ्यास करण्यात आलेला आहे.

**अभ्यासपद्धती :**

प्रस्तुत शोधनिबंधामध्ये द्वितीयक स्रोताद्वारे मिळविलेल्या माहितीचे विश्लेषण करण्यात आले आहे. माहिती विश्लेषणासाठी पुस्तके, साप्ताहिके, वृत्तपत्रे, विविध संशोधन जरनल इत्यादींचा आधार घेण्यात आला आहे. मिळालेली माहिती एकत्र केली व या माहितीचे विश्लेषण करुन निष्कर्ष काढण्यात आले आहेत.

**विषय विवेचन :**

मानवाच्या मूलभूत गरजा प्रत्यक्ष-अप्रत्यक्षरित्या प्राकृतिक भूगोलाच्या घटकाद्वारेच भागविल्या जातात. त्यात भूरचना, हवामान, सागर व जैविक इत्यादी मानवी जीवनावर प्रभाव पाडणाऱ्या घटकांचा समावेश आहे. म्हणून या घटकांचे विवेचन करणे आवश्यक आहे. निसर्ग व मानव यांच्यात परस्पर सहकार्य असल्यास त्यातून मानवी जीवन सुखी होईल. त्यासाठी प्राकृतिक भूगोलाच्या शाखा व त्याचे महत्त्व जाणून घेण्याची आवश्यकता आहे.

**भूरुपांचा प्रभाव :**

पृथ्वीच्या पृष्ठभागावरील विविध भूरुपे, त्यांची निर्मिती, उत्क्रांती, भूपृष्ठांच्या जडण-घडणीमध्ये सहभागी होणाऱ्या शक्ती, भूरुपांचे वर्गीकरण, वितरण इत्यादींचा अभ्यास भूरुपशास्त्रात केला जातो. भूरुपातील पर्वत, पठारे व मैदानांचे मानवाच्या क्रियांवर अनुकूल व प्रतिकूल परिणाम होतात. भूपृष्ठावर आढळणाऱ्या विविध मृदा व वितरण यावर भूरुपांचा प्रभाव पडतो. पृथ्वीच्या अंतर्गत घडामोडींमुळे पृथ्वीच्या पृष्ठभागावर परिणाम होतो. मानवाच्या दृष्टीने भूकंप-ज्वालामुखीच्या क्षेत्रात बरेचसे हानीकारक परिणाम होतात. तर पृथ्वीवरील बहिर्गत शक्तींची कारके भूभागावर बदल घडवून आणतात. या परिणामांचे स्वरुप समजावून घेण्यासाठी याचा अभ्यास करावा लागतो. या सर्व बाबींचे निरिक्षण करुन मानवास वस्ती, उद्योगधंदे स्थापन करावे लागतात. यावरुन प्राकृतिक भूगोलांचा अभ्यास मानवी जीवनाशी निगडीत असल्याचे स्पष्ट होते.

**हवामानाचा प्रभाव :**

हवा, हवामान, हवेची घनता, वातावरणाची रचना, आर्द्रता, पर्जन्य, हवामान प्रकाराचे वितरण इत्यादी घटकांचा अभ्यास हवामानशास्त्रात केला जातो. म्हणूनच एकेकाळी भूरचनेपेक्षाही हवामान या घटकास मानवी जीवनाच्या संदर्भात जास्त महत्त्व होते.

हवामानाचा मानवाच्या जीवनावर अनेक प्रकारे प्रभाव पडतो. प्रदेशानुसार हवामान बदललेले असते. ते काही प्रदेशात प्रतिकूल तर काही प्रदेशात अनुकूल असे असते. याचा परिणाम मानवाचे वस्तीस्थान, शेती, उद्योगधंदे आणि वाहतूकीवर होतो. ऋतुनुसार मुसळधार पाऊस, उष्ण हवेची लाट, पूर, थंड हवेची लाट, धुके, दुष्काळ, अभ्राच्छादित आकाश इत्यादींचा प्रभाव मानवी जीवन व मानवी व्यवसायावर होतो. याचा परिचय होण्यासाठी हवामानशास्त्राचा अभ्यास करावा लागतो. मानवाच्या जीवनाशी संबंधीत मृदेचा व वनस्पती जीवनाचा विकास हा हवामानाशी निगडीत असतो. म्हणून हवामान या घटकाचा प्रभाव मानवी जीवनावर पडलेला असतो.

## सागराचा प्रभाव :

सागरजलाचे तापमान, सागरजलाची क्षारता, भरती-ओहोटी, सागरी किनारे, सागरतळ, सगरतळावरील निक्षेप, जलसंपत्ती, सागराचे आर्थिक महत्त्व, सागरजलाच्या हालचाली इत्यादी घटकांचा अभ्यास सागरशास्त्र विषयक भूगोलात केला जातो. या घटकांचा सागर किनारपट्टीलगत प्रभाव पडतो. त्यामुळे या घटकांचे स्वरुप समजावून घेणे आवश्यक असते. सागर किनाऱ्याची रचना, भरती-ओहोटीचा परिणाम मानवी जीवनावर होतो. एखाद्या देशाचा व्यापार बंदराच्या स्वरुपावर अवलंबून असतो. महासागराचा परंपरागतदृष्ट्या वाहतूक संरक्षण आणि मासेमारीसाठी मानव उपयोग करत असतो. त्यामुळे मानवाचे अधिकाधिक लक्ष सागराकडे वेधू लागले आहे. यावरुन सागराचा मानवी जीवनावर प्रभाव पडलेला दिसतो.

## जैविक घटकांचा प्रभाव :

पृथ्वीवरील वनस्पती व प्राणी यांचा अभ्यास जैविक भूगोलात केला जातो. मानव आणि जीवावरण दरम्यान पारस्पारिक नातेसंबंध आहे. कारण मानवाचा अन्न ऊर्जेचा प्रमुख स्त्रोत वनस्पती असून वनस्पती व प्राणी ही मानवाची मुख्य साधनसंपत्ती आहे. मानवाच्या मूलभूत गरजा वनस्पती व प्राणी यांच्यावर अवलंबून असतात. तसेच मानवी प्रगतीसाठी जीवावरणाचा आधार घेतला जातो. यावरुन जैविक घटकांचा मानवी जीवनावर प्रभाव पडलेला दिसून येतो. अशाप्रकारे प्राकृतिक भूगोल मानवी जीवनाशी निगडीत असून तो मानवाचा एक अविभाज्य घटक आहे.

## निष्कर्ष :

सदरील संशोधनात प्राकृतिक भूगोलाचा मानवी जीवनावर पडलेल्या प्रभावाचा अभ्यास करण्यात आलेला असून त्यातून प्राकृतिक भूगोल मानवी जीवनाशी कसे निगडीत आहे हे स्पष्ट होते. मानवाच्या मूलभूत गरजा प्रत्यक्ष व अप्रत्यक्षरित्या प्राकृतिक भूगोलाच्या घटकाद्वारेच भागविल्या जातात. शिलावरण, वातावरण, जलावरण व जीवावरण या प्रमुख प्राकृतिक घटकांचा मानवी जीवनावर प्रभाव पडतो. हेच घटक मानवाच्या विकासास जबाबदार आहेत. म्हणून मानवामध्ये स्वतःची प्रगती साधण्यासाठी प्राकृतिक भूगोलातील घटकांशी सामंजस्य असणे आवश्यक आहे. यावरुन प्राकृतिक भूगोल मानवी जीवनाशी निगडीत असून तो मानवाचा एक अविभाज्य घटक आहे, हेच स्पष्ट होते.

## संदर्भसूची :

१. भूमिस्वरुपे : प्रा. सवदी व प्रा. केचे
२. भूशास्त्र परिभाषा : महाराष्ट्र राज्य भाषा संचालनालय
३. भूरुपशास्त्र : मगर जे.के.
४. भूरुपशास्त्र : तावडे एम.डी.
५. हवामानशास्त्र : प्रा.केचे व सवदी
६. हवामान व सागरशास्त्र : प्रा. ए.बी. सवदी
७. प्राकृतिक भूविज्ञान : प्रा. सु.प्र. दाते, सौ. दाते
८. जैविक भूगोल: डॉ. विठ्ठल घारपूरे
९. जीव भूगोल : डॉ. प्रदीप कुमार
१०. हवामान शास्त्र व सागर विज्ञान: कोलते, पुराणिक, कुबडे

# दक्षिण परभणी जिल्ह्यातील उच्च प्राथमिक शिक्षणाच्या सुविधेचा भौगोलिक वृत्तांत

**प्रा. डॉ. विश्वराज श्रीरामराव चिमणगुंडे**

भूगोल विभाग,

कला, वाणिज्य आणि विज्ञान महाविद्यालय,

गंगाखेड, जि.परभणी, महाराष्ट्र.

**सारांश :**

शिक्षणाच्या संदर्भात आज मोठ्या प्रमाणात जागृतता निर्माण झाली आहे. शिक्षण म्हटले की, आपणास शिक्षणाच्या विविध पायऱ्या डोळ्यासमोर येतात. यात प्राथमिक, उच्च प्राथमिक, माध्यमिक, उच्च माध्यमिक व उच्च शिक्षण अशा विविध शैक्षणिक पायऱ्यांतुन प्रत्येक व्यक्तीला शिक्षण घ्यावे लागते. परंतु या सर्व पायऱ्या सर्वत्र उपलब्ध आहेत का? तर त्याचे उत्तर नक्कीच नकारात्मक आपल्या डोळ्यासमोर येते. आजही ग्रामीण भागात अनेक विद्यार्थी शिक्षणासाठी एका गावातुन दुसऱ्या गावात पायपीट करताना दिसतात. छोट्या खेड्यातुन मोठ्या गावात शिक्षणासाठी ये-जा करताना दिसतात. या शिक्षण सुविधा प्रत्येक गावात सर्व आपण देवु शकतो का? निश्चीतच याचे उत्तर विविध बुद्धीने नाही असे येईल. कारण या सर्व विचारसरणीवर लोकसंख्या व इतर भौगोलिक घटक कारणीभुत ठरतात. त्यामुळे वरील शैक्षणिक व इतर अनेक सुविधा आपण प्रत्यक्ष प्रत्येक गावात देऊ शकत. परंतु प्राथमिक शिक्षण मात्र आज प्रत्येक गावामध्ये मिळत आहे व दिलेही जाते.

उच्च प्राथमिक शिक्षणाचा विचार केला असता हे शिक्षण मात्र सर्व गावांमध्ये उपलब्ध असलेले दिसत नाही. याचाच आधार घेऊन दक्षिण परभणी जिल्ह्यातील उच्च प्राथमिक शिक्षणाची सध्या स्थिती काय आहे. याचा विचार या शोधनिबंधात घेतला आहे. भारत स्वतंत्र होऊन मोठा कालावधी होऊनही आज आपण उच्च माध्यमिक शिक्षणाच्या सुविधा प्रत्येक ग्रामीण भागामध्ये देऊ शकलो नाहीत. याची मात्र खंत वाटते. अनेक प्राथमिक गरजा आपण ग्रामीण भागामध्ये पुरवठा करू शकलो नाहीत. त्यातच उच्च प्राथमिक शिक्षण सुविधा.

**प्रस्तावना :**

मानवाच्या ज्या मुलभुत गरजा आहेत त्यामध्ये अन्न, वस्त्र, निवारा आणि शिक्षण होय. शिक्षण म्हटले की, शिक्षणाच्या विविध पायऱ्यांतुन व्यक्तीला (मुलांना) जावे लागते. त्यामध्ये सरकारने तर प्राथमिक शिक्षण सर्वांना मोफत व आवश्यक उपलब्ध करून दिले आहे. पहिले ते पाचवी पर्यंतचे शिक्षण हे प्राथमिक शिक्षण, सहावी ते आठवीपर्यंतचे शिक्षण हे उच्च प्राथमिक शिक्षण व ९वी ते १०वी पर्यंतचे शिक्षण हे माध्यमिक शिक्षण म्हणुन ओळखले जाते. महाराष्ट्र शासनाने १० मे २०१० रोजी एक परिपत्रक प्रसिद्ध करून प्राथमिक शिक्षणाचा समावेश मुलभूत अधिकारांत केल्याचे जाहिर केले आहे. केंद्र सरकारने २७ ऑगस्ट २००९च्या राजपत्रात 'राईट ऑफ चिल्ड्रेन टू फ्री अँड कम्पल्सरी एज्युकेशन अॅक्ट, २००९' प्रसिद्ध केला आहे. त्यानुसार ६ ते १४ वयोगटातील सर्व बालकांना मोफत आणि सक्तीचे शिक्षण देणारा अधिनियम १ एप्रिल २०१० पासुन संपूर्ण भारतात लागू केल्याचे नमुद केले आहे.(जम्मू-काश्मीर सोडून)

शिक्षण हक्क कायद्यानुसार पहिली ते पाचवी पर्यंतच्या विद्यार्थ्यांना त्याच्या घरापासुन एक किलोमीटरच्या आत आणि सहावी ते आठवीच्या विद्यार्थ्यांना तीन किलोमीटरच्या आत मोफत शाळेची सुविधा उपलब्ध करून देणे सरकारला अनिवार्य असून, त्यापेक्षा अधिकच्या अंतरासाठी वाहतूक सुविधाही सरकारने करावयाची आहे. हे सर्व विचारात घेतले असता आपणास शिक्षणाविषयी सध्या काय स्थिती आहे हे पाहणे अनिवार्य आहे. त्यासाठी दक्षिण परभणी जिल्ह्याचा संशोधन क्षेत्र म्हणुन विचार केला आहे.

**बीज संज्ञा :**

उच्च प्राथमिक शिक्षण, उच्च प्राथमिक शिक्षणाच्या सुविधा

**उद्दिष्टे :**

१) उच्च प्राथमिक शिक्षण ही एक सेवा आहे. त्याविषयी अभ्यास करणे.

२) उच्च प्राथमिक शिक्षण सर्वांना (विद्यार्थ्यांना) देणे अनिवार्य आहे. ते दिले जाते का? हे पाहणे.

३) अभ्यास क्षेत्रामध्ये उच्च प्राथमिक शिक्षण सुविधा सर्वत्र आहे का याविषयी अभ्यास करणे.

४) उच्च प्राथमिक शिक्षण सुविधेवर भौगोलिक घटकांचा परिणाम होतो का ते अभ्यासणे.

**आधार सामग्री संकलन :**

दक्षिण परभणी जिल्ह्यातील उच्च प्राथमिक शिक्षण सुविधांचा भौगोलिक अभ्यास करण्यासाठी प्राथमिक आणि दुय्यम स्वरूपाच्या आधार सामग्रीचा वापर करण्यात आला आहे. प्राथमिक स्वरूपाच्या माहितीसाठी प्रत्यक्ष ग्रामीण क्षेत्राचे सर्वेक्षण केले आहे. दुय्यम स्वरूपाच्या आकडेवारीसाठी परभणी जिल्ह्यांची जनगणना पुस्तिकेचा वापर केला आहे.

**संशोधन पद्धती :**

दक्षिण परभणी जिल्ह्यातील उच्च प्राथमिक शिक्षण सुविधेच्या क्षमतेचा अभ्यास करण्यासाठी खालील सुत्राचा उपयोग केला आहे :

$$Xie = \frac{Pi}{mp}$$

**खुलासा :**

$Xie$ =सर्कलमधील सेवा सुविधांची अपेक्षित संख्या

Pi =सर्कलमधील एकुण ग्रामीण लोकसंख्या

mp = तालुक्यातील प्रती एक सुविधावर अवलंबुन असलेली लोकसंख्या

$$mp = \frac{P}{Fi}$$

खुलासा :

P =तालुक्यातील एकुण लोकसंख्या

Fi = प्रत्येक एक सेवा सुविधांची एकुण संख्या

अभ्यास क्षेत्र :

प्रस्तुत शोध निबंधासाठी मराठवाडा विभागातील परभणी जिल्ह्याचा दक्षिणेकडील भागाची निवड केली आहे. परभणी जिल्ह्याच्या मध्यैंतुन गोदावरी नदी वाहते. गोदावरी नदीच्या दक्षिणेकडील भागाचा संशोधनासाठी अभ्यास क्षेत्र म्हणुन निवडले आहे. दक्षिण परभणी जिल्ह्यात गंगाखेड, पालम व सोनपेठ या तीन तालुक्यांचा समावेश होतो. दक्षिण परभणी जिल्ह्याचा अक्षवृत्तीय विस्तार $18^0$42’27’’ उत्तर ते $19^0$7’55’’ उत्तर तर रेखावृत्तीय विस्तार $76^0$26’2’’ पूर्व ते $77^0$6’18’’पूर्व दरम्यान असुन या क्षेत्राच्या उत्तरेस परभणी, पूर्णा, मानवत व पाथरी हे तालुके, पश्चिमेस बीड जिल्हा, दक्षिणेस लातुर जिल्हा तर पुर्वेस नांदेड जिल्ह्याची सीमा आहे. दक्षिण परभणी जिल्ह्याच्या उत्तर सीमेवरून गोदावरी नदी वाहते तर पश्चिम सीमेवरून वाण नदी वाहते तर सीमेवर बालाघाट डोंगररांगा पसरलेल्या आहेत. दक्षिण परभणी जिल्ह्याचे एकुण क्षेत्रफळ १५८३.२८ चौरस किलोमीटर आहे. या क्षेत्राची ग्रामीण लोकसंख्या २,७०,१८२ आहे तर लोकसंख्येची घनता दर चौरस किलोमीटरला १७१ एवढी आहे. संपूर्ण परभणी जिल्ह्याच्या एकुण क्षेत्रफळाच्या २५.२० टक्के क्षेत्र या विभागाने व्यापले आहे तर महाराष्ट्राच्या एकुण क्षेत्रफळापैकी ०.५१ टक्के क्षेत्र या विभागाने व्यापलेले आहे.

दक्षिण परभणी जिल्ह्यात एकुण तीन तालुक्यात सात सर्कलचा समावेश होतो. या विभागात सोनपेठ व गंगाखेड येथे नगर पालिका आहे तर एकुण २४८ ग्रामीण वसाहती आहेत. गंगाखेड तालुक्यात माखणी, गंगाखेड व राणी सावरगाव ही सर्कलची ठिकाणे आहेत तर पालम तालुक्यात पालम व चाटोरी ही दोन सर्कल व सोनपेठ तालुक्यात सोनपेठ व आवलगाव ही सर्कल (महसुल मंडळ) आहेत.

विषय विवेचन :

दक्षिण परभणी जिल्ह्यातील एकुण ग्रामीण वसाहतीमध्ये एकुण उच्च प्राथमिक शाळांची संख्या १२१ इतकी आहे. एका उच्च प्राथमिक शाळेवर २२३३ एवढी ग्रामीण लोकसंख्या अवलंबून आहे. दक्षिण परभणी जिल्ह्यैंतील सर्कलनिहाय एकुण ग्रामीण वसाहतीतील उपलब्ध असलेली उच्च प्राथमिक शाळांची संख्या आणि एकुण ग्रामीण लोकसंख्या याचा विचार करून सर्कलनिहाय अपेक्षित उच्च प्राथमिक शाळांची संख्या सुत्राच्या साहाय्याने काढली आहे.

अभ्यास क्षेत्रातील एकुण उपलब्ध उच्च प्राथमिक शाळांच्या संख्येपैकी सर्वांत जास्त संख्या पालम सर्कलमधील ग्रामीण वसाहतीमध्ये २२ एवढी आढळते. त्या खालोखाल गंगाखेड व चाटोरी सर्कलमधील ग्रामीण वसाहतीमध्ये प्रत्येकी १९ आढळते. राणी सावरगाव सर्कलमधील ग्रामीण वसाहतीमध्ये १८, माखणी सर्कलमधील ग्रामीण वसाहतीमध्ये १८, आवलगाव सर्कलमधील ग्रामीण वसाहतीमध्ये १७, आणि सर्वांत कमी उच्च प्राथमिक शाळांची संख्या सोनपेठ सर्कलमधील ग्रामीण वसाहतींमध्ये फक्त ८ एवढी आहे.(सारणी क्रमांक १.१)

### सारणी क्रमांक १.१: सर्कलनिहाय ग्रामीण वसाहतीतील उच्च प्राथमिक शिक्षणाची सुविधा

| अ.क्र. | सर्कल | उच्च प्राथमिक शाळांची उपलब्ध संख्या | उच्च प्राथमिक शाळांची अपेक्षित संख्या |
|---|---|---|---|
| १ | सोनपेठ | ०८ | ०९ |
| २ | आवलगाव | १७ | १५ |
| ३ | गंगाखेड | १९ | २० |
| ४ | माखणी | १८ | १६ |
| ५ | राणीसावरगाव | १८ | २० |
| ६ | पालम | २२ | २४ |
| ७ | चाटोरी | १९ | १७ |
| | एकुण | १२१ | १२१ |

अभ्यास क्षेत्रातील चाटोरी, माखणी आणि आवलगाव या सर्कलमध्ये उच्च प्राथमिक शाळांची अपेक्षित संख्या अनुक्रमे १७, १६ व १५ असणे आवश्यक आहे. परंतु या सर्कलमधील एकुण ग्रामीण वसाहतीमध्ये उच्च प्राथमिक शाळांची संख्या अनुक्रमे १९, १८ व १७ एवढी आहे. यावरून असे स्पष्ट होते की, या सर्कलमधील एकुण ग्रामीण लोकसंख्येला अनुसरून एकुण ग्रामीण वसाहतीमध्ये आवश्यक असलेल्या अपेक्षित उच्च प्राथमिक शाळांच्या संख्येपेक्षा उपलब्ध असलेल्या उच्च प्राथमिक शाळेची संख्या जास्त आहे. उपलब्ध उच्च प्राथमिक शाळांची संख्या आणि अपेक्षित उच्च प्राथमिक शाळांच्या संख्येच्या निरीक्षणावरून या सर्कलमधील ग्रामीण वसाहतीमध्ये उच्च प्राथमिक शिक्षणाची सुविधा उच्च स्वरूपाची आहे.

गंगाखेड आणि सोनपेठ सर्कलमधील ग्रामीण वसाहतीमध्ये उच्च प्राथमिक शाळांची अपेक्षित संख्या अनुक्रमे २० व ०९ एवढी असणे अपेक्षित आहे. परंतु या सर्कलमधील ग्रामीण वसाहतीमध्ये उच्च प्राथमिक शाळांची उपलब्ध संख्या अनुक्रमे १९ व ०८ एवढीच

आहे. या सर्कलमध्ये ग्रामीण वसाहतीतील उच्च प्राथमिक शाळांची अपेक्षित संख्येपेक्षा उच्च प्राथमिक शाळांची उपलब्ध संख्या प्रत्येक सर्कलमध्ये एकने कमी आहे. त्यामुळे या दोन्ही सर्कलमध्ये प्रत्येकी एक उच्च प्राथमिक शाळेची आवश्यकता आहे.

पालम व राणीसावरगाव या सर्कलमध्ये अपेक्षित उच्च प्राथमिक शाळांची संख्या अनुक्रमे २४ व २० एवढी असणे आवश्यक आहे. परंतु या सर्कलमध्ये एकुण ग्रामीण वसाहतीमध्ये उच्च प्राथमिक शाळांची संख्या अनुक्रमे २२ आणि १८ एवढी आहे. यावरून असे स्पष्ट होते की, या सर्कलमधील एकूण ग्रामीण लोकसंख्येला अनुसरून एकूण ग्रामीण वसाहतीमध्ये आवश्यक असलेल्या अपेक्षित उच्च प्राथमिक शाळांच्या संख्येपेक्षा उपलब्ध असलेली उच्च प्राथमिक शाळांची संख्या कमी असल्याचे आढळते. उपलब्ध उच्च प्राथमिक शाळांची संख्या आणि अपेक्षित उच्च प्राथमिक शाळांच्या संख्येच्या निरीक्षणावरून या तालुक्यातील ग्रामीण वसाहतीमध्ये उच्च प्राथमिक शिक्षणाची सुविधा निम्न स्वरूपाची असल्याचे आढळते. पालम व राणी सावरगाव सर्कलमधील ग्रामीण वसाहतीमध्ये ग्रामीण लोकसंख्येनुसार उपलब्ध उच्च प्राथमिक शाळांच्या संख्येमध्ये प्रत्येकी किमान ०२ उच्च प्राथमिक शाळा वाढणे आवश्यक आहे.

### निष्कर्ष :

दक्षिण परभणी जिल्ह्यातील उच्च प्राथमिक शिक्षण सुविधेचा विचार केल्यास सर्वच ग्रामीण वसाहतीत उच्च प्राथमिक शिक्षणाची सुविधा नाही. परंतु लोकसंख्या हा घटक विचारात घेतल्यास काही सर्कलमध्ये जास्त शाळा आहेत तर काही सर्कलमध्ये कमी शाळा दिसुन येतात. आवलगाव, माखणी व चाटोरी या सर्कलमध्ये प्रत्येकी ०२ उच्च प्राथमिक शाळा जास्त आहेत तर राणी सावरगाव, पालम, सोनपेठ व गंगाखेड सर्कलमध्ये एकुण ग्रामीण लोकसंख्येला अनुसरून अनुक्रमे ०२, ०२, ०१ व ०१ उच्च प्राथमिक शाळेची आवश्यकता.

### संदर्भ :

१) *अहीरराव, वा.र.(१९९७) : अधिवास भुविज्ञान, निराली प्रकाशन, पुणे.*

२) *परभणी डिस्ट्रीक्ट गॅझेटियर (महाराष्ट्र शासन, मुंबई १९६७)*

३) *भारतीय जनगणना अहवाल १९९१, २००१, २०११.*

४) *Agrawal, P.C.(1968) : Human Geography of Bastar District, Garg Brothers Allahabad.*

५) *https://mr.m.wikipedia.org.*
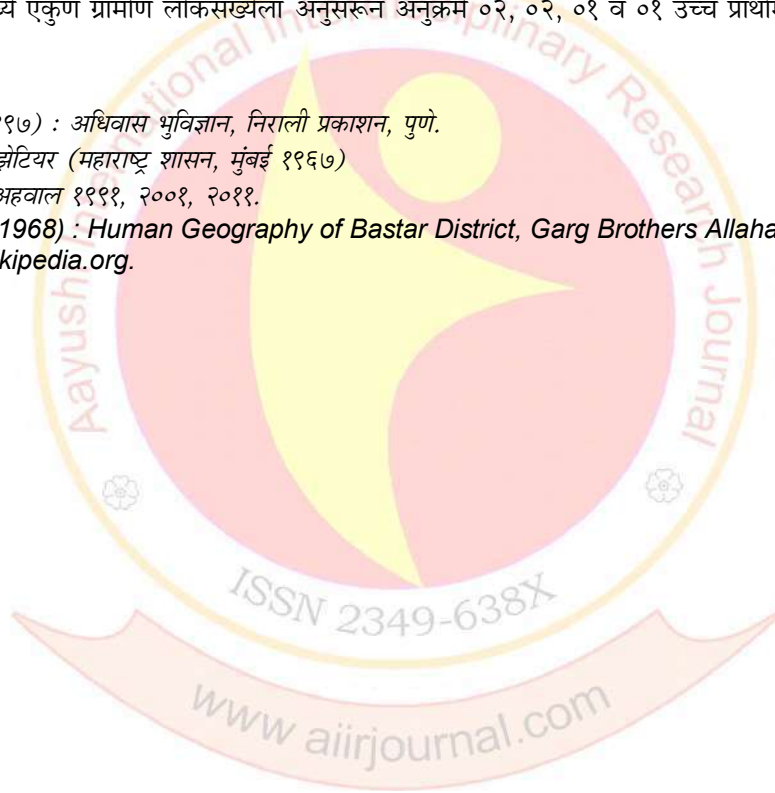
# आदर्श प्रश्नावलीचे स्वरूप

**डॉ. जनार्धन केशवराव वाघमारे**

सहयोगी प्राधापक, भूगोल विभाग

भाई किशनराव देशमूख महाविद्यालय, चाकूर.

जि. लातूर.(महाराष्ट्र)

**प्रस्तावना :**

    मानवी समाजाच्या प्रगतीसाठी प्रयत्नशील असणाया शास्त्राचा विकास हा एका बौध्दिक प्रक्रिमेवर अवलंबून असतो. ती बौध्दिक प्रक्रिया म्हणजे संशोधन होय. प्रत्येक शास्त्रात मग ते शास्त्र नैसर्गिक असो वासामाजिक त्यात ा असंख्य संशोधने निरंतर चालू असतात. संशोधन ही निरंतर चालनारी प्रक्रिया आहे. या अर्थानेच संशोधन हा शब्द सर्वसामान्य व्यावहारात प्रचलित आहे. बौध्दिक आणिव्यावहारीक समस्यांची उत्तरे शोधून काढणे हा संशोधनाचा प्रयत्न असतो. त्यासाठी वैज्ञानिक पध्दतीचा अवलंब केलाजातो. संशोधन हा ज्ञानाचा अविभाज्य घटक आहे. मानवी जीवनात ज्ञानाची भर टाकणे हे संशोधनाचे मुलभूत कार्यआहे.संशोधनाव्दारे बौध्दीक आणि व्यावहारिक समस्यांची उत्तरे शोधून काढली जातात. अविरत संशोधन आणित्यावर आधारित निष्कर्ष याव्दरे समाज उन्नत अवस्थेत पोहचला आहे आणि याव्दरे भविष्यकाळात संशोधने केलीजातील. संशोधन प्रक्रिमेतील समस्या सुज्ञण, ग्रहित कृत्यांची निर्मिती, संशोधन आराखडा अशी टप्पे संशोधकांनी पुर्णकेल्यानंतर संशोधन प्रक्रिमेतील सर्वांत महत्त्वाचा टप्पा येतो तो तथ्य संकलनाचा. तथ्यांचे संशोधनामध्ये खूप महत्त्व आहे. तथ्य ही दोन प्रमूख स्त्रोतांव्दारे प्राप्त होत असते. प्राथमिक आणि दुय्यम तथ्य अशा दोन प्रकारच्यातथ्याव्दारे संशोधनकर्ता संकलन करीत असतो. प्राथमिक तथ्य संकलन तंत्रामध्ये मुलाखत, निरिक्षण, प्रश्नावली,अनूसूची यांचा समावेश होतो. या प्राथमिक तथ्यातील प्रश्नावली हे एक महत्त्वाचे संशोधन प्रक्रिमेतील तंत्र आहे. म्हणजेच संशोधन योग्य, परिपूर्ण, अर्थपूर्ण होण्यासाठी प्रश्नावली योग्य असावी लागते. तरच अपेक्षीत माहिती प्राप्त होऊन संशोधन विषयाचा चांगला अभ्यास होउ शकतो. त्यासाठी प्रश्नावली (योग्य) आदर्श असावी लागते. त्यात गुण असावे लागतात.

**उद्दिष्टचे :**

    संशोधनात प्रश्नावलीचे अर्थ व महत्त्व जाणून घेणे.२ आदर्श प्रश्नावलीचेगुण पाहणे.

**प्रश्नावलीचा अर्थ :**

    संशोधन कार्यातील एका विषयासंधर्भात व्यक्तीकडून माहिती मिळविण्यासाठी तयार केलेली प्रश्नाची एक क्रमबध्द सूची म्हणजे प्रश्नावली होय.

    **लुडबर्ग**-मुलभूत स्वरूपात प्रश्नावली ही प्रेरणांचा असा समूह आहे की जी शिक्षित लोकापूढे या प्रेरणेच्या अंतर्गत त्याच्या मौखिक व्यवहाराचे निरिक्षण करण्यासाठी प्रस्तूत केली जाते.

    **गुड आणि हॅट**-सामान्य रूपात प्रश्नावली म्हणजे प्रश्नाची उत्तरे प्राप्त करून घेण्याची पध्दती असुन तिच्यात प्रश्नपत्रिकेचा उपयोग केला जातो. आणि तो उत्तरदाता स्वतः भरतो.

    **बोगार्डस** -प्रश्नावली विविध व्यक्तींना उत्तर देण्याकरीता तयार करण्यात आलेली एक तालिका होय.

**प्रश्नावलीचे महत्त्व :**

    प्रश्नावली ज्यांच्यकडून भरून घेतली जाते तो घटक प्रत्यक्षात स्वतःच्या विवेकाप्रमाणे प्रश्नावली भरून देतो. त्यामूळे मिळणारी माहिती /उत्तरे स्वतःची असतात. संशोधन अर्थपूर्ण होण्यासाठी प्रश्नावली योग्य असावी लागते. त्यामूळे अपेक्षीत माहीती प्राप्त होऊन निवडलेल्या विषयाचा आभ्यास दर्जेदार होऊ शकतो.

**संशोधकाची ओळख :**

    प्रश्नावलीद्वारे जो व्यक्ती एखाद्या विषयी संशोधन करणार आहे. त्याने आपली ओळख, संशोधनाचा हेतु, उद्घीष्ट, माहिती देणाऱ्याचा फायदा या विषयी कल्पना द्यावी. स्वतःचा पत्ता असलेले आणि पोष्टाचे योग्य तिकीट लावलेले पॉकेट प्रश्नावलीसोबत पाठवावे. तसेच दिलेली माहिती गुप्त ठेवून त्याचा कोठेही दुरुपयोग केला जाणार नाही. तसेच कायदेशीर कार्यवाही साठी तीचा उपयोग केला जाणार नाही. असे हमी देवून प्रश्नावली संबंधीत व्यक्तीनां दिली जावी.

**प्रश्न सोपे असावेत :**

    प्रश्नावली सोपी असावी, त्यात गोंधळात टाकणारे द्विअर्थी शब्द वापरु नयेत, प्रश्नाचे उत्तर सहजवनिश्चितपणे देता आले पाहीजे. असी सोपी प्रश्नावली असावी.

**प्रश्न स्पष्ट असावेत :**

    प्रश्नावलीत विचारलेले प्रश्न मोघम असु नयेत, ते स्पष्ट असावेत. म्हणजेच समजुन सुध्दा त्याचे उत्तर काय द्यावे याबद्दल गोंधळ निर्माण होईल असे प्रश्न विचारुन नयेत

## प्रश्नावलीत द्वीअर्थी शब्द नसावेत :

प्रश्नावलीत गोंधळात टाकणारे द्विअर्थी शब्द वापरु नयेत, ज्या शब्दाचा अर्थ स्पष्ट आहे अशाप्रकारचेच शब्द वापरणे आवश्यकच असते.

## प्रश्नाची संख्या कमी असावी :

प्रश्नावलीत विचारलेल्या प्रश्नांची संख्या फार जास्त किंवा फार कमी नसावी सर्वसाधारणपणे २० ते ३० च्या दरम्याण असावीत व जास्तीत जास्त ४० प्रश्न असावेत. प्रश्नांची संख्या फार जास्त असेल तर ते काम कंटाळवाणे होते तसेच प्रश्नांची संख्या फारच कमी असेल तर संशोधनाचा उद्देश पुर्ण होत नाही.

## प्रश्नाशी सबंधीत उत्तरे लांबलचक नसावी :

प्रश्नावलीत विचारलेल्या प्रश्नांची उत्तरे लांबलचक नसावीत करण माहिती देणा-याचा वेळ वाचविण्या साठी, माहीतीचे वर्गीकरण करण्यासाठी, उत्तर फार मोठे लांबलचक असेल तर त्यावरुन व्यक्तीचे मत घटनेच्या अनुकुल की प्रतिकुल याचा अंदाज बांधता येत नाही. म्हणुन उत्तरे फार लांबलचक असावेत.

## गुप्त स्वरुपाचे प्रश्न नसावेत :

प्रश्नावलीत विचारलेल्या प्रश्नात गुप्त माहिती विचारली जाऊ नयेत. त्यामुळे त्याचा रोष ओढावलेला जाईल, त्याच्या कडुन सहकार्य होण्याऐवजी असहकार्य होईल. म्हणुन गुप्त स्वरुपाचे प्रश्न विचारली जाऊ नयेत.

## मत प्रदर्शनाचे स्वातंत्र्य हिरावले जाऊ नये :

आपणास जी माहीती गोळा करावयाची आहे तीच्या सहाय्याने अमुक एक गोष्ट सिध्द झालीच पाहीजे असे बंधन नाही केल्यास संशोधनाच्या अभ्यासाला खीळ लावल्यासारखे होईल. त्यामुळे ठराविक उत्तराची अपेक्षा ठेवुन जर आपण प्रश्न विचारला तर मत प्रदर्शनाचे स्वातंत्र्य हिरावुन घेतल्यासारखे होईल. म्हणुन प्रश्नावलीत विचारलेले प्रश्न स्वातंत्र्य हिरावुन घेणारे नसावेत.

## भावना दुखावणारे प्रश्न नसावेत :

प्रत्येक व्यक्तीला अभिमान असतो तो दुखावल्यास त्याची भावना दुखावली जाते. त्यामुळे त्याच्या कडुन सहकार्य होण्याऐवजी असहकार्य होईल. म्हणुन प्रश्नावलीत भावना दुखावणारे प्रश्न नसावेत.

## प्रश्नाचा क्रमांक योग्य असावा :

प्रश्नावलीत प्रश्न योग्य क्रमाने असावेत, उत्तरे देणा-या व्यक्तीस अवडेल त्यामुळे तो प्रश्नाची उत्तरे योग्य पध्दतीने देईल त्यामुळे योग्य प्रकारची माहिती संशोधकास मिळेल. त्यामुळे प्रश्न योग्य क्रमाने असावेत.

## प्रश्नावलीत उलट तपासण्याची शक्यता असावी :

एखादी प्रश्नावली संबधीत व्यक्तीकडे पाठविल्यानंतर त्याचा पुन्हा संपर्क होत नाही. त्यामुळे प्रश्नावलीत भरलेली माहिती बरोबर आहे की नाही, याची कल्पना येत नाही. म्हणुन भरलेल्या माहितीवरच संशोधकाला अवलंबुन रहावे लागते. त्यासाठी अधुन मधुन उलट तपासणीसाठी काही प्रश्न विचारुन माहिती खरी, खोटी पाहता येते. म्हणून प्रश्नावलीत उलट तपासणीची शक्यता ठेवावी.

## प्रश्न उद्देशानुसार असावा :

प्रश्नावलीत प्रश्न संशोधकाच्या उद्देशानुसार असावीत. विनाकारण अनावश्यक प्रश्न टाळावेत म्हणजेच मुळ उद्देशानुसारच प्रश्न विचारुन आपला उद्देश प्राप्त करावा.

## प्रश्नावली आकर्षक असावी :

पाठविलेली प्रश्नावली ज्याच्याकडे जाते, त्याच्या मनात पाठविणाऱ्या बाबत चांगले मत झाले पाहीजे. त्यासाठी प्रश्नावलीचा कागद चांगला असावयास पाहीजे. त्याचा रंग सुदंर व छपाई उत्कृष्ट व आकर्षक असावी.

## प्रश्नाचे उत्तरे सारणीयन योग्य असावे :

प्रश्नावलीत विचारलेल्या प्रश्नांची उत्तरे वर्णनात्मक स्वरुपाची नसावीत. उत्तराचे सारणीयन करण्यासारखे उत्तरे असावीत. कारण मिळालेल्या उत्तराचे वर्गीकरण करुन उत्तरांची रचना सारणीत किंवा तक्यात भरावयाची असते. म्हणुन प्रश्न योग्य असावेत.

## प्रश्नावली भरण्यासाठी आकडेमोडाची गरज नसावी :

प्रश्नवलीत दिलेले प्रश्नाचे उत्तर आकडेमोड करणारे नसावेत. आकडेमोड करण्यासारखे प्रश्न असतील तर आकडेमोड करीत बसावे लागेल. म्हणून प्रश्नावली भरण्यास तो टाळाटाळ करेल.

**कठीण प्रश्नांना तळटीप द्याव्यात :**

प्रश्नावलीतील काही प्रश्न कठिण असतात. अशा वेळी त्याचे स्वरूप सांगण्यासाठी तळटिपा द्याव्यात.

**उपलब्ध असलेल्या माहितीवरच प्रश्न असावेत :**

आपण ज्याला प्रश्नावली पाठवतो, अशाच माणसाजवळ सहजपणे उपलब्ध असणाऱ्या माहितीवरच प्रश्नावली आधारलेली असावी. ती माहिती जमा करण्यासाठी जास्तच कष्ट करावे लागणार नाही याची काळजी घ्यावी.

**प्रश्न मुद्याला अनुसरुन असावेत :**

प्रश्नाचे उत्तर मिळविण्यासठी दोन पध्दती आहेत. पहीली म्हणजे मुद्याला अनुसरुन प्रश्न विचारणे की ज्यामूळे उत्तर व्यवस्थित मिळेल. दुसरी पध्दत म्हणजे अनेक प्रश्न विचारुन प्रमुख उत्तरावर येणे, म्हणजेच पहील्या पध्दतीने प्रश्न विचारुन अपेक्षीत उद्देश पुर्ण करता येतो.

**संदर्भः**

१. डॉ. सूनील जाधव, सामाजिक संशोधन पध्दती, अरूणा प्रकाशन, लातूर, २०१२.
२. डॉ. वा. भा. पाटील (२०१२): संशोधन पध्दती.डॉ. प्रकाश बोधनकर,
३. प्रा. विवेक अलोणी (१९९९): सामाजिक संशोधन पध्दती
४. डॉ. वा.भा. पाटील, संशोधन पध्दती, प्रशांत पब्लीकेशन पुणे, २००६.
५. गुरूनाथ नाडगोडे, सामाजिक संशोधन पध्दती, फडके प्रकाशन, कोल्हापूर, १९८६.
६. वाजपेयी एस. आर. (१९६२): सामाजिक अनूसंधान तथा सर्वेक्षणं.
७. घाटोळे आर. एन. (१९९२): समाजशास्त्रीय संशोधन – तत्चे व पध्दती.

# हवामान बदलाचे भारतीय शेतीवरील परिणाम

**डॉ. कदम अरविंद वसंतराव**
भूगोल विभागप्रमुख,
शिवजागृती महाविद्यालय, नळेगाव
ता. चाकूर, जि. लातूर.

**प्रस्तावना :**

जगातल्या अनेक देशासमोर हवामान बदल (Climate change) हे मोठे आव्हान आहे. हवामान बदल आणि हवामानातील विचलन याचा वनस्पती, प्राणी, नैसर्गिक साधनसंपत्ती यावर तसेच मानवी जीवनावर परिणाम होत आहे. त्यामुळे या प्रश्नाकडे वैज्ञानिक व राजकिय नेते यांचे लक्ष वेधले आहे. हवामान बदलाचा अभ्यास करण्यासाठी सैद्धांतिक व अनुभवाधिष्ठित निरीक्षण केलेले असणे आवश्यक आहे. हवामान बदलासंबंधी अभ्यासामध्ये हवामानविषयक आकडेवारीच्या कालक्रमाची संरचना समाविष्ट असते.

तापमान, पर्जन्यमान, आर्द्रता, वारे, बाष्पीभवन, वायुदाब इ. प्रकारची हवामानविषयक आकडेवारी हवामान बदलात अपेक्षित आहे. हवामान बदलाचा सर्वाधिक प्रभाव शुष्क व अर्धशुष्क प्रदेशातील जलसंपदा, वनस्पतीच्या विविध प्रजाती आणि जंगली प्राणी यांच्यावर होतो. १९ व्या शतकाच्या मध्यापासून लघु हिमयुगाचा प्रभाव कमी होऊ लागला. गेल्या शतकापासून हळूहळू उबदारपणा वाढत चाललेला आहे.

पृथ्वीवरील वातावरणीय प्रणाली किंवा पृथ्वीबाह्य घटकामधील अंतर्गत प्रेरणेमुळे हवामानात बदल होत जातात.

**अभ्यासक्षेत्र :**

भारताचे स्थान दक्षिण व आग्नेय आशियात महत्त्वपूर्ण आहे. भारतीय उपखंडाचा मोठा भाग भारताने व्यापला आहे. भारताचे क्षेत्रफळ ३२८७२६३ चौ.कि.मी. असून भारताचा क्षेत्रफळाच्या दृष्टीने जगात सातवा क्रमांक आहे. भारत हा उष्ण व मोसमी हवामान असलेला देश आहे. भारताचा अक्षवृत्तीय विस्तार ८ ँ४’ ते ३७ ँ१८’ उत्तर अक्षवृत्तादरम्यान असून रेखावृत्तीय विस्तार ६८ ँ ७’ ते ९७ ँ २५’ पूर्व रेखावृत्तादरम्यान आहे.

**उद्देश :**

१) हवामान बदलाची कारणे जाणून घेणे.
२) हवामान बदलाचे भारतीय शेतीवर झालेले परिणाम जाणून घेणे.

**माहितीस्रोत व अभ्यासपद्धती :**

प्रस्तुत शोधनिबंधासाठी दुय्यम माहिती स्त्रोतांचा उपयोग करण्यात आला. हवामान व सागरशास्त्र, Climate change and Agricultural Problems, Emnvironmental Geography ही पुस्तके इंटरनेटद्वारा प्राप्त माहिती, आकडेवारी व दूरदर्शनवर प्रसिद्ध झालेली मुलाखत यांच्या आधारे प्राप्त माहितीचे विश्लेषण करण्यात आले आहे.

**विषय विवेचन :**

हवामानातील परिवर्तन, हवामान प्रवृत्ती, हवामान चक्र हे कालगणनेच्या संदर्भात असतात. अभिक्षेत्रानुसार आणि काळानुसार हवामान बदल होत असतो. वातावरण हे नेहमी अस्थिर व क्षोभ निर्माण करणारे असल्यामुळे हवा आणि हवामानाच्या स्थितीत भिन्नता निर्माण होते. अभिक्षेत्र व काळानुसार हवेच्या स्थितीमध्ये भिन्नता व स्थित्यंतर निर्माण होऊन हवामान बदल घडून येतो. उदा. उबदार आणि आर्द्र हवामान उबदार आणि कोरड्या हवामानात बदलणे आणि उबदार व आर्द्र हवामान बदलून ते शीत आणि आर्द्र हवामानात बदलणे हे स्थित्यंतर भारतात कार्बनी फेरस काळात (३६० दशलक्ष ते २८६ दशलक्ष वर्षापूर्वी) होऊन गेले आहे.

**हवामानातील बदल (Climate change) :**

प्रदीर्घ काळापर्यंत हवामानात असा फरक होत जातो की, ज्यामुळे एखाद्या प्रदेशात हवामानाचे स्थलांतर होते याला 'हवामानातील बदल' म्हणतात.

१८५० पासून ध्रुवीय आणि समशितोष्ण प्रदेशात उबदारपणा वाढत आहे. १९४० ला उबदारपणाची पहिली कमाल अवस्था होती. त्यानंतर किमान तापमानात किंचित घट झाली. १९६० पासून पर्जन्यात घट होऊ लागली आहे. १९७० पासून किमान तापमानात अचानक वाढ झाली. त्यामध्ये १९८०-९० या काळात झपाट्याने वाढ झाली. याचा जागतिक स्तरावर परिणाम झाला. यालाच जागतिक उबदारपणा असे संबोधले जाऊ लागले. जागतिक सरासरी तापमान २०१३ मध्ये १४.६ ँ से. होते जे १८८० पूर्वी १३.८ ँ से. होते.

हवामान बदलामध्ये वातावरणामधील सर्वसाधारण चक्रातील बदल अंतर्भूत आहेत. यावरच हवामान सर्वार्थाने अवलंबून असते. परंतु फक्त वातावरणाशी हवामान निगडित नसून जलवरण, जीवावरण, मृदावरण व निम्न तापावरण (Cryosphere) अशा एकूण पाच घटकांशी संबंधित असते.

**हवामान बदलाची प्रमुख कारणे :**

अ) पृथ्वीबाह्य हवामान बदलाची कारणे

१) सौर प्रदान चढउतार
२) सूर्यावरील डागांची क्रिया

३) कार्बन-१४ ची क्रिया

४) आंतरतारकीय परिकल्पना

ब) ज्योतिर्विज्ञानविषयक हवामान बदलाची कारणे

    १) पृथ्वीच्या कक्षेमधील विकेंद्रता / विमध्यता

    २) विषुवाचे अयनांश

    ३) लंबवर्तुळाकृती कक्षेमधील तिर्यकता

क) पृथ्वीच्या वातावरणामधील हवामान बदलाची कारणे

    १) वातावरणामधील संचारणता आणि शोषकतामधील चढउतारामुळे प्रमुख्याने हवामानामधील बदल होत असतात

    २) वातावरणामधील संरचनेत प्रकर्षित चढउतार

    ३) पूर्वी कार्बन डाय-ऑक्साइडचे प्रमाण हजारो पटीने जास्त होते.

    ४) प्राचीन काळी सौर दिप्ती कमी होती

    ५) ज्वालामुखीय धुळीचे (राखेचे) उत्सर्जन

    ६) वा-यापासून निर्माण झालेली धूळ

ड) महासागरावरील हवामान बदलाची कारणे

    १) भूविवर्तनिकी आणि अभूविवर्तनिकी क्रियेमुळे सागरजलाच्या उंचीमध्ये फरक

    २) सागरजलाच्या पातळीवरील तापमानाचे विचलन

    ३) सागरी प्रवाहाचा परिणाम

इ) भूपृष्ठीय हवामान बदलाची कारणे

    १) भूखंडाच्या सापेक्ष स्थानामधील बदल

    २) ध्रुवीय अक्षाच्या स्थानाचे स्थलांतर

    ३) पर्वत, निर्माणकारी हालचालीमुळे खंडाचे उंचावणे

    ४) सागरी प्रवाहाचा सर्वसाधारण परिणाम

**हवामान बदलाचे भारताच्या शेतीवरील परिणाम :**

    हवामान बदलत आहे म्हणजे ते अधिक उबदार बनत आहे. त्याचा परिणाम भारतावर होत आहे. तापमानात वाढ होणे, अतिवृष्टी, महापूर, अनावृष्टी, चक्री बादळांची तीव्रता वाढणे, आरोग्यावर प्रतिकुल परिणाम होणे, मान्सून प्रभावित होणे, जैव विविधतेचा -हास होणे, कृषी आधारित उद्योगावर प्रतिकुल परिणाम तसेच सर्वात महत्त्वाचे म्हणजे भारतीय अर्थव्यवस्थेचा कणा असलेल्या शेतीवर हवामान बदलाचे परिणाम जाणवत आहे. तो खालीलप्रमाणे स्पष्ट करता येईल -

**१) शेतीमध्ये किटकनाशकांचा वापर वाढला -**

    अवेळी पडणारा पाऊस तसेच आर्द्रतेचे प्रमाण वाढल्यामुळे पिकांवर अनेक रोग पडतात. त्यापासून संरक्षण करून उत्पादन वाढविण्यासाठी किटकनाशकांची फवारणी करण्याचे प्रमाण वाढत चालले आहे. त्याचा घातक परिणाम जमिनीवर व मानवावर होत आहे.

तक्ता क्र. १ राज्यनिहाय किटकनाशकांचा वापर

| अ.क्र. | राज्य | किटकनाशकांचा वापर (टन) | | दर हेक्टरी वापर किलोग्रॅम २०१६-१७ |
|---|---|---|---|---|
| | | २००८-०९ | २०१५-१६ | |
| १ | पंजाब | ५७६० | ५७४३ | ०.७४ |
| २ | हरियाणा | ४२८८ | - | ०.६२ |
| ३ | महाराष्ट्र | २४०० | ११६६५ | ०.५७ |
| ४ | केरळ | २७३ | ११२३ | ०.४१ |
| ५ | उत्तर प्रदेश | ८९६८ | १०४५७ | ०.३९ |
| ६ | छत्तीसगड | २७० | १६२५ | ०.२६ |
| ७ | आंध्र प्रदेश | १३८१ | २७१३ | ०.२४ |
| ८ | मध्यप्रदेश | ६६३ | ७३२ | ०.०३ |
| ९ | संपूर्ण भारत | ४३८६० | ५४१२१ | ०.२९ |

*Source : Ministry of Chemical and Fertilizers, Govt. of India.*

**२) शेतीच्या उत्पादनखर्चात वाढ :**

    संकरीत बियाणे, रासायनिक खते, किटकनाशके, आधुनिक अवजारे याशिवाय शेती करणे कठीण झाले आहे. या बाबीवर खर्च करणे आवश्यक झाले आहे. हा खर्च दरवर्षी वाढतच आहे. याशिवाय अनियमित व अपूरा पाऊस झाल्यामुळे सिंचनसुविधेचा खर्च करावा लागतो. परिणामी शेतीच्या उत्पादनखर्चात वाढ होताना आढळते.

## ३) पीक प्रारूपात बदल होत आहे :

शेतकरी आपल्या शेतात मका, बाजरी, ज्वारी, बार्ली अशा प्रकारची पारंपरिक कोरडवाहू पिके घेत होता. त्याऐवजी आता ऊस, कापूस, भात, गहू, पालेभाज्या आणि फळबागा यांच्या लागवडीस प्राधान्य देत आहे. ही पीके सिंचनावर आधारित असल्यामुळे भूजलपातळीत घट होत आहे.

महाराष्ट्रातील मराठवाड्यातील लातूर जिल्ह्यात २५ वर्षापूर्वी उडीद, मूग, खरीप व रब्बी ज्वारी, तीळ, भुईमूग, तांदूळ या पिकांची अल्प प्रमाणात पण दरवर्षी लागवड होत होती, ती आता पूर्णपणे बंद होऊन सोयाबीन, ऊस व फळबागा यांची लागवड वाढली आहे. तसेच भाजीपाला लागवडीचे प्रमाणही वाढले आहे.

## ४) कृषी उत्पादनात घट :

हवामान बदलामध्ये तापमान वाढत आहे. सिन्हा आणि स्वामीनाथन (१९९१) तसेच अग्रवाल व कलरा (Kalra) (१९९४) यांनी केलेल्या अभ्यासात असे आढळून आले आहे की, हवेचे सरासरी तापमान २° से. वाढल्यानंतर भाताचे उत्पादन ०.७५ टन प्रतिहेक्टरी घटले. हवामान बदलाचा सर्वात जास्त प्रभाव सिंचन सुविधा नसलेल्या पिकावर होतो. भारतातील गरीब, अल्पभूधारक ज्यांची शेती पावसावर अवलंबून आहे अशा शेतक-यांवर हवामान बदलाचा परिणाम अधिक होत आहे. हिवाळ्यातील तापमान ०.५° से. वाढ झाल्यास पावसावर आधारित गव्हाचे उत्पादन ०.४५ टन प्रतिहेक्टर कमी होत आहे.

जेथे जलसिंचन सुविधा उपलब्ध आहेत अशा शेतीमध्ये संकरित बियाणे व किटकनाशकांचा वापर करून कृषी उत्पादनात वाढ झालेली आढळते. परंतु हा हवामान बदलाचा परिणाम नसून कृषी पद्धतीत बदल व तंत्रज्ञानाचा परिणाम आहे.

## निष्कर्ष :

हवामान बदलाचा भारतीय शेतीवर खूप प्रतिकूल परिणाम झाला आहे. शेतीच्या उत्पादनखर्चात वाढ झाली आहे. पूर, वादळे यामुळे शेतीचे खूप नुकसान होत आहे. संबंधित प्रदेशातील कृषी उत्पादनात घट होते.

तीव्र कीटकनाशकाचा मोठ्या प्रमाणावर वापर करावा लागत आहे. कृषी उत्पादनातील चढ-उतारामुळे कृषी आधारित उद्योग अडचणीत येत आहेत. हवामान बदलाचा सर्वाधिक परिणाम कोरडवाहू शेतीवर जाणवत आहे.

## संदर्भसूची :

१) *सवदी ए.बी., हवामान व सागरशास्त्र, निराली प्रकाशन, पुणे, प्रथम आवृत्ती, ऑगस्ट २००४.*
२) *Dr. Kulkarni Vijay & Walankikar Anand, Editor, Climate Change and Agricultural Problems, Aruna Prakashan, Latur.*
३) *Dr. Singh Savindra, Environmental Geography, Prayag Pustak Bhawan, Allahabad, Revised Edition, 2010*
४) *www.researchgate.net Table-uploaded by Subhash S.P.*
५) *Rohitashw Kumar and Harender Raj Gautam, Published research paper on 'Climate change and Its Impact on Agricultural Productivity in India' in the "Journal of Climatology & Weather for casting", Published April 10, 2014, ISSN 2332-2594.*
६) *दूरदर्शनच्या सह्याद्री वाहिनीवरील कृषीदर्शन कार्यक्रमात शुभांगी भुते, संचालिका, प्रादेशिक हवामान केंद्र कुलाबा (मुंबई), यांची मुलाखत दि. २३ मार्च २०१८.*

# महाराष्ट्रातील जलव्यवस्थापन एक चिकित्सक अभ्यास

**प्रा. डॉ. एस. एन. कळसकर**

कै. बापूसाहेब पाटील एकंबेकर ग्रामीण
महाविद्यालय, हणेगांव ता. देगलूर जि. नांदेड

**प्रस्तावना :**

पाणी ही प्राथमिक, मूलभूत गरजांपैकी प्रथम गरज आहे. जलांचे भरपूर अस्तित्व असणारा आपल्या सूर्यमालेत 'पृथ्वी' हा एकमेव ग्रह आहे. पाणी हेच जीवन आहे. पाण्यावाचून जीवाचे अस्तित्व संभवत नाही. पृथ्वीचा ७१ टक्के भाग पाण्याचा असून २९ टक्के भाग जमिनीचा आहे. ७१ टक्के पाण्यापैकी ९७ टक्के पाणी क्षारयुक्त असून उर्वरीत ३ टक्के पाणी गोड्या पाण्याच्या स्वरूपात आहे. या ३ टक्के गोड्या पाण्यापैकी उत्तर व दक्षिण ध्रुविय प्रदेश आणि उंच पर्वतीय शिखरावर हिमच्या स्वरूप २.१ टक्के, भूपृष्ठ जल आणि भूगर्भ जल ०.९ टक्के असल्याचे दिसून येते.

पाणी जसे तारक आहे तसेच पाणी विध्वंसकही आहे. प्राचन संस्कृती संस्कृतीचा उदय नद्यांच्या खोऱ्यात झाला आहे. जसे की सिंधु-मोहेंजोदडो संस्कृतीच्या निर्मितीमध्ये जलसंस्कृतीचे अस्तित्व अतिशय महत्वाचे असल्याचे दिसून येते. त्याच बरोबर अशा नद्यांना महापूर आल्यानंतर मानवी वस्त्यांचा विनाशही घडून येवू शकतो.

महाराष्ट्र राज्य उष्ण कटिबंधात मोडतो. त्यामुळे राज्यातील हवामान बहुतांशी कोरडे असते. राज्यात सर्वसाधारणपणे वार्षिक पावसाचे सरासरी प्रमाण ७५० मिली मीटर आहे. महाराष्ट्रात पाऊस मुख्यतः नैऋत्य मोसमी वाऱ्यापासून ६० ते ७० दिवसात पडतो. तर महाराष्ट्रातील पूर्व भागात ईशान्य मोसमी वाऱ्यापासून सप्टेंबर ऑक्टोबर महिन्यात पाऊस पडतो. अशा या ६० ते ७० दिवसात पाऊसाद्वारे उपलब्ध झालेले पाणी उरलेल्या २९५ दिवस वापरण्याचे नियोजन करणे आवश्यक आहे.

**उदेश :**

१) जलव्यवस्थापनच्या संकल्पनेचा अभ्यास करणे.

२) महाराष्ट्र राज्यातील जलव्यवस्थापनाचा अभ्यास करणे.

**अभ्यसपध्दती :**

हा शोधनिबंध द्वितीय आधार सामुग्रीवर आधारित असून यासाठी संदर्भ ग्रंथ, वर्तमान पत्र, शोध निबंध, इंटरनेट यांचा वापर करण्यात आला आहे. या शोध निबंधासाठी विश्लेषणात्मक पध्दतीचा वापर करण्यात आला आहे.

**विषय विवेचन :**

जागतिक स्तरावर, देश स्तरावर आणि स्थानिक स्तरावर जल उपलब्धतेचे सर्वेक्षण केले जाते. जलस्रोत, त्यात वर्षभर उपलब्ध असणारे पाणी, ऋतुनुसार जल प्रमाणात होणारा बदल, तसेच पाण्याचा दर्जा यामध्ये पाणी क्षारयुक्त आहे कि गोडे, क्षारांचे प्रकार व प्रमाण, सुक्ष्म जीवांचे प्रमाण, त्या जलाची उपयुक्तता इत्यादी विचारत घ्यावे लागते.

"जलाचे प्रमाण, त्याची उपयोगिता व उपभोग किंवा वापर यांचा शास्त्रीय दृष्ट्या अभ्यास करून व योग्य प्रमाणात उपलब्ध करून देण्याच्या दृष्टीने केलेली व्यवस्था, तरतूद किंवा उपययोजना म्हणजे जलव्यवस्थापन होय."

जलव्यवस्थापन म्हणजे "जलसंरक्षण जलसंवर्धन व विकास यांची शास्त्रीय दृष्ट्या केलेली चिकित्सात्मक रचना म्हणजे जलव्यवस्थापन होय''.

**महाराष्ट्रात विविध विभागात आणि विविध कालावधीत पडणाऱ्या पावसाची आकडेवारी**

| अ. क्र. | विभागाचे नांव | वार्षिक सरासरी पर्जन्यमान (मिमी.) | विविध कालावधीत पडणाऱ्या पावसाचा तपशिल | | | |
|---|---|---|---|---|---|---|
| | | | जून ते सप्टेंबर | ऑक्टोबर ते डिसेंबर | जानेवारी ते फेब्रुवारी | मार्च ते मे |
| १ | कोकण | ३१६१ | ९४% | ४% | १% | १% |
| २ | प. महाराष्ट्र | १००० | ८४% | ११% | १% | ४% |
| ३ | मराठवाडा | ८२६ | ८५% | १०% | १% | ४% |
| ४ | विदर्भ | ११०६ | ८८% | ७% | २% | ३% |

*स्रोतः www. Water management.com.*

जलव्यवस्थापनामध्ये जलाची उपलब्धता आणि त्याचा दर्जा, वर्तमान आणि भावी काळासाठी पाण्याच्या गरजांचा अंदाज, जलवाटपाचे योग्य नियोजन आणि जलव्यवस्थापनात येणाऱ्या अडचणींचा आढावा व त्यावरील उपाययोजना यांचा समावेश होतो.

महाराष्ट्र राज्य उष्ण कटिबंधात मोडतो. त्यामुळे राज्यातील हवामान बहुतांशी कोरडे असते. राज्यात सर्वसाधारणपणे वार्षिक पावसाचे सरासरी प्रमाण ७५० मिलीमीटर आहे. महाराष्ट्रात पाऊस मुख्यतः नैऋत्य मोसमी वाऱ्यापासून ६० ते ७० दिवसात पडतो. तर महाराष्ट्रातील पूर्व भागात ईशान्य मोसमी वाऱ्यापासून सप्टेंबर ऑक्टोबर महिन्यात पाऊस पडतो.

महाराष्ट्रामध्ये पडणाऱ्या पावसाचे प्रमाण दरवर्षी कमी होताना दिसून येत आहे. याचे सर्वात महत्वाचे कारण म्हणजे होणारी वृक्षतोड हे आहे. वृक्ष लागवडीचे प्रमाण वृक्षतोडीच्या प्रमाणात न वाढविल्यास भविष्यात पावसाचे प्रमाण कमी होऊन कोकण वगळता संपूर्ण महाराष्ट्राला भिषण पाणी टंचाईचा समाना करावा लागणार आहे. यावर वेळीच उपाय योजना करणे आवश्यक आहे.

महाराष्ट्रात वर्षाकाठी सरासरी ५९ दिवस पाऊस पडतो. (२.५ मिलीमीटर किंवा त्यापेक्षा जास्त पाऊस पडलेला दिवस म्हणजेच १ पावसाळी दिवस) यामध्ये पावसाळ्यातील चार महिन्यांच्या काळात ४९ दिवस पाऊस पडतो. ऑक्टोबर ते डिसेंबर या काळात सरासरी ६ दिवस, तर जानेवारी ते फेब्रुवारी या काळात सरासरी एक दिवस तसेच मार्च ते मे या काळात सरासरी ३ दिवस पाऊस पडतो. राज्याच्या विविध भागातील पर्जन्य दिवसांची संख्या ही वेगवेगळी आहे.

कोकणामध्ये साधारणतः वार्षिक सरासरी ३१६१ मिलीमीटर इतका पाऊस पडतो. हा पाऊस ९५ दिवसात पडतो. पश्चिम महाराष्ट्रात साधारणतः १००० मिलीमीटर पाऊस ५१ दिवसात पडतो तर मराठवाड्यात ८२६ मिलीमीटर पाऊस ४६ दिवसात पडतो. तर विदर्भात सरासरी ११०६ मिलीमीटर पाऊस ५५ दिवसात पडतो. या कालावधीत उपलब्ध होणाऱ्या पाण्याचे नियोजन वर्षभर मानवाच्या सर्वच क्रियासाठी करणे आवश्यक आहे.

राज्यातील सह्याद्री पर्वताच्या घाटमाथ्यावर सर्वात जास्त व सर्वात जोरदार पाऊस पडतो. मात्र तेथून पूर्वेकडे जाताना पावसाची तीव्रता कमी होऊ लागते. मराठवाड्यातील नांदेड पासून पुढे आणखीन पूर्वेकडे जाताना पावसाचे प्रमाण आणखी वाढताना दिसते.

### पाच प्रमुख नदी खोऱ्यामधील पृष्ठजल व भूजल संपत्ती

| नदी खोऱ्याचे नांव | वार्षिक सरासरी पाणी उपलब्धता दलघमी | वापरासाठी उपलब्ध पाणी दलघमी | वार्षिक पुनर्भरण दलघमी | वापरासाठी उपलब्ध भूजल दलघमी | होणारा भूजल उपसा दलघमी |
|---|---|---|---|---|---|
| गोदावरी | 50880 | 34185 | 18058 | 11768 | 3498 |
| तापी | 9118 | 5415 | 4925 | 3202 | 1253 |
| नर्मदा | 580 | 308 | 54 | 35 | 3 |
| कृष्णा | 34032 | 16818 | 7153 | 4650 | 2423 |
| कोकण | 69210 | 69210 | 1354 | 880 | 73 |
| महाराष्ट्र एकूण | 163820 | 125936 | 31544 | 20504 | 7249 |

स्रोत : महाराष्ट्राचा भूगोल ए.बी. सवदी



पाच प्रमुख नदी खोऱ्यामधील पृष्ठजल व भूजल संपत्ती
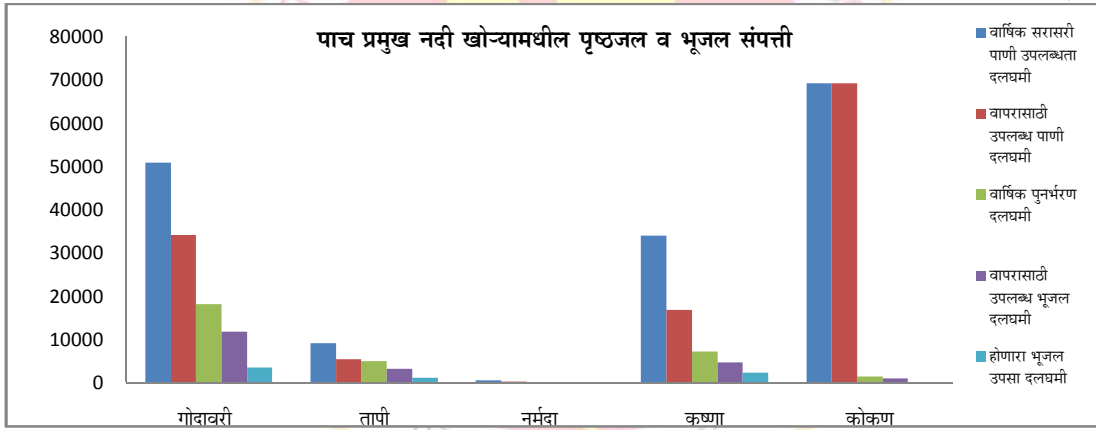
वरील सारणीच्या अभ्यासावरून असे दिसून येते की, महाराष्ट्र राज्यातील पाच नदी खोऱ्यामधील कोकण नदी खोऱ्यामध्ये सर्वात जास्त वार्षिक सरासरी पाणी उपलब्धता ६९२१० दलघमी असल्याचे दिसून येते. तसेच तेवढेच वापरासाठी उपलब्ध असलेले पाणी आहे. त्याखालोखाल गोदावरी नदी खोऱ्यामध्ये ५०८८० दलघमी वार्षिक सरासरी पाण्याची उपलब्धता असून वापरासाठी उपलब्ध असलेले पाणी ३४१८५ दलघमी एवढे आहे. कृष्णा नदी खोऱ्यामध्ये ३४०३२ दलघमी वार्षिक सरासरी पाण्याची उपलब्धता असून १६८१८ दलघमी वापरास मुभा असलेले पाणी आहे.

तापी आणि नर्मदा या नद्यांचा प्रवाह महाराष्ट्रातून कमी असल्यामुळे अनुक्रमे ९११८ आणि ५८० दलघमी वार्षिक सरासरी पाण्याची उपलब्धता असून वापरासाठी उपलब्ध असलेले पाणी अनुक्रमे ५४१५ आणि ३०८ दलघमी असल्याचे दिसून येते.

वापरासाठी उपलब्ध भूजलाचा विचार केल्यास सर्वात जास्त भूजलाची उपलब्धता गोदावरी खोऱ्यात ११७६८ दलघमी असल्याचे दिसून येते. तर होणारा भूजलाचा उपसासुद्धा सर्वात जास्त ३४९८ दलघमी आहे. त्याखालोखाल कृष्णा नदी खोऱ्यामध्ये वापरासाठी उपलब्ध भूजल ४६५० दलघमी असून होणारा भूजलाचा उपसा २४२३ दलघमी असल्याचे दिसून येते. तापी, कोकण आणि नर्मदा नदी खोऱ्यामध्ये अनुक्रमे वापरासाठी उपलब्ध असलेले पाणी अनुक्रमे ३२०२, ८८० आणि ३५ दलघमी असून होणारा भूजलाचा उपसा अनुक्रमे १२५३, ७३ आणि ३ दलघमी असल्याचे दिसून येते.

डॉ. फाल्कन मार्क यांच्या मापदंडानुसार, दरडोई दरवर्षी १७०० घनमीटर पेक्षा जास्त प्रमाणात पाणी उपलब्ध असणारा प्रदेश वैभवशाली समजला जातो. या मापदंडानुसार एखाद्या प्रदेशाला सुजलाम-सुफलाम बनवायचे असेल तर दरडोई दरवर्षी १००० ते १७०० घनमीटर पाणी उपलब्ध असावे लागते. जर पाणी उपलब्धता १००० घनमीटरपेक्षा कमी प्रमाणात असेल तर अशा प्रदेशाला पाणी टंचाईचा प्रदेश म्हणून ओळखले जाते. दरडोई दरवर्षी ५०० घनमीटर पाणी उपलब्धता असल्यास असा प्रदेश मानवी जीवनासाठी कठीण समजला जातो. या पर्श्वभूमीवर महाराष्ट्राचा विचार करता राज्यातील वेगवेगळ्या भागात पाण्याचा प्रश्न गंभीर स्वरूप धारण करत असल्याचे दिसून येते. सन २००१ च्या जनगणनेनुसार कोकण विभागाच्या २.४९ कोटी लोकसंख्येला ६९२१० दलघमी म्हणजेच दरडोई दरवर्षी सुमारे २७८० घनमीटरच्या जवळपास पाणी उपलब्ध होते. याउलट गोदावरी, तापी, नर्मदा आणि कृष्णा या चार नदी खोऱ्यातील, वापरण्यासाठी मुभा असलेल्या ५६२७६ दलघमी जलस्रोतावर ७.२० कोटी लोकसंख्या अवलंबून होती. म्हणजेच या चार नदी खोऱ्यांच्या क्षेत्रात दरडोई दरवर्षी केवळ ७८८ घनमीटर एवढेच पाणी वापरासाठी उपलब्ध आहे. म्हणजेच या चार नदी खोऱ्यातील मानवाला पाणी

टंचाईंचा सामना नेहमी करावा लागतो. यावरून विचार केल्यास असे दिसून येते की, महाराष्ट्राची वाटचाल कायमस्वरूपी पाणी टंचाईकडे सुरू झालेली आहे.

राज्यातल्या पावसाचे बदलते प्रमाण, वाढती लोकसंख्या, स्थलांतरितांचा बोजा, बदलत्या जीवन शैलीमुळे वाढलेली पाण्याची गरज, उद्योगांना तसेच बीज प्रकल्पांना लागणारे पाणी, शहरांची वाढती मागणी या सर्वांमुळे राज्यात उपलब्ध असलेल्या पाणी साठ्यावर प्रचंड ताण पडला आहे. त्यात भर पडते ती ऊसाचे वाढीव क्षेत्र आणि बागायती शेतीची. महाराष्ट्रात ऊसाची लागवड ३.५ टक्के लागवडी योग्य क्षेत्रात आहे आणि त्यासाठी ६० टक्के सिंचानाचे पाणी वापरले जाते. सन १९७१-७२ ते २०११-१२ या ४० वर्षात महाराष्ट्रात ऊसाची लागवड ६ पटीने वाढली आहे. त्यामुळे पाण्याचा वापरही वाढला आहे.

महाराष्ट्रात दरवर्षी पडणारा दुष्काळ हा अवर्षणजन्य आहे. अशा परिस्थितीत पाणी टंचाई होऊ न देण्याकडे लक्ष देऊन उपाययोजना केल्या तर दुष्काळावर कायमस्वरूपी मात करून पाणी टंचाई दूर करता येऊ शकते. आपली पाण्याची किमान वार्षिक गरज २८०० अ.घ.फू. असून त्याच्या दीडपट, अंदाजे ४००० अ.घ.फू. वापरण्यायोग्य पाणी राज्यात उपलब्ध आहे. त्याचे योग्य व्यवस्थापन केल्यास राज्यातील पाणीटंचाई निवारण शक्य आहे.

महाराष्ट्रातील हवामान, पर्जन्यपध्दती, पर्जन्याचा कालावधी, भौगोलिक परिस्थिती, भूस्तर रचना, विविध खोऱ्यातील पाण्याची उपलब्धता व गरज, पाण्याचा तुटवडा आणि विपुलतेचे भाग याबाबतची सर्व माहिती उपलब्ध आहे.

या सर्व माहितीचा एकत्रित विचार करून जलनियोजन केले तर पाणी टंचाई आणि दुष्काळावर मात करता येऊ शकते. यासाठी पाणी नियोजनाची योग्य उद्दिष्टे व दिशा ठरवून पाणी वापराचे आराखडे तयार करणे आवश्यक आहे. अशा नियोजनाचे उद्दिष्ट राज्याच्या सर्व भागात आवश्यकतेनुसार समन्यायी पध्दतीने किमान गरजे एवढे पाणी उपलब्ध करून देणे हे असले पाहिजे. यासाठी सर्व नदी खोऱ्यातील पाणी वापराचे नियोजन सर्व भागाच्या किमान गरजा लक्षात घेऊन एकात्मिक पध्दतीने केले पाहिजे.

कृष्णा खोऱ्यातील पाण्याचे नियोजन त्या खोऱ्यातील काही विशिष्ट भागासाठी झाले. गोदावरी व तापी खोऱ्यातील पाण्याचे नियोजनही काही भागापूरतेच झाले. संपूर्ण महाराष्ट्रातील ४५ टक्के जलसंपदा अंदाजे २००० अघफू असलेल्या कोकणातील पाण्याचे तर नियोजनच झाले नाही. हे जल नियोजन झाले नसल्यामुळेच लातूर शहराला ३०० किमी अंतरावरून रेल्वेने पाणी आणण्याची नामुष्की ओढवली होती. यासाठी संपूर्ण महाराष्ट्र एक भौगोलिक घटक समजून, त्यातील प्रत्येक भागाचा विकास घडवून आणण्यासाठी, सर्व खोऱ्यातील पाणी वापराचे आराखडे तयार झाले पाहिजेत आणि ते पूर्णही केले पाहिजेत. त्याच बरोबर नदीजोड प्रकल्प हाती घेऊन तोही पूर्ण केला पहिजे. हिवरे बाजार या गावाने ज्या पध्दतीने पाण्याचे नियोजन आणि संवर्धन केले आहे तशा प्रकारचे नियोजन आणि संवर्धन संपूर्ण महाराष्ट्रातील पाणी टंचाई असलेल्या प्रदेशात केल्यास भाविष्यात लातूर शहरासारखी पाणी टंचाई निर्माण होणार नाही. दुष्काळ सदृश्य परिस्थिती असलेल्या गावाच्या परिसरामध्ये एकात्मिक पानलोट योजने अंतर्गत जल शिवार, पाणी आडवा पाणी जिरवा, नाला खोली करण, शेत तळे, बांध बंधिस्ती अशा विविध योजना राबवाव्यात. ज्यामुळे पडणारा पावसाचा प्रत्येक थेंब त्याच परिसरात मुरल्यास जाईल. तसेच पडलेले पावसाचे पाणी वाहून न जाता आडवले जाईल. यामुळे भूजल पातळी वाढून त्या गावामध्ये सरासरी पेक्षा कमी पाऊस पडल्यानंतर सुध्दा पाण्याची टंचाई निर्माण होणार नाही.

राज्यातील ६० टक्के भाग पाणी तुटिचा असून, तेथील पाण्याची उपलब्धता फक्त ११३८ घ. फू. प्रति हेक्टर आहे, जी ३००० घ. फू. या किमान गरजेच्या निम्म्याहून कमी आहे. तर विपुलतेच्या १९ टक्के क्षेत्रातील पाण्याची उपलब्धता २१००० घ. मी. प्रति हेक्टरपेक्षा अधिक आहे. या पाणी विपुलतेच्या भागातून राज्यातील एकूण उपलब्ध ४६४७ अ.घ.फू. पाण्यापेक्षा ३००० अ.घ.फू. पाणी विनावापर परराज्यात आणि समुद्रात दरवर्षी वाहून जातो. आणि त्याच वेळी पाणी तुटीच्या भागात पिण्यासाठीही पाणी मिळत नाही. आशा परिस्थितीत विपुल पाण्याच्या भागातून तुटीच्या भागात पाणी परिवहन करून त्या भागातील पाण्याच्या टंचाईचे निवारण करता येते.

**निष्कर्ष :**

महाराष्ट्रामध्ये कोकण विभागात सर्वात जास्त म्हणजेच वार्षिक सरासरी ३१६१ मिलीमीटर एवढा पाऊस पडतो. त्याखालोखाल विदर्भामध्ये सरासरी ११०६ मिलीमीटर, पश्चिम महाराष्ट्रात साधारणतः १००० मिलीमीटर, मराठवाड्यात सरासरी ८२६ मिलीमीटर पाऊस पडत असल्याचे दिसून येते. म्हणजेच महाराष्ट्रात पडणारा पाऊस सर्वच प्रदेशामध्ये सारखाच पडत नाही. पावसाचे वितरण असमान असल्यामुळे महाराष्ट्रामध्ये संपूर्ण मराठवाडा आणि पश्चिम महाराष्ट्राच्या काही भागात पाण्याची टंचाई निर्माण होते. विशेषतः ज्या वर्षी पाऊस कमी पडतो त्या वर्षी अवर्षणाची परिस्थिती निर्माण होते.

राज्यामध्ये पडणाऱ्या पावसाचे प्रमाण दरवर्षी सरासरी किंवा त्यापेक्षा कमी होत आहे. यामुळे जी पाणी टंचाई निर्माण होत आहे त्यावर मात करण्यासाठी प्रत्येक गाव परिसरामध्ये जलशिवार, पाणी आडवून ते पाणी जमीनीत मुरविणे उताराच्या प्रदेशावर चरे खोदणे, घरावर पडणारे पाणी जमीनीमध्ये मुरविणे अशा प्रकारच्या उपाययोजना करून भूपृष्ठावरील आणि भूगर्भातील पाणी साठा वाढविणे आवश्यक आहे.

**संदर्भ ग्रंथ :**

१)  *पर्यावरण भूगोल, प्रा. डॉ. सुभाषचंद्र सारंग, विद्या प्रकाशन नागपूर.*
२)  *महाराष्ट्राचा भूगोल, डॉ. देशपांडे सी. डी. नॅशनल बुक ट्रस्ट इंडिया, न्यू दिल्ली.*
३)  *महाराष्ट्राचा भूगोल, ए.बी. सवदी, निराली प्रकाशन.*
४)  *www. Water management.com.*
५)  *Climate of Maharashtra : India Meteorological Department*

# नांदेड जिल्ह्यातील औद्योगिक क्षेत्र : एक भौगोलिक अभ्यास (इ.स. १९९१ ते २००५)

**प्रा. डॉ. यु. एस. कानवटे**
भूगोल विभाग,
वसंतराव नाईक महाविद्यालय, वसरणी नांदेड.

**प्रस्तावना :**

भारत हा कृषी प्रधान देशआहे. देशाचा आर्थिक विकास कृषी व्यवसायावर अवलंबून आहे. कारण आपल्या देशातील लोकसंख्यापैकी ७० टक्क्याहुन अधिक लोकांचे जीवन प्रत्यक्ष, अप्रत्यक्षपणे कृषीवर अवलंबून आहे.[१] तर व्यापार नौकरी व वाहतुक व्यवसायात फक्त १३ % लोक आहेत. सुमारे २० % लोक कारखानदारी व निर्मिती उद्योगात गुंतलेले आहेत. शेतीपासून मिळणारे उत्पन्न राष्ट्रीय उत्पन्नाच्या ३२ % एवढे असून ते सर्वात जास्त आहे. देशातून केल्या जाणाऱ्या निर्यातीत सर्वात जास्त वाटा शेतीचा असून तो ५०% पेक्षा जास्त आहे.[२] त्यामुळे भारतात विकासाचा प्रमुख घ्घटक शेती आणि शेतीशी निगडीत उद्योगच आहेत.[३] म्हणून औद्योगिक विकास घडून येण्यासाठी औद्योगिक क्षेत्राची निवड करणे महत्वाचे आहे. औद्योगिक क्षेत्राची निवड योग्य प्रकारे केल्यास फायदेशीर ठरते. औद्योगिक क्षेत्र ही औद्योगिक भूगोलातील महत्वाची संकल्पना आहे . प्रस्तुत शोध निबंधात नांदेड जिल्ह्यातील औद्योगिक क्षेत्र: एक भौगोलिक अभ्यास यासाठी इ.स. १९९१ ते २००० या पंधरा वर्षाचा कालावधी अभ्यासासाठी निवडलेला आहे. या नांदेड जिल्ह्यातील औद्योगिक क्षेत्राचा अभ्यास केलेला आहे. या अभ्यास क्षेत्रात असे आढळून येते की, नांदेड जिल्ह्याचे एकूण भौगोलिक क्षेत्रफळ १०३४१०० हेक्टर एवढे आहे. तालुका निहाय भौगोलिक क्षेत्रफळ नांदेड - १०३२००, हदगांवं- १५२६००, किनवट-- १०१२००, भोकर -१०८२००, बिलोली - १४८१००, देगलूर - ६५९००, मुखेड - ९३४०० व कंधार - १६१५०० हेक्टर आहे.

नांदेड जिल्ह्यातील औद्योगिक क्षेत्रात नांदेड औद्योगिक क्षेत्र-२७१.८९ हेक्टर , कृष्णूर औद्योगिक क्षेत्र-- ६८५.८१ हेक्टर, मुखेड औद्योगिक क्षेत्र हेक्टर, कंधार औद्योगिक क्षेत्र -११.३९ हेक्टर, , किनवट औद्योगिक क्षेत्र - ५४.५४ हेक्टर व मुद्रखेड औद्योगिक क्षेत्र- ९५.०० हेक्टर क्षेत्र संपादीत करण्याची कार्यवाही चालु आहे..

**बिज संज्ञा :**

देशातील उद्योगाचा सर्वांगीन विकासा घडवून आणण्यासाठी सरकारने आखलेले व कार्यवाहीत आणलेले धोरण म्हणजेच औद्योगिक धोरण होय. देशाचा औद्योगिक विकास हा धोरणावर अवलंबून असतो.[४] "An Industry is a group of firing produsing the same comodity for the same market"[५] भारतातील उद्योग धंद्याचे वितरण असमान आहे. महाराष्ट्रात ही तिच परिस्थिती आहे. सर्व कारखानदारी मुख्यत: मुंबई शहर, मुंबई उपनगर, ठाणे, पुणे या जिल्ह्यात केंद्रीकरण झालेले आढळून येते. आलीकडे उद्योगाचे विकेंद्रीकरण आणि अविकसित भागाचे संतूलन व औद्योगिक विकास करण्याच्या दिशेने धोरणे आखले जात आहेत. अविकसित भागात उद्योग सुरु व्हावेत म्हणून १९९६ मध्ये State Industrial and investment Corporation of Maharashtra (Sicom) सिकॉमची स्थापना झाली. महाराष्ट्र राज्य वित्तीय महामंडळ १९६२ (MSFC), महाराष्ट्र लघुउद्योग विकास महामंडळ - १९६८ (MSSIDC), खादीग्राम उद्योग मंडळ १९६२ (KVIC) जिल्ह उद्योग केंद्र- १९७० इत्यादी मंडळामार्फत उद्योग क्षेत्राची भरभराट होत आहे. कोणत्याही देशाचा आर्थिक व सामाजिक विकास भूमी उपयोजन व औद्योगिकीकरण कशाप्रकारे झालेले आहे यावर अवलंबून असते.[६]

यासाठी उद्योगधंदा हा कोणत्या ठिकाणी होणे योग्य व आर्थिक दृष्ट्या कायदेशीर ठरेल याचा विचरपूर्वक अभ्यास करणे आवश्यक असते. कारण काही अयोग्य ठिकाणी स्थापन झालेले उद्योग नंतर बंद पडतात. परंतु परिणाम करणाऱ्या घटकाचा विचार करुन स्थापन इ ाालेल्या उद्योगाना उत्पादन खर्च, वाहतुक खर्च कमी येतो, कमी उत्पादन खर्च आलेला पक्का माल बाजार पेठेत स्पर्धा करु शकतो. याचाच अर्थ औद्योगिक क्षेत्र (स्थानिकीकरण) असे म्हणतात.

इ.स. १९९१ ते २००५ या या पंधरा वर्षाच्य अभ्यासावरुन नांदेड जिल्ह्यात सहा औद्योगिक क्षेत्र विकसित झालेले दिसुन येतात. १) नांदेड औद्योगिक क्षेत्रात - ६१३ भुखंड २) कृष्णूर औद्योगिक क्षेत्रात -१९७ भुखंड ३) देगलूर औद्योगिक क्षेत्रात - ३० भुखंड ४) मुखेड औद्योगिक क्षेत्रात ५) कंधार औद्योगिक क्षेत्रात - ५० भुखंड ६) किनवट औद्योगिक क्षेत्रात - सिमाकण व सर्वेक्षणाचे काम पूर्ण झालेले आढळते.

**अभ्यास क्षेत्र :**

नांदेड जिल्हा हा मराठवाड्यातील एकूण ८ जिल्ह्यापैकी एक असून महाराष्ट्राच्या दक्षिण पूर्व दिशेला दक्षिणोत्तर पसरलेला आहे. नांदेड जिल्ह्याचा अशवृत्तीय विस्तार १८°१५ उत्तर ते १९°५५ उत्तर अक्षांस व रेखावृत्तीय विस्तार ७६°५६ पूर्व ते ७८°१९ पूर्व रेखांश मध्ये स्थित आहे.[७] नांदेड शहर गोदावरी नदीच्या काठावर वसलेले आहे. नांदेड जिल्ह्याच्या उत्तरेस महाराष्ट्राचा यवतमाळ जिल्हा, दक्षिणेस परभणी जिल्हा, दक्षिण-पश्चिमेस- लातूर जिल्हा आहे. जिल्ह्याच्या दक्षिण पूर्व दिशेला आंध्र प्रदेशातील आदिलाबाद व निजामाबाद हे जिल्हे आहेत. दक्षिणेस कर्नाटक राज्यातील बिदर जिल्ह्याचे संतापुर तहसिल आहे. प्राकृतिक रचनेच्या बाबतीत उत्तरेकडील डोंगराळ प्रदेश, गोदावरी खोऱ्याचा प्रदेश व बालघाट डोंगर रांगाचा प्रदेश असे एकूण तीन स्वभावीक विभाग पडतात. तर नांदेड जिल्हयातून वाहणाऱ्या महत्वाच्या नद्या- गोदावरी, मांजरा, मन्याड, सरस्वती, पैनगंगा, आसना, सिता व लेंडी ह्या आहेत. नांदेड जिल्ह्याचे हवामान उन्हाळ्यात ४२° कमाल से. तर हिवाळ्यात १८° से. इतके किमान तापमान असते. यामुळे येथील हवामान थोडे विषम आहे.[८]

नांदेड जिल्ह्यात नांदेड, अर्धापूर, मुदखेड, लोहा, कंधार, हदगांव, भोकर, हिमायतनगर या तालुक्यात ७६ से.मी. ते १०० से.मी. दरम्यान पावसाचे वार्षिक प्रमाण आहे. माहूर, किनवट, धर्माबाद, बिलोली, देगलूर, मुखेड, नायगांव व उमरी या तालुक्यात १०० से.मी. ते १५०

से.मी. दरम्यान पावसाचे वार्षिक प्रमाण आहे. ९ नांदेड जिल्ह्यात खोल काळी, मध्यम काळी व उथळ काळी तीन प्रकारच्या मृदा आहेत.१० सर्वसाधारण पणे काळी सुपिक व कसदार, मध्यम काळी, जंगलव्यात, मुरुमाड, रेतीयुक्त इ. प्रकारच्या मृदा आढळते.

**उद्दीष्ट्चे :**

१) नांदेड जिल्ह्यातील तालुकानिहाय औद्योगिक क्षेत्राचा अभ्यास करणे.

२) नांदेड जिल्ह्यातील  औद्योगिक क्षेत्राचा तालुकानिहाय तौलनिक अभ्यास करणे.

३)  नांदेड जिल्ह्यातील  तालुकानिहाय  औद्योगिक क्षेत्रात घडून आलेल्या बदला मागील

    कारणाचा शोध घेणे.

**गृहितके :**

प्राकृतिक, आर्थिक, सामाजिक व तांत्रिक घटकचा परिणाम औद्योगिक क्षेत्र निवडीवर व आद्योगिक विकास घडून येण्यावर होतो.

**माहिती स्त्रोत व  संशोधन पद्धती  :**

प्रस्तुत शोधन निबंधासाठी आवश्यक असणारी   आकडेवारी ही विविध स्वरुपाची असून ही माहिती नांदेड जिल्हा सामाजिक व आर्थिक समालोचन पुस्तिका वर्ष १९९१ ते २००५ या वर्षाच्या पुस्तिकेतुन  संकलीत केलेली आहे.  प्राप्त माहितीचे सांख्यिकीय  गणन  करुन दर्शविली आहे.

**विषय  विवेचन :**

प्रस्तुत शोध निबंधात नांदेड जिल्ह्यातील तालुकानिहाय औद्योगिक क्षेत्रांतील जमीन, पाणी,  हवामान,   शक्ती साधने, भांडवल, मजुर पुरवठा,  वाहतुकीच्या सोयी,  बाजारपेठ व  इतर सोयी विचारात घेवून सहा तालुक्यात औद्योगिक क्षेत्र विकसित करण्यात आले आहेत.

**सारणी क्र. ०१ : नांदेड जिल्ह्यातील औद्योगिक क्षेत्र (इ.स. १९९१ - २००५)**

| अ.क्र. | तालुका | क्षेत्र (हेक्टरमध्ये) | भुखंड |
|--------|--------|---------------------|-------|
| १ | नांदेड औद्योगिक क्षेत्र | २७१.८० | ६१३ |
| २ | कृष्णूर औद्योगिक क्षेत्र | ६४५.८१ | १९७ |
| ३ | देगलूर  औद्योगिक क्षेत्र | ७१.०६ | ३० |
| ४ | मुखेड  औद्योगिक क्षेत्र |  |  |
| ५ | कंधार औद्योगिक क्षेत्र | ११.३९ | ५० |
| ६ | किनवट औद्योगिक क्षेत्र | ५४.५४ | सिमांकण व सर्वेक्षणाचे काम पूर्ण |
|  | एकूण औद्योगिक क्षेत्र | १०५४.६ | ८९० |

*स्त्रोत : संशोधन २०१२.*

**नांदेड जिल्ह्याच्या अंतर्गत येणारे औद्योगिक क्षेत्र :**

नांदेड जिल्ह्यात ६ औद्योगिक क्षेत्र असून या आद्योगिक क्षेत्रात लहान मोठे  उद्योगासाठीचे कारखाने कार्यरत आहेत.  नांदेड औद्योगिक क्षेत्र, कृष्णूर औद्योगिक क्षेत्र, देगलूर औद्योगिक क्षेत्र, मुखेड औद्योगिक क्षेत्र, कंधार औद्योगिक क्षेत्र, किनवट औद्योगिक क्षेत्र या क्षेत्रात महामंडळाच्या औद्योगिक वसाहती खेरीज  सहकारी तत्वावर देखील काही वसाहती उभारण्यात आल्या आहेत.

**१.    नांदेड औद्योगिक क्षेत्र :**

महाराष्ट्र औद्योगिक विकास महामंडळाने नांदेड औद्योगिक क्षेत्र हे  नांदेड - हैद्राबाद या महामार्गावर विकसित केलेले आहे.  सदर क्षेत्र नांदेड शहरापासून सुमारे ०.७ कि.मी. अंतरावर असून या औद्योगिक क्षेत्रासाठी  २७१.८९ हेक्टर जमीन संपादीत केलेली असून येथे महामंडळातर्फे औद्योगिक क्षेत्रासाठी सर्व मुलभूत सोई- सुविधा म्हणजे डांबरी रस्ते, पाणी पुरवठा योजना, पथदिवे,  विद्युत पुरवठा, वाहनतळ इत्यादी सोई उपलब्ध करुन देण्यात आलेल्या आहेत.

सदर औद्योगिक क्षेत्रामध्ये महामंडळाकडून विविध आकाराचे एकूण ६१३ भूखंड विकसित करण्यात आले आहेत. त्यापैकी ५६६ भूखंडाचे वाटप करण्यात आलेले आहेत. यापैकी १६२ भूखंड बांधकाम अवस्थेमध्ये आहेत.  या औद्योगिक क्षेत्राचा कायम स्वरुपी पाणीपुरवठा योजनेची व्यवस्था या औद्योगिक क्षेत्रापासून ८ कि.मी. अंतरावरील  गोदावरी नदीवरील विष्णुपुरी प्रकल्पामध्ये  एकूण ५०.०९ दश घ.मी. प्रतिवर्षे इतके पाणी आरक्षित करण्यात आलेले असून मौजे असर्जन येथे   महामंडळाकडून उदयन विहिर बांधण्यात आलेली आहे. व तेथून ४५० मी.मी. व्यासाच्या अशुध्द  उदयान विहिरीव्दारे  नांदेड व कृष्णूर औद्योगिक क्षेत्रासाठी नांदेड औद्योगिक क्षेत्रामधील जल शुध्दीकरण केंद्रापर्यंत  व यापुढील औद्योगिक क्षेत्रामधील विविध व्यासाच्या जलवितरणाव्दारे भूखंड धारकांना शुध्द जल पाणी पुरवठा करण्यात येतो.

**२.    कृष्णुर औद्योगिक क्षेत्र :**

महाराष्ट्र औद्योगिक विकास महामंडळाने नांदेड औद्योगिक क्षेत्रापासून २८ कि.मी. अंतरावर नांदेड- हैद्राबाद या  महामार्गावर अंदाजे ६४५.८१ हेक्टर कृष्णूर औद्योगिक क्षेत्र स्थापित केलेले आहे. त्यापैकी १५० हेक्टर क्षेत्र हे पंचतारांकित म्हणून विकसित केलेले आहे.

सदर औद्योगिक क्षेत्रामध्ये विविध आकाराचे  एकूण  १९७ भूखंड विकसित करण्यात आलेले असून ३३ भूखंडाचे वाटप करण्यात आलेले आहे.  व यापैकी २३ भूखंड उत्पादनात असून १० भूखंड  बांधकाम अवस्थेत आहेत. कृष्णूर औद्योगिक क्षेत्राच्या पाणी पुरवठ्यासाठी नांदेड औद्योगिक क्षेत्रापासून पुढे कृष्णूर औद्योगिक क्षेत्रामधील टेकडीवरील जलकुंभापर्यंत सुमारे २८ कि.मी. लांबीची     ५०० मी. व्यासाची शुध्दजल उदयन वाहिनी टाकण्यात आलेली असून  त्याव्दारे कृष्णूर औद्योगिक क्षेत्रासाठी शुध्द जल पुरवठा कण्यात येतो.  या औद्योगिक क्षेत्रामधील विविध भूखंडासाठी विविध व्यासाच्या जलवाहिनी नलिकेव्दारे पाणी वितरण करण्यात येते.  सदर क्षेत्रात डांबरी रस्ते, पथदिवे, दळणवळणाच्या सर्व पूरक सोई उपलब्ध करुन देण्यात आलेल्या आहेत.

३.      **देगलूर औद्योगिक क्षेत्र :**

महाराष्ट्र औद्योगिक विकास महामंडळाने  देगलूर शहरापासून ५ कि.मी. अंतरावर नांदेड-हैद्राबाद राज्य महामार्गा जवळ एकूण ७१.०६ हेक्टर जमिनीवर  देगलूर औद्योगिक क्षेत्र विकसित केलेले आहे. या औद्योगिक क्षेत्रामध्ये विविध  आकाराचे   एकूण ३० भूखंड विकसित केलेले असून    यापैकी १४ भूखंडाचे वाटप करण्यात आलेले आहे.  या वाटप  केलेल्या भूखंडापैकी ६ भूखंड उत्पादनापासून ४ भूखंड हे  बांधकाम अवस्थेत आहेत.

सदर औद्योगिक क्षेत्राच्या पाणी पुरवठ्यासाठी महामंडळाने  मन्याड नदिच्या पात्रावर मौजे   वझरगा येथे खुली विहीर बांधलेली असून तेथून १०० मि.मी. व्यासाच्या जल वाहिनीव्दारे देगलूर  औद्योगिक क्षेत्रासाठी पाणी पुरवठा करण्यात येतो.  या क्षेत्रात डांबरी रस्ते, पथदिवे, जलवितरण नलिका तसेच जलकुंभ, विज इत्यादी  सोई उपलब्ध करुन दिलेल्या आहेत.

४.      **मुखेड औद्योगिक क्षेत्र :**

महामंडळाने मुखेड येथे  औद्योगिक क्षेत्र विकसित करीत आहे. सदर औद्योगिक क्षेत्रात बांधकाम अवस्थेत आहे. तेथे महामंडळाच्या तसेच सहकार क्षेत्राचा  कार्यातून उद्योग चालू आहेत.  वर्ष १९९४ मध्ये स्थापित लक्ष्मी व्यंकटेश तेल उद्योग, वर्ष २००२ मध्ये स्थापित कोडगीरे तेल उद्योग सद्य स्थितीत कार्यरत आहेत.

५.      **कंधार औद्योगिक क्षेत्र**

महाराष्ट्र औद्योगिक विकास महामंडळाने कंधार शहरापासून ७ कि.मी. अंतरावरील कंधार -मुखेड रस्त्यावर ११.३९ हेक्टर जमीन संपादित करुन औद्योगिक क्षेत्र स्थापित केलेले आहे. याऔद्योगिक क्षेत्रामध्ये महामंडळाकडून विविध आकाराचे एकूण ५० भूखंड पाडण्यात आलेले आहेत. यापैकी एक भूखंड शासकीय संस्थेसाठी वाटप करण्यात आलेला आहे. व सदर भूखंड बांधकाम अवस्थेमध्ये आहे.  सदरील क्षेत्रात महामंडळाकडून खडी मुरुमाचे रस्ते, कार्यालय, जलकुंभ,  जलवितरण नलिका, वीज, इत्यादी  सोई उपलब्ध करण्यात आलेल्या आहेत. या औद्योगिक क्षेत्राच्या पाणी पुरवठ्यासाठी मौजे बहादरपुरा  येथील मन्याड नदीच्या पात्रामध्ये महामंडळाने खुली विहिर बांधण्यात आली असून तेथून १०० मी.मी. व्यासाच्या जलवाहिनीव्दारे औद्योगिक क्षेत्रासाठी पाणी पुरवठा करण्यात आलेला आहे.

५.      **किनवट  औद्योगिक क्षेत्र**

महाराष्ट्र औद्योगिक विकास महामंडळाकडून किनवट शहरापासून ३.कि.मी. अंतरावर  व किनवट नांदेड राज्य महामार्गावर  एकूण ५४.५४ हेक्टर जमीन संपादित केलेली असून सदरील औद्योगिक क्षेत्राचे  सिमांकन व सर्वेक्षणाचे काम पूर्ण झालेले आहे. तसेच या क्षेत्रात सहकार क्षेत्रातून लघु उद्योग कार्यरत आहेत.

तसेच महाराष्ट्र औद्योगिक विकास महामंडळाकडून मुदखेड औद्योगिक क्षेत्र स्थापित करण्याची कार्यवाही चालू आहे.  या क्षेत्रात सुमारे अंदाजित ९५.०० हेक्टर आरक्षित करण्यात येणार आहे.

**निष्कर्ष :**

नांदेड जिल्ह्यातील तालुकानिहाय औद्योगिक क्षेत्राच्या अभ्यासावरुन पुढील प्रमाणे निष्कर्ष  काढले आहेत.

१)      नांदेड जिल्ह्यातील औद्योगिक क्षेत्रावर प्राकृतिक, सामाजिक व आर्थिक घटकांचा प्रभाव पडलेला दिसून येतो.  त्यामुळेच मुखेड, कंधार, किनवट व देगलूर हे औद्योगिक क्षेत्र विकसित  झालेले नाहीत.

२)      नांदेड जिल्ह्यातील औद्योगिक क्षेत्र सर्वात जास्त कृष्णूर  ६४५.८९ हेक्टर असून त्या खालोखाल नांदेड औद्योगिक क्षेत्राचा क्रमांक लागतो.

३)      नांदेड औद्योगिक व कृष्णूर औद्योगिक क्षेत्रासाठी कायम स्वरुपी  पाणीपुरवठा योजना गोदावरी  नदीवरील विष्णुपुरी  प्रकल्पाव्दार एकूण ५९.०९ दश घ.मी. प्रति वर्षे  इतके पाणी आरक्षण करण्यात आलेले आहे.  त्यामुळे या दोन क्षेत्राचा विकास जास्त        झालेला दिसून येतो.

**संदर्भ :**

१.   *डॉ.जयकुमार मगर "भारताचा भूगोल ", विद्या प्रकाशन नागपूर , प्रथम आवृत्ती- १९९० पान नं.४३*

२.   *डॉ. अरुण राजाराम कुंभार "कृषि भूगोल "महाराष्ट्र भूगोलशास्त्र संशोधन पत्रिका जाने ते जुन २०१५ पान नं. ११८*

३.   *उद्योजक मासिक महाराष्ट्र उद्योजकता विकास केंद्र प्रकाशन औरंगाबाद मार्च २००८ पान नं.  २४*

४.   *प्रा.के. एम. भोसले ५१, के. बी. काटे "स्वातंत्र्योत्तर भरतीय अर्थ व्यवस्था " फडके प्रकाशन कोल्हापूर,  आठवी आवृत्ती २००३ पान नं. १३४*

५.   *प्रा. डॉ. स.न. कुलकर्णी गॅ. रमेशचंद्र रा. बोराडे,  डॉ. सौ. लिला "व्यवसायिक अर्थ शास्त्र "भाग- १ विद्या प्रकाशन नागपूर प्र. आ. जाने २००२ पा.नं. १७८.*

६.   *प्रफुला एस. ठाकरे, डी.एस. सुर्यवंशी, "महाराष्ट्र भूगोल शास्त्र " संशोधन पत्रीका जाने ते जुन २०१५  पान नं. ११२*

७.   *जिल्हा सामाजिक आर्थिक समालोचन  जि. नांदेड वर्ष  २००४-०५  पा.नं. ०३*

८.   *सु.प्र. दाते,  करमाकर "सुगम भूविज्ञान " विद्या प्रकाशन- नागपुर २००८ पा.नं. १०२*

१.   *नांदेड जिल्हा विकास पूर्व  "पूरस्थितीतील नांदेड "२००५ पा. नं. ४५*

१०.  *ए.बी. सवदी द मेगा स्टेट महाराष्ट्रा निराली प्रकाशन पुणे, नववी आवृत्ती २००५. पान नं. ५३*

# गेवराई तालुक्यातील पीक प्रारूपाचा अभ्यास

**डॉ. सोमनाथ संभाजी लांडगे**
भूगोल विभाग,
कला व विज्ञान महाविद्यालय,
चौसाळा, ता.जि. बीड.

**सारांश (Abstract) :**

गेवराई हा बीड जिल्ह्यातील एक तालुका असून तो बालाघाट डोंगर रांगेचा पायथ्याचा भाग आहे. हे बव्हंशी अवर्षणप्रवण क्षेत्र असून येथील शेती हा प्रमुख व्यवसाय आहे. पीक प्रारूप ही लवचिक व गतिशील संज्ञा आहे. कारण त्यावर भौगोलिक व सांस्कृतिक घटकांचा प्रभाव पडतो. प्रस्तुत अभ्यास हा संशोधन क्षेत्रातील पीक प्रारूप व पीक प्राबल्य पाहण्याच्या हेतूने केलेला असून यासाठी केवळ चार वर्षांच्या सांख्यिकीचा प्रातिनिधीक स्वरूपाचा विचार केला आहे. संशोधनासाठी व्दितीय सांख्यिकी स्त्रोतांचा विचार केला असून त्यासाठी जसबिर सिंग यांच्या पीक पध्दतीचा आधार घेतला आहे. त्यामुळे अभ्यासाला शास्त्रीय स्वरूप प्राप्त झाले असून त्यात नेमकेपणा आलेला आहे. गेवराई तालुक्यात अन्नधान्ये पिकांच्या लागवडीखालील क्षेत्र जास्त असून रब्बी ज्वारी व कापूस ही अग्रणी पिके आहेत. संशोधन क्षेत्रात पीक प्रारूपात विषमता आढळली असून त्यात नगदी पिकांची लागवड करणे काळानुरूप योग्य ठरेल. सदर अभ्यासात केवळ 18 पिकांचाच विचार केला असून चार वर्षांची सांख्यिकी वापरली आहे.

**बीजसंज्ञा (Keywords) :** पीक प्रारूपाचा (Cropping Pattern), पीक श्रेणी (Crop Ranking), अग्रणी पीक (Leadning Crop)

**प्रस्तावना (Introduction):**

मानवी आर्थिक क्रियेत कृषी या उद्योगात अनन्यसाधारण महत्त्व आहे. संशोधन क्षेत्रात औद्योगिकरणाचा विकास झालेला नसल्यामुळे 70 ते 80 टक्के लोक प्रत्यक्ष शेती व शेतीपुरक व्यवसायात गुंतलेले आहेत. कृषी हा प्राचीन व्यवसाय असून औद्योगिक व माहिती तंत्रज्ञान युगात सुध्दा संशोधन क्षेत्राच्या अर्थव्यवस्थेचा मूलाधार आहे.

**उद्दिष्ट्ये (Objectives) :**

1. गेवराई तालुक्यातील पीक प्रारूप अभ्यासणे.
2. संशोधन क्षेत्रातील पीक प्राबल्य शोधणे.

**संशोधन पध्दती (Research Methodology) :**

जसबिर सिंग यांच्या पीक प्रारूप पध्दती व सूत्राधारे पिकांची टक्केवारी काढून ज्या पिकांची क्षेत्रीय टक्केवारी 15 पेक्षा जास्त असेल ते पिके प्रथम श्रेणी, 5 ते 15 क्षेत्रीय टक्केवारी पिके व्दितीय श्रेणी व 5 पेक्षा कमी क्षेत्रीय टक्केवारी पिके तृतीय श्रेणी असे पीक श्रेणी गट तयार केले. गेवराई तालुक्यातील पीक प्रारूप अभ्यासण्यासाठी सन 2000–01, 2005–06, 2010–11 व 2015–16 या प्रातिनिधीक वर्षांच्या सांख्यिकीचा उपयोग केला असून सांख्यिकी व्दितीय स्वरूपाची आहे.

जसबिर सिंग पीक प्रारूप पध्दती

$$\text{सूत्र :} \quad CP = \frac{Ca}{N} \times 100$$

CP = Cropping Pattern (पीक प्रारूप)

Ca = Area Under Crop 'a' in the Component Areal Unit (संशोधन क्षेत्रातील 'अ' पिकाखालील क्षेत्र)

N = Total Cropped Area in the Component Area Unit (संशोधन क्षेत्रातील एकूण पिकाखालील क्षेत्र)

**अभ्यास क्षेत्र (Study Area) :**

बीड जिल्ह्यातील अकरा तालुक्यापैकी गेवराई हा एक तालुका आहे. गेवराई तालुक्याचे पूर्वीचे नाव गवराई असे होते. बीड जिल्ह्याच्या उत्तरेस गोदावरी नदी खोऱ्याच्या सुपिक गंगथडी मैदानात अभ्यास क्षेत्र विस्तारलेले असून या प्रदेशात काळ्या रंगाची मृदा आढळते तर इतरत्र खडकाळ मृदा आढळते. हा तालुका बालाघाट डोंगर रांगात पसरलेला आहे. संशोधन क्षेत्रात गणोबा, चितोरा, सिंदफणा व गोदावरी या नद्या आहेत. गोदावरी प्रमुख नदी असून गेवराई तालुक्याच्या उत्तर सिमेवरून वाहते. सिंदफणा ही महत्त्वाची नदी असून

तालुक्याच्या दक्षिण सिमेवरून वाहते. जलसिंचनाच्या दृष्टीने तालुक्याच्या उत्तर भागात गोदावरी नदी व पैठण धरणाचा उजवा कालवा महत्त्वाचे आहे.

गेवराई तालुक्याचा अक्षवृत्तीय विस्तार 19⁰16'05'' उ. ते 19⁰26'40'' उ. असून रेखावृत्तीय विस्तार 74⁰61'57'' पू. ते 75⁰44'46'' पू. आहे तर क्षेत्रफळ 1455.64 चौ.कि.मी. असून यापैकी ग्रामीण क्षेत्रफळ 1451.34 चौ. कि.मी. तर नागरी क्षेत्रफळ 4.30 चौ.कि.मी. आहे. संशोधन क्षेत्र पर्जन्यछायेच्या प्रदेषात असून अवर्षण प्रवण आहे. येथील हवामान उष्ण व कोरडे असून येथे जून ते सप्टेंबर या कालावधीत पाऊस पडतो. पावसाचे प्रमाण अत्यंत कमी असून पाऊस अनियमित स्वरूपाचा आहे. सरासरी वार्षिक पर्जन्य 725 मि.मी. असून सरासरी किमान तापमान 29.90⁰ से. तर सरासरी कमाल तापमान 39.40⁰ से. असे आहे. सन 2011 च्या जनगणनेनुसार अभ्यास क्षेत्राची एकूण लोकसंख्या 262540 इतकी होती. यापैकी ग्रामीण लोकसंख्या 234048 तर नागरी लोकसंख्या 28492 होती. एकूण साक्षरतेचे प्रमाण 67 टक्के आहे. पुरूष साक्षरता प्रमाण 76 टक्के तर महिला साक्षरता प्रमाण 58 टक्के होते.

पीक प्रारूप (Cropping Pattern) :

''विषिष्ट क्षेत्रात व विषिष्ट काळात वेगवेगळ्या पिकाखाली असलेले क्षेत्राचे प्रमाण म्हणजे पीक प्रारूप होय.''

लहान किंवा मोठा प्रदेष हा तेथील भौगोलिक व सांस्कृतिक घटकांच्या प्रभावाखाली असतो. या घटकातील बदलाला अनुसरून पीक प्रारूपात बदल होत असते. त्यामुळे पीक प्रारूप ही लवचिक व गतिमान संकल्पना असून कोणतेही पीक प्रारूप दीर्घकाळ आदर्ष किंवा अयोग्य राहू शकत नाही. या गृहितकानुसार संषोधन केलेले आहे. या संषोधनाची मर्यादा म्हणजे संषोधन क्षेत्रातील फक्त 18 पिकांच्या प्रारूपाचा अभ्यास केलेला आहे. तसेच केवळ चार वर्षांचाच प्रातिनिधीक आकडेवारी घेऊन अभ्यास केला आहे.

**सारणी क्र. 01: संशोधन क्षेत्रातील पीक प्रारूप**

*(लागवड क्षेत्र – टक्केवारीमध्ये)*

| वर्ष | 2000—01 | | 2005—06 | | 2010—11 | | 2015—16 | |
|---|---|---|---|---|---|---|---|---|
| अ.क्र. | पिके | लागवड क्षेत्र | पिके | लागवड क्षेत्र | पिके | लागवड क्षेत्र | पिके | लागवड क्षेत्र |
| 1 | उडीद | 0.04 | ख.ज्वारी | 0.1 | ख.ज्वारी | 0.0 | ख. ज्वारी | 0.0 |
| 2 | तीळ | 0.4 | भात | 0.2 | भात | 0.0 | भात | 0.0 |
| 3 | खरीप मका | 0.5 | उडीद | 0.2 | उडीद | 0.0 | उडीद | 0.0 |
| 4 | खरीप ज्वारी | 1.0 | ख.सूर्यफुल | 0.6 | तीळ | 0.04 | जवस | 0.0 |
| 5 | भात | 1.0 | खरीप मका | 0.7 | जवस | 0.1 | ख. सूर्यफुल | 0.06 |
| 6 | जवस | 1.3 | जवस | 0.7 | सोयाबीन | 0.2 | तीळ | 0.07 |
| 7 | सोयाबीन | 1.3 | तीळ | 0.8 | ख. सूर्यफुल | 0.2 | करडई | 0.4 |
| 8 | मूग | 3.4 | सोयाबीन | 1.0 | खरीप मका | 0.5 | ख. भूईमुग | 1.0 |
| 9 | ख. सूर्यफुल | 4.0 | मूग | 1.1 | ख. भूईमुग | 1.0 | खरीप मका | 1.0 |
| 10 | हरभरा | 4.2 | ख. भूईमुग | 2.2 | मूग | 4.2 | ऊस | 1.4 |
| 11 | ऊस | 4.2 | करडई | 9.0 | ऊस | 5.0 | सोयाबीन | 3.3 |
| 12 | गहू | 4.3 | गहू | 10.0 | करडई | 5.1 | मूग | 4.0 |
| 13 | ख. भूईमुग | 4.4 | ऊस | 10.0 | हरभरा | 7.0 | गहू | 4.1 |
| 14 | करडई | 7.2 | हरभरा | 12.0 | गहू | 10.0 | तूर | 7.1 |
| 15 | तूर | 12.0 | तूर | 12.1 | तूर | 14.0 | बाजरी | 9.0 |
| 16 | कापूस | 16.0 | बाजरी | 35.3 | बाजरी | 16.3 | हरभरा | 17.4 |
| 17 | बाजरी | 38.4 | कापूस | 35.3 | रब्बी ज्वारी | 55.3 | रब्बी ज्वारी | 59.0 |
| 18 | रब्बी ज्वारी | 68.0 | रब्बी ज्वारी | 73.0 | कापूस | 63.0 | कापूस | 75.4 |

*स्त्रोत : संषोधक*

सारणी क्र. 01 अन्वये पीक श्रेणी गटाआधारे पिकांची विभागणी करून पीक श्रेणी सारणी तयार करण्यात आली.2000—01 वर्षी कापूस, बाजरी व रब्बी ज्वारी ही प्रथम श्रेणीचे पिके होते. सर्वात जास्त लागवड क्षेत्र रब्बी ज्वारीचे (68.0%) असून संशोधन क्षेत्रात रब्बी ज्वारी पिकाचे प्राबल्य असल्यामुळे रब्बी ज्वारी हे अग्रणी पीक (Leading Crop) होते.

सन 2005—06 साली बाजरी, कापूस व रब्बी ज्वारी प्रथम श्रेणीचे पिके होते. परंतु या वर्षी सन 2000—01 पेक्षा बाजरी पीक क्षेत्रात 3.1 टक्के घट झाली तर कापूस लागवड क्षेत्रात 19.3 टक्के आणि रब्बी ज्वारी पीक क्षेत्रात 05 टक्के वाढझाली. सन 2005—06 वर्षी रब्बी ज्वारी पिकाचे प्राबल्य असल्यामुळे हे अग्रणी पीक होते.

## सारणी क्र. 02:पीक श्रेणी (Crop Ranking)

| अ. क्र. | वर्ष | प्रथम श्रेणी पिके | व्दितीय श्रेणी पिके | तृतीय श्रेणी पिके |
|---|---|---|---|---|
| 1 | 2000—01 | कापूस, बाजरी, रब्बी ज्वारी | करडई, तूर | उडीद, तीळ, खरीप मका, खरीप ज्वारी, भात, जवस, सोयाबीन, मूग, खरीप सूर्यफुल, हरभरा, ऊस, गहू, खरीप भूईमुग |
| 2 | 2005—06 | बाजरी, कापूस, रब्बी ज्वारी | करडई, गहू, ऊस, हरभरा, तूर | खरीप ज्वारी, भात, उडीद, खरीप सूर्यफुल, खरीप मका, जवस, तीळ, सोयाबीन, मूग, खरीप भूईमुग |
| 3 | 2010—11 | बाजरी, रब्बी ज्वारी, कापूस | उस, करडई, हरभरा, गहू, तूर | जवस, सोयाबीन, तीळ, खरीप सूर्यफुल, खरीप मका, खरीप भूईमुग, मूग |
| 4 | 2015—16 | हरभरा, रब्बी ज्वारी, कापूस | तूर, बाजरी | खरीप सूर्यफुल, तीळ, करडई, खरीप भूईमुग, खरीप मका, ऊस, सोयाबीन, मूग, गहू |

*स्रोत :—संशोधक*

सन 2010—11 वर्षी बाजरी, रब्बी ज्वारी व कापूस हे प्रथम श्रेणीचे पिके होते. सन 2005—06 पेक्षा सन 2010—11 मध्ये बाजरी (19.0%) व रब्बी ज्वारी (17.7%) पीक क्षेत्र कमी झाले तर कापूस पीक क्षेत्रात 27.7 टक्के वाढझाली. या वर्षी कापूस पिकाचे प्राबल्य असल्यामुळे कापूस हे अग्रणी पीक होते तर ऊस, करडई, हरभरा, गहू व तूर हे व्दितीय श्रेणीचे पिके होते. सन 2005—06 पेक्षा सन 2010—11 मध्ये ऊस, करडई, हरभरा या पिकांचे क्षेत्र घटले तर तूर पीक क्षेत्रात वाढझाली.

सन 2015—16 मध्ये हरभरा, रब्बी ज्वारी व कापूस ही प्रथम श्रेणीची पिके होती. सन 2010—11 पेक्षा सन 2015—16 मध्ये रब्बी ज्वारी (3.7%), हरभरा (10.4%) व कापूस (12.4%) पीक क्षेत्रात वाढझाली. 2015—16 वर्षी कापूस पिकाचे प्राबल्यामुळे कापूस हे अग्रणी पीक होते. या वर्षी व्दितीय श्रेणीचे पिके फक्त तूर व बाजरी होते.

सन 2000—01 पेक्षा 2015—16 मध्ये पीक प्रारूपात बराच बदल झालेला दिसून येतो. संशोधन क्षेत्रातून खरीप ज्वारी, भात, उडीद, जवस, खरीप सूर्यफुल, तीळ, करडई, खरीप भूईमुग, खरीप मका हे पिके नामषेष होण्याच्या मार्गावर आहेत. रब्बी ज्वारी (9.0%) व बाजरी (59.4%) या तृणधान्ये पिकांचे क्षेत्र घटले असून कापूस (59.4%) या प्रमुख नगदी पिकांच्या क्षेत्रात वाढझालेली आढळते.

संशोधन क्षेत्रातील पीक प्रारूप अभ्यासानुसार गहू, ऊस, हरभरा, तूर, बाजरी, रब्बी ज्वारी, कापूस या पिकांत स्पर्धा असलेली दिसून येते. गेवराई तालुका औद्योगिकदृष्ट्या मागासलेला असून कृषी व्यवसाय हा एकमेव आर्थिक विकासाचा स्रोत आहे. वाढते जलसिंचन स्रोत आणि सुविधामुळे शेतकरी आधुनिक शेतीशी जोडला गेला. त्यामुळे कापूस या नगदी पिकांच्या क्षेत्रात मोठ्या प्रमाणात वाढझाली. नगदी पिकाकडे शेतक-यांचा कल वाढल्याने पारंपारिक पिकांचे अस्तित्व धोक्यात आले. या पिकांचे क्षेत्र नगण्य तर काही पिके नामषेष होण्याच्या मार्गावर आहेत.

## निष्कर्ष व सूचना (Conclusion and Suggestions) :

### निष्कर्ष (Conclusion) :

1. संशोधन क्षेत्रात हरभरा, तूर, बाजरी, रब्बी ज्वारी या अन्नधान्ये पिकांचे क्षेत्र जास्त असून इतर अन्नधान्ये पिकांचे क्षेत्र कमी होते तर काही पिके नामषेष होत आहेत.
2. अभ्यास क्षेत्रात हरभरा, तूर, बाजरी, रब्बी ज्वारी, कापूस या पिकांचे प्राबल्य असून रब्बी ज्वारी व कापूस हे अग्रणी पिके होती.

### सूचना (Suggestions) :

1. संशोधन क्षेत्रातील पीक प्रारूप विषमता कमी करून सम प्रमाणात तृणधान्ये, गळीतधान्ये व नगदी पिके लागवड करण्याची गरज आहे.
2. अभ्यास क्षेत्र पर्जन्य छायेच्या प्रदेशात असून पर्जन्य कालावधी, वितरण आणि जलसिंचन स्रोत, सिंचन क्षमता या अनुषंगाने आदर्ष पीक प्रारूप विकसित करणे आवष्यक आहे.

## संदर्भ (References) :—

1. *Agricultural Geography – Jasbir Sing, S.S. Dhillon.*
2. *कृषी भूगोल – डॉ. इंदिरा सिंह.*
3. *कृषी भूगोल – माजिद हुसेन.*
4. *कृषी भूगोल – डॉ. सुरेश फुले.*
5. *सामाजिक व आर्थिक समालोचन, जिल्हा बीड.*

# पर्यावरण संतुलन काळाची गरज : एक अभ्यास

**प्रा. डॉ. एम. एस. मुरुडकर**

अहिल्यादेवी महाविद्यालय, जळकोट

ता. जळकोट जि. लातूर

**प्रस्तावना:**

भारतामध्ये आधुनिक काळात पर्यावरणीय संतुलनात मोठया प्रमाणात तफावत दिसुन येत आहे. नैसर्गिक साधन संपत्तीची वाढ गणितीय पध्दतीने होत आहे. तर प्रदुषणाची वाढ ही भूमितीय पध्दतीने होत आहे. पर्यावरण बदलाचा ऐतिहासिक आढावा घेतल्यानंतर असे निदर्शनात येते की, पर्यावरणीय संतुलनातील बदल ही अनाधिकाळापासून घडत आलेली नैसर्गिक क्रिया आहे. आधुनिक काळात मानवी कार्यामुळे पर्यावरणातील अनेक घटकांचे अमर्याद शोषण झाले. लोकसंख्यावाढ, नागरिकरण, औद्योगिकरण, वाढते प्रदुषण, रासायनिक बी-बियाणे, खते व औषधाचा अमर्याद वापर, अतिरिक्त खाण काम, वृक्षतोड, पाण्याचा अपव्यय, मानवाचा पर्यावरणात वाढलेला हस्तक्षेप, वाढता उर्जा वापर, पर्जण्यात झालेली घट, तापमान वाढीमुळे पर्यावरण संतुलनात बिघाड निर्माण झाली. त्यामुळे, भारतातील पर्यावरण संतुलनात बदल झालेले आढळते.

आजपर्यंतच्या पर्यावरण संतुलनापेक्षा आताच्या पर्यावरण संतुलनाच्या स्वरुपात अधिक भिन्न अधिक संव्हारक अधिक परिणामकारक बदल झालेले दिसून येत आहे. त्यामुळे पर्यावरण संतुलणाचा समतोल राखणे काळाची गरज आहे.

**उदिष्ट्ये:**

1) पर्यावरण संतुलनाचा अभ्यास करणे.
2) पर्यावरण समतोल संतुलीत करण्याची उपाय जाणुन घेणे.
3) पर्यावरण संतुलनातून वैश्विक समृध्दी साध्य करणे.

**विषय विवेचन:**

पर्यावरण ही संकल्पना बहुव्यापक सर्वसमावेशक असल्याने क्लिष्ट ही आहे. सामान्यपणे आपलला असे म्हणता येईल की सजीवांची निर्मिती वाढ व नाश या नैसर्गिक क्रियासाठी सभोवतालचया सजीव व निर्जीव घकांची गरज असते. यासर्व घटकांच्या एकत्रित स्थितीला पर्यावरण असे म्हणतात. सभोवतालची परिस्थिती अनेक घटकापासून बनलेली असते व हे सर्व घटक सातत्याने एकमेकांवर परिणाम करित असतात. या सर्व घटकांचा अभ्यास केला असता आपल्याला असे लक्षात येते की, कांही घटक नैसर्गिक असतात. तर कांही मानव निर्मित असतात. या सर्व घटकांशी एकमेकांशी संबंध येतो व त्यातुन एकत्रित स्थिती निर्माण होऊन पर्यावरण तयार होते. या पर्यावरणाचा घडलेला समतोल का बिघडला ? व तो संतुलित करण्यासाठी काय उपाययोजना कराव्या लागतील याचा अभ्यास करणे आवश्यक आहे.

मानव आणि पर्यावरण यांचा आंतरसंबंध अनाधिकाळापासुन आहे. निसर्गातील काही आपत्तीमुळे पर्यावरणातील संतुलनात वेळोवेळी बिघाड निर्माण झाली. पण निसर्ग तत्वानुसार पर्यावरणीय व्यवस्था संतुलित होण्याची क्षमता निसर्गात असल्याने अन्न, वस्त्र, निवारा पूर्णता करत असताना मानवाने निसर्गाकडे कानाडोळा केला आहे त्यामुळे वेगवेगळया पर्यावरणीय आपत्ती निर्माण झाल्या. त्याचाच परिणाम म्हणून पर्यावरणाचा समतोल बिघडला. आज प्रचंड प्रमाणात औद्योगिक क्रांती झाली. त्यामुळे वेगवेगळया समस्या निर्माण झाल्या. औद्योगिकरणामुळे पर्यावरणीय संपदाच्या वापराला प्रचंड गती मिळाली, नगर झपाटयाने वाढू लागली. मानवाचे राहणीमान उंचावले, गरजा व मागण्या यांच्यात वाढ झाली. वृक्षतोड, जंगलतोड, प्रदुषण, हरितगृह परिणाम, आम्लपित्त, भुमिप्रदुषण, शेतीच्या पध्दतील बदल या विविध घकांचे प्रमाण वाढल्यामुळे पर्यावरणाचा समतोल बिघडला त्यामुळे वेगवेगळया पर्यावरणीय समस्या निर्माण झाल्या म्हणून पर्यावरणातील जमिन, हवा, पाणी, वनस्पती प्राणी इ. मुख्य संपदावर ताण वाढला. निसर्गातल्या साधन संपदावर दडपणे येवू लागली. मानव पर्यावरणापासुन परावृत्त झाला त्यामुळे आज पर्यावरणाचा समतोल पुन्हा संतुलित करण्यासाठी, शासकिय, निमशासकिय स्तराव प्रयत्न केले पाहिजेत. आज प्रचंड प्रमाणात वृक्ष तोड झाली आहे. वृक्षतोडीचे प्रमाण प्रचंड प्रमाणात वाढले आहे. त्यामुळे पर्यावरणाचा समतोल बिघडला आहे. म्हणून वृक्षाचे महत्व भावी पिढीला पटवून देण्यासाठी वृक्ष लागवड केली पाहिजे. पर्यावरणाचे महत्व पटवून दिले पाहिजे, ओझोन वायुचे महत्व भावी पिढीला पटवून दिले पाहिजे, टाकाऊ पदार्थाचे पुन:चक्रीकरण केले पाहिजे, पूरास नियंत्रण, प्रदुषणास नियंत्रण पर्यावरण बचाव ही मोहिम राबविली पाहिजे. अशा विविध प्रयत्नाव्दारे पर्यावरणाचा बिघडलेला समतोल संतुलीत केला पाहिजे.

**उपाययोजना :**

1) वृक्ष लागवड करणे.
2) जनजागृती करणे.
3) पर्यावरणाचे महत्व पटवून देणे.
4) शासकिय नवे कायदे करावे.
5) "झाडे लावा झाडे जगवा" हि मोहिम राबविणे.

6) पर्यावरण शिक्षण देणे.
7) जैविक विविधतेचे संवर्धन करणे.
8) हरितगृहाचे प्रमाण कमी करणे.
9) जंगलाचे महत्व पटवून देणे.
10) हवा प्रदुषण नियंत्रण.
11) भूमि प्रदुषण प्रतिबंध करणे.
12) ओझोन वायूचे महत्व विषद करणे.
13) नैसर्गिक साधन संपत्तीचे संवर्धन करणे.
14) मानव निर्मित आपत्तीचे प्रमाण कमी करणे.
15) शहरी करणामुळे निर्माण होणाऱ्या समस्याच्या प्रमाण कमी करणे.

## निष्कर्ष :

1) पर्यावरणामध्ये साधन संपत्तीवर असाहय ताण पडत आहे.
2) हवा, पाणी, जमीन या नैसर्गिक संपदाचा मोठया प्रमाणात क्षय होत आहे.
3) पर्यावरणीय समतोल राखण्यासाठी, सामाजिक आणि राष्ट्रीय स्तरावर नियोजन आखणे आवश्यक आहे.
4) पर्यावरण शिक्षणाची अंत्यत गरज आहे.
5) शासकिय नविन कायदे करणे अंत्यत आवश्यक आहे.

## संदर्भ ग्रंथ :

1) प्रा.डॉ.दयानंद उजळबें – निसर्गबंध
2) विठ्ठल घारपूरे – पर्यावरण भूगोल
3) डॉ. श्रीकांत कोलेकर – पर्यावरण समस्या निराकरण व क्षेत्र अभ्यास
4) सौ. आशा भराडिया – पर्यावरण शिक्षण.
5) एस.बी.सौदी – पर्यावरण व भूलोल.

# भूगोल संशोधनात संख्याशास्त्राचा उपयोग

डॉ. अशोक उमराव नागरगोजे

भूगोल विभाग,

महाराष्ट्र उदयगिरी महाविद्यालय, उदगीर

**प्रस्तावना :**

'संख्याशास्त्र' (Statics) या शब्दाची उत्पत्ती लॅटिन भाषेतील 'Status', इटालियन भाषेतील 'Statsta' व जर्मन भाषेतील 'statiskik' या शब्दापासून झालेली आहे. आधुनिक अर्थानी सांख्यिकी या शब्दाचा उपयोग केवळ गेल्या शंभर वर्षांपासून केला जात आहे. पण संख्याशास्त्राचा सर्वांगीण विकास गेल्या तीन शतकापासून सुरुवात झाला आहे. अब्राहम डी मॉयर, डी लाप्लेस, कॉर्ल पिअरसन व आर.ए. फिशर या संख्याशास्त्रज्ञांचे कार्य हे संख्याशास्त्राच्या विकासात मोलाचे आहे. संख्याशास्त्र हे राजकीय क्षेत्रातील वेगवेगळे निर्णय घेण्याचे महत्त्वाचे साधन बनले आहे. अलिकडे सर्वच शास्त्रामध्ये संख्याशास्त्राचा उपयोग मोठ्या प्रमाणात केला जात आहे. व्यापारात होत असलेली वाढ, वेगवेगळ्या शास्त्रात संशोधनात होत असलेली प्रगती यामुळे संख्याशास्त्रास मागणी वाढली आहे. तसेच इलेक्ट्रॉनिक कॉम्प्युटर (विद्युत-गणक) क्षेत्रातील प्रगतीमुळे संख्याशास्त्रातील प्रक्रियेचा खर्च कमी झाला आहे व वेळही कमी लागत आहे. ते चलनशिलता (फरक) स्पष्ट करणारे शास्त्र आहे.

**व्याख्या :**

१)    ए.एल. बाऊले यांच्या मते, कोणत्याही विभागातील सत्य घटकाचे संख्यात्मक निवेदन ज्यामध्ये वेगवेगळ्या घटकाचे संबंध स्पष्ट केलेले शास्त्र म्हणजे संख्याशास्त्र होय.

२)    क्रॉकस्टन काऊडन यांच्या मते, सांख्यिकी सामग्री गोळा करणे, तिची मांडणी, पृथक्करण आणि विश्लेषण करणे म्हणजे संख्याशास्त्र होय.

यावरुन स्पष्ट होते की, संख्याशास्त्राचा वापर करणे म्हणजे केवळ सांख्यिकी सामग्री जुळवून गणिताच्या साह्याने संख्यात्मक उत्तर शोधून काढणे नसून त्या संख्यात्मक उत्तराचे विश्लेषण करणे होय.

**सांख्यिकी भूगोल:**

भूगोलशास्त्रातील विविध सिद्धांत शोधून काढण्यासाठी संख्याशास्त्राचा उपयोग करून घेतला जातो. यासाठी विविध सांख्यिकी तंत्र (Statistical Techniques) वापरावी लागतात. वेगवेगळ्या सांख्यिकी तंत्राचा वापर करुन भौगोलिक सिद्धांत, संकल्पना आणि सत्य शोधून काढण्याच्या दृष्टीने केलेला अभ्यास म्हणजे सांख्यिकी भूगोल होय. संख्याशास्त्रीय पद्धतीचा वापर करुन काढलेली अनुमाने किंवा निष्कर्ष हे केव्हाही गुणात्मक अनुमान किंवा निष्कर्षापेक्षा जास्त रास्त असतात. अशा निष्कर्षामध्ये परिस्थितीचे यथायोग्य वर्णन सामावलेले असते.

संख्याशास्त्राचा उपयोग सर्वच ठिकाणी करता येतो आणि केलाच पाहिजे असे म्हणणे मात्र संयुक्तिक ठरणार नाही. ज्या विषयाचा अभ्यास संख्यात्मक पद्धतीने मांडता येतो अशा विषयामध्ये संख्याशास्त्राचा अभ्यास जास्त प्रमाणात करता येतो. भूगोल विषयातील वेगवेगळ्या शाखामध्ये निरनिराळ्या घटकांची संख्यात्मक अभिव्यक्ती करता येते. म्हणून भूगोल विषयात संख्याशास्त्रीय पद्धतीचा वापर मोठ्या प्रमाणात केला जातो.

**विषय विवेचन:**

संख्यात्मक वर्णन हे भूगोल अभ्यासामध्ये पूर्वीपासून केले जात आहे. पण सुरुवातीच्या काळात वर्णनात्मक माहितीच्या मानाने संख्यात्मक माहितीचे प्रमाण कमी होते. सांख्यिकी पद्धतीचा वापर मात्र भूगोलाच्या अभ्यासात फारसा जुना नाही. विसाव्या शतकाच्या सुरुवातीपासून सांख्यिकी पद्धतीचा वापर थोड्याफार प्रमाणात सुरू झाला. इ.स. १९५० पासून सांख्यिकी पद्धतीचा भूगोल संशोधनात उपयोग मोठ्या प्रमाणात वाढला. आज सांख्यिकी पद्धतीची उपयुक्तता इतकी वाढली आहे की, सांख्यिकी भूगोल या विषयास भूगोलाची एक मूलभूत शाखा म्हणून स्थान प्राप्त झालेले आहे.

भूगोलातील वेगवेगळ्या घटकांचा अभ्यास करुन कार्यकारणभाव शोधून काढण्यासाठी सांख्यिकी तंत्र उपयुक्त ठरते. सांख्यिकी तंत्रानुसार काढलेल्या निष्कर्षामध्ये नेमकेपणा असतो. भूगोलाच्या अभ्यासामध्ये संख्यात्मक अभिव्यक्ती शक्य असते. म्हणून संख्याशास्त्राचा वापर भूगोल संशोधनात मोठ्या प्रमाणात केला जातो. वेगवेगळ्या सांख्यिकी पद्धती या भूगोल संशोधनाची साधने आहेत.

जेव्हा एखाद्या संशोधनातील घटक आपण संख्येत अभिव्यक्ती करू शकत नाही किंवा मोजू शकत नाही. म्हणजे आपले संशोधन अपूरे आहे किंवा असमाधानकारक आहे असे समजले जाते. म्हणून अलिकडे संख्याशास्त्रास महत्त्व आले आहे. भूगोल संशोधनात संख्याशास्त्रीय उत्क्रांती झाली आहे. भूगोल संशोधनात वेगवेगळ्या भौगोलिक घटकांची माहिती गोळा करून तिची मांडणी केली जाते व त्या माहितीचे वारंवारता वितरण हे वारंवारता सारणी किंवा आलेखात्मक पद्धतीने स्तंभालेख रेषालेखाच्या साह्याने दाखविले जाते. उदा.वेगवेगळ्या महिन्यातील पर्जन्यमान.

**संख्याशास्त्राची भूगोल संशोधनातील उद्दिष्ट्ये:**

१)    भूगोल संशोधनात सत्य परिस्थितीची मांडणी करणे.

२)    भूगोल संशोधनात तुलनात्मक अभ्यास करणे.

३)    भूगोल संशोधनातील सिद्धांत, परिकल्पना, नियमांची पडताळणी करणे.

४) भूगोल संशोधनात भविष्यकालीन भौगोलिक परिस्थितीचे अंदाज व्यक्त करणे.

५) भूगोल संशोधनात नियोजन व योजना राबविणे.

संख्याशास्त्राचा खालीलप्रमाणे भूगोल संशोधनात उपयोग केला जातो.

१) भूगोल संशोधनात संख्याशास्त्राच्या उपयोगामुळे - सत्य परिस्थितीचे योग्य प्रकारे मांडणी ही संख्याशास्त्रामुळे शक्य झाली आहे. कारण संख्यातम केलेली मांडणी ही जास्त स्पष्ट व प्रभावी असते व संख्याशास्त्रीय निवेदन हे लवकर समजते.

२) भूगोलातील सत्य परिस्थितीची थोडक्यात मांडणी - संख्या उपयोगाने शक्य झाले आहे.

संशोधनात वेगवेगळ्या भौगोलिक घटकाचे प्रादेशिक वितरण विचारात घेतले जाते. उदा.शहरी वसाहतीचे कार्य ठरविण्यासाठी त्या विभागातील वेगवेगळ्या वसाहतीतील लोकांचा व्यवसाय विचारात घेऊन सरासरी विचलन, प्रमाणित विचलन इत्यादी सांख्यिकी पद्धतीचा वापर करून सर्व वसाहतीचे कार्य थोडक्यात स्पष्ट करता येते. उदा.लातूर व्यापारी वसाहत आहे.

३) भूगोल संशोधनात तुलनात्मक अभ्यास करण्यासाठी संख्याशास्त्रातील वेगवेगळ्या पद्धतीचा उपयोग महत्त्वपूर्ण मानला जातो. उदा. वसाहतीतील लोकसंख्या व त्याठिकाणी असलेल्या सेवा यांची तुलना करण्यासाठी सहसंबंध गुणांक, चलन गुणांक इत्यादींचा उपयोग केला जातो व वसाहतीतील लोकसंख्येचा आकार व उपलब्ध सेवा यांची तुलना करता येते.

४) भूगोल संशोधनात वेगवेगळे भूगोल सिद्धांत, परिकल्पना, नियम इत्यादींची मांडणी केली जाते व हे सिद्धांत व परिकल्पना या पडताळून पाहण्यासाठी वेगवेगळ्या संख्याशास्त्रीय पद्धतीचा उपयोग केला जातो. उदा.चलन गुणांक, सरासरी विचलन काम वर्ग चाचणी, संभाव्यता चाचणी इत्यादी वेगवेगळे प्रतिचयन प्रकार आहेत.

५) भूगोल संशोधनाच्या साह्याने भविष्यकालीन वेगवेगळ्या भौगोलिक परिस्थिती विषयीचे अंदाज व्यक्त करण्याचा प्रयत्न केला जातो. उदा.हवामान अंदाज, लोकसंख्यावाढीचे अंदाज, शेती उत्पादनातील अंदाज

६) संख्याशास्त्रीय उपयोगामुळे भूगोल संशोधनाचा उपयोग नियोजन व योजना राबविण्यासाठी होतो. उदा.लोकसंख्येची भविष्यकालीन वाढ-सेवा उपलब्ध करण्यासाठी नियोजन

**निष्कर्ष:**

संख्याशास्त्राची भूगोल संशोधनातील व्याप्ती ही विस्तृत आहे. कारण सर्व शास्त्रामध्ये याचा उपयोग केला जातो. शास्त्रीय विश्लेषण करण्यासाठी याचा उपयोग भूगोल व इतर शास्त्रात केला जातो.

सर्व नैसर्गिकशास्त्रात वेगवेगळे सत्य शोधून काढण्यासाठी वेगवेगळे घटक व घटना यांचा कार्यकारण भाव समजण्यासाठी संख्याशास्त्राचा उपयोग केला जातो.

वेगवेगळ्या प्रकारचे प्रयोग पडताळण्यासाठी संख्याशास्त्रीय पद्धतीचा उपयोग केला जातो. कार्ल पियर्सनच्या गुणाकार घात सहसंबंध गुणांकाचा उपयोग-तुलनात्मक अभ्यासात उपयोग होतो.

हवामानशास्त्रात सरासरी तापमान, आर्द्रता, दाब इत्यादींचा अभ्यास मोठ्या प्रमाणात केला जातो. लोकसंख्या, वस्ती, भूउपयोगिता, भूरूपशास्त्रात आर्थिक, औद्योगिक भूगोलातही मोठ्या प्रमाणात उपयोग होतो. सिद्धांत स्पष्ट करण्यासाठी अर्थशास्त्र, समाजशास्त्रातही उपयोग होतो.

शास्त्रज्ञ, राजकीय पुढारी, अर्थतज्ञ, समाजसुधारकास, संख्याशास्त्रातील पुराव्याने वेगवेगळ्या विषयातील सत्य व असत्य घटना स्पष्ट करण्यासाठी व त्यांची मते मांडण्यासाठी, तुलनात्मक महत्त्व स्पष्ट करण्यासाठी, जमिनीची कार्यक्षमता, जमिनीचे वर्गीकरण, नद्यांच्या नंबरासंदर्भातील नियम, लोकसंख्या एकत्रीकरण, स्थलांतर, औद्योगिक स्थान इत्यादीच्या अभ्यासात, किंमतीतील वाढ, दरडोई उत्पन्न, बेरोजगारी, व्यापार, दळणवळण इत्यादी घटकांचा अभ्यास संख्याशास्त्राच्या साह्याने केला जातो.

**संदर्भ :**

१) डॉ.उमाकांत शुक्ला व प्रा.एस.टी. कुलकर्णी, सांख्यिकी तत्त्व आणि व्यवहार, पिंपळापुरे अँड पब्लिकेशन, नागपूर

२) पी.एल. मिश्र, प्रयोगात्मक भूगोल, विश्वभारती पब्लिकेशन, नवी दिल्ली-११०००२

३) डॉ.पी.एम. नागतोडे, भूगोलशास्त्रातील संशोधन तंत्राची मूलतत्त्वे, पिंपळापुरे अँड पब्लिकेशन, नागपूर

४) प्रा.वाय.आर. महाजन, सासंख्यिकी, पिंपळापुरे अँड पब्लिकेशन, नागपूर

# संशोधन अहवाल लेखनाचे महत्व

**प्रा. डॉ. नामदेव केशवराव वाघमारे**

भूगोल विभाग

**प्रस्तावना :**

सामाजिक संशोधनात विविध पध्दतीने व विविध तंत्राच्या सहाय्याने तथ्यांचे संकलन केले जाते, आणि या संकलित तथ्यांचे विश्लेषण केले जाते. संशोधन ही दीर्घ काळ चालणारी प्रक्रिया आहे. त्या अधारे संशोधनाचे निष्कर्ष काढले जातात. तथ्यांच्या आधारावर निष्कर्ष काढला जातो, अशा प्रकारे केलेले संशोधन लिखीत स्वरूपात प्रस्तूत करणे आवश्यक असते. अन्यथा संशोधन कर्त्याने केलेले संशोधन संशोधन समाजापर्यंत पोहचणार नाही त्याचा इतरांना उपयोग होणार नाही. म्हणून संशोधनाला अतिशय व्यवस्थितपणे लिखीत स्वरूपात पध्दतशीरपणे मांडणी केली जाते यालाच संशोधनाचा अहवाल म्हणतात. ही संशाधनाची शेवटची आणि अत्यंत महत्त्वाची पायरी आहे.

**संशोधन विषयाचे महत्त्व :**

संशोधनाचा अहवाल तयार केल्यामुळे संशोधकाने संशोधनासाठी निवडलेला विषय त्याची पार्श्वभूमी, व्याप्ती, समजून घेण्यासाठी तसेच त्याचे निष्कर्ष संबंधीची माहिती प्राप्त करण्यासाठी, दूसऱ्या संशोधकासाठी, संशोधन अहवाल महत्त्वाचा ठरतो तसेच संशोधकाने संशोधनात कोणत्या पध्दतीचा वापर केलेला आहे, त्याचे निष्कर्ष, उपाययोजना व सूचना यांचे पूर्णपरिक्षण करण्यासाठी, तसेच संशोधकाने सांगितलेल्या सूचनांचा फायदा समाजाला होऊ शकतो म्हणून संशोधन अहवाल तयार करणे अवश्यक आहे.

संशोधन एका व्यक्तीसाठी किंवा व्यक्तींसमूहासाठी असते. संशोधकाने केलेले संशोधन लोकांपुढे येणे आवश्यक आहे. अन्यथा ते संशोधन संशोधकापूरतेच मार्यादित राहील. त्या संशोधानाचा समाजाला आणि इतर संशोधकाला कोणताही फायदा होणार नाही. त्यामूळे संशोधनाचा संशोधन अहवाल लिखीत स्वरूपात प्रस्तूत करणे अत्यंत अवश्यक आहे.

**उद्दिष्ट्ये :**

संशोधनात संशोधन अहवाल लेखनाचे महत्त्व, संशोधन अहवालाचे घटक जाणून घेणे.

**संशोधन अहवालाचा अर्थ:**

संशोधन अहवालाच्या संदर्भाने प्रा. हंसराज म्हणतात 'समाजाला केलेले परिणामकारक व हेतूपर्वक निवेदन म्हणजेच वास्तववादी अहवाल लेखन होय.' संशोधनकर्त्याने अथक परिश्रम घेवून प्राप्त केलेले ज्ञान वा माहिती ही जनसामान्यापर्यंत पोहोचावी किंवा अन्य अभ्यासक संशोधनकर्त्यांना देखील तिचा उपयोग व्हावा याप्रमूख उद्देशाने संशोधनकर्ता संशोधनात प्राप्त झालेल्या ज्ञानाची लिखीत स्वरूपात सुव्यवस्थित व सुत्रबध्दपणे मांडणी करतो. संशोधन अहवाल लेखन हे नवे शास्त्र आसून ती एक सूंदर कला आहे.

**1) गुड आणि हॅट :** "अहवाल तयार करणे हे संशोधनाचे अंतिम चरण होय आणि त्याचा उद्देश इच्छूक वाचकांना आध्ययनातून काढण्यात आलेल्या परिणामांना समजू शकेल अशा व्यवस्थित व विचारपूर्वक स्वरूपात मांडणे होय की, ज्याद्वारे वाचक तथ्यांना समजू शकले व स्वत: पूरता तरी संशोधनाच्या निष्कर्षाशी प्रामाणिकता पडताळून पाहण्या योग्य बनेल.''

**2) अमेरिकन मार्केटिंग सोसायटी :** अहवालाचा उद्देश हा अध्ययन परिणामाविषयी रूची ठेवणाऱ्या व्यक्तीपूढे अहवाल सविस्तर प्रस्तूत करणे आणि संशोधनाच्या परिणामाला व्यवस्थितपणे मांडणे की, ज्यामुळे तो अहवाल वाचणारी प्रत्येक व्यक्ती तथ्यांना समजण्यास आणि निष्कर्षाची वैधता स्वत: निर्धारित करण्यास समर्थ होऊ शकेल.

**संशोधन अहवालाचे घटक :**

**प्रस्तावना :**

संशोधन अहवालात सुरूवातीला संशोधनाची प्रस्तावना दिली जाते. प्रस्तावणेमध्ये संशोधनाचा विचार कसा सुचला, योजना काय आहे, विषयाचे महत्त्व, तथ्य संकलनाच्या पध्दती विश्वासनीयतेचा आधार इत्यादीबाबत थोडक्यात माहिती दिली जाते.

**2) समस्यांचे वर्णन:** -संशोधनासाठी निवडलेल्या विषयाची माहिती दिली जाते, विषयाच्या संबंधात संशोधन करण्याची आवश्यकता, विषयाची निवड, विषयाच्या अभ्यासातून कोणता लाभ होऊ शकतो इत्यादी गोष्टीचे वर्णन केल जाते.

**3) संशोधनाचा उद्देश :-** कोणत्याही संशोधनाचा उद्देश हा ज्ञानाची वृध्दी करणे किंवा व्यावहारिक लाभ प्राप्त करणे हा असतो, ज्ञानाची प्राप्ती करणे, सिध्दांताचे परीक्षा करणे, त्याचा व्यावहारीक लाभ, संशोधनाचे उद्देश यासंबंधीचा उल्लेख यात केला जातो.

**4) संशोधन क्षेत्र :-** संशोधनाचे क्षेत्र कोणते आहे या विषयीची माहिती अहवालात नमूद केली जाते. भौगोलिक वर्ग, लोकसंख्यात्मक आणि आर्थिक वैशिष्ट्यांचे स्पष्टीकरण करून संशोधन क्षेत्र निश्चित केले जाते, संशोधन क्षेत्र हेच का निवडले गेले आहे, इत्यादीची माहिती दिली जाते.

**5) तथ्य संकलन पध्दती :** तथ्य संकलनाचे प्रामुख्याने प्राथमिक आणि द्वितीयक हे दोन स्त्रोत आहेत. तसेच निरीक्षण, मुलाखती, प्रश्नावली हे प्राथमिक तथ्याचे स्त्रोत आहेत. प्रस्तूत संशोधनात तथ्य संकलनासाठी कोणत्या पध्दतीचा उपयोग केला आहे त्या पध्दतीद्वारे तथ्याचे संकलन व त्याची कारणे    यासंबंधीचा उल्लेख संशोधन अहवालात केला जातो.

**6) नमूना निवड :-** प्रस्तूत संशोधनात कोणत्या प्रकारच्या नमूना निवड पध्दतीचा उपयोग करण्यात आला, ती नमूना निवड पध्दती संशोधनाकरीता उपयुक्त आहे  त्याचबरोबर अवश्यकतेनूसार नमूना निवड पध्दत वापरली जाते. ते संशोधन अहवालात दिले जाते.

**7) संशोधन कार्याचे संघटन :** संशोधन कार्याचे कोणत्या पध्दतीने व्यवस्थित संघटन करण्यात आले याविषयीचे विवेचन संशोधन अहवालात दिले जाते. अध्ययन स्थळ किंवा घटनांची निवड, कार्यकर्त्यांची निवड, प्रशिक्षण कार्यविभाजन, तथ्य, संपादन इत्यादी कार्य संशोधन कर्त्याला करावे लागते.

**8) विश्लेषण आणि निर्वचन :** संशोधनात तथ्याचे संकलन केल्यानंतर त्या तथ्यांना व्यवस्थित रूप द्यावे लागते, त्याकरिता तथ्याचे वर्गीकरण, सांकेतिकरण, सारणीकरण करून विश्लेशन केले जाते.

**9) तथ्याचे उल्लेखनीय वैशिष्ट्ये :** संशोधन अहवालात विश्लेषन आणि निर्वचनानंतर एका स्वतंत्र प्रकरणात उल्लेखनीय वैशिष्ट्ये आणि त्यांच्या आधारावर काढलेले निष्कर्ष क्रमाने मांडले जाते. अहवालाचे वाचन करणाऱ्यांना अध्ययनाचा निष्कर्षचा सार एकाच प्रकरणात उपलब्ध होतो यामुळे अहवालातील परिणाम निष्कर्ष वाचकाच्या लक्षात येतो.

**10) सुचना आणि उपाययोजना :** संशोधन हे ज्ञान मिळवण्याच्या उद्देशाने केले जाते, तसेच व्यावहारिक लाभ मिळावा, हा देखील उद्देश असतो, सामाजिक जीवनाशी महत्त्वपूर्ण सूचना आणि उपाययोजना अहवालात नमूद केलेल्या असतात. या सूचना दोन प्रकारच्या असतात. 1. सूचना तथ्यांचे संकलन करित असताना उत्तरदाता स्वतः सूचना देत असतो. त्या महत्त्वाच्या असतात. या सूचनाही अहवालात नमूद केल्या जातात. 2. तर दूसऱ्या प्रकारच्या सूचना संशोधनकर्ता संशोधनाच्या आधारावर अविषयाच्या संबंधी सूचना करत असतो. याचाही उल्लेख अहवालात असतो.

**11) परिशिष्टे :** संशोधन अहवालात सूचना आणि उपाययोजना दिल्यानंतर अहवाल पूर्ण होतो परंतू अहवालाच्या शेवटी संशोधनासंबंधीचे काही परिशिष्ट्ये महत्त्वाचे असतात. महत्त्वाची कागदपत्रे, पत्रे, चार्ट, आलेख, चित्र परिशिष्टात येतात. त्याच प्रमाणे प्रश्नावली ,अनूसूची , क्षेत्रिय नकाशे, सारण्या, संदर्भग्रंथसूची याचा परिशिष्टात समावेश होतो.

**निष्कर्ष :**

संशोधनात संशोधन अहवाल तयार करणे अत्यंत महत्त्वाचे आहे. संशोधकाने केलेल्या सूचनाचे पालन करण्यासाठी संशोधनाचा लिखीत अहवाल अवश्यक आहे. संशोधन विषयाच्या संदर्भात केलेल्या सूचना समाजाच्या दृष्टीने महत्त्वाच्या असतात. त्या समाजापर्यंत पोहचवण्यासाठी संशोधन अहवाल तयार करणे आवश्यक आहे. केलेले संशोधन मानवी हिताचे असते त्यात मानवाला भेडसावणाऱ्या समस्यांचा विचार केलेले असतो. अशा विचार लोकांपर्यंत पोहचवण्यासाठी संशोधन अहवाल लिखित स्वरूपात असलाच पाहिजे.

**सारांश :**

संशोधनाचा अहवाल तयार केल्यामुळे संशोधकाने कोणत्या विषयाबाबत संशोधन केले आहे, त्यातून कोणते निष्कर्ष काढलेले आहेत, निष्कर्षाची पूर्नपरीक्षा करण्यासाठी संशोधन अवहालाला विशेष महत्त्व आहे. संशोधन कर्त्याने केलेले संशोधन केवळ संशोधकापूरतेच मर्यादित राहत नाही. अहवालामूळे संशोधनाची माहिती सर्व लोकांना प्राप्त होते. त्यामुळे त्या संशोधनावर लोक चर्चा करतात. अनेकदा टिका केली जाते. त्यामुळे ज्ञानाची वृध्दी होण्यास मदत होते. ज्ञानाचा फायदा समाजास होतो. संशोधनाचा अहवाल ही संशोधनाची शेवटची पायरी आहे.

**संदर्भ सूची :**

1) डॉ. सुनील महादेव जाधव, सामाजिक संशोधन पध्दती - अरूना प्रकाशन, 5 सप्टे. 2012
2) प्रा. किशोर राऊत, सामाजिक संशोधन पध्दती - चिन्मय प्रकाशन, जून 2014
3) डॉ. वा. भा. पाटील, संशोधन पध्दती - प्रशांत पब्लीकेशन, 2012
4) प्रा. डॉ. सुनील मायी, सामाजिक संशोधन पध्दती - डायमंड पब्लीकेशन, पुणे - 2008
5) पु. ल. भांडारकर, सामाजिक संशोधन पध्दती - महाराष्ट्र विद्यापीठ ग्रंथ निर्मीती मंडळ, नागपूर - 1999
6) गुरूनाथ नाडगोडे, सामाजिक संशोधन पध्दती - फडके प्रकाशन, कोल्हापूर - 1986
7) डॉ. दा. धो. काचोळे, सामाजिक संशोधन पध्दती - कैलास पब्लीकेशन, औरंगाबाद - 1993
8) प्रदीप आगलावे, संशोधन पध्दती शास्त्र व तंत्रे - विद्या प्रकाशन, नागपूर — 2000.

# पाण्याचे व्यवस्थापन, समस्या व उपाय

**प्रा. डॉ. पी. के. मोरखंडे**

भूगोल विभाग,

उज्वल ग्रामीण महाविद्यालय, घोणसी ता.जळकोट जि.लातूर

## प्रस्तावना :

पाण्याचे जतन, संवर्धन व योग्य व्यवस्थापन करणे आवश्यक आहे. वाढती लोकसंख्या, औद्योगिकरण, ग्रामीण अज्ञानपणा, निरक्षरता व पर्यावरण असमतोल याबाबत असलेली शासन व प्रशासनाची उदासिनता याचा पाणी व्यवस्थापन व वापर यावर विपरित परिणाम होत आहे. पाणी किंवा जल म्हणजे जीवन होय. पृथ्वीतलावरील कोणताच जीव पाण्याशिवाय जीवंत राहू शकत नाही. असे मानले जाते की, सजीवांची उत्पत्ती पाण्यातूनच झालेली आहे. म्हणून पाण्याला जीवन म्हटले जाते. परंतू मानव स्वतःच्या आर्थिक व भौतिक सुखासाठी पाण्याचा दुरुपयोग करीत आहेत. पर्यायाने स्वतःचे जीवन संपविण्याचा प्रयत्न करीत आहेत. पूर्वी लोकसंख्या कमी असल्यामुळे पाण्याचा प्रश्न गंभीर नव्हता परंतु वाढती लोकसंख्या, औद्योगिकरण व बागायती शेतीसाठी पाण्याचा उपसा मोठया प्रमाणात होत आहे. तर दुसरीकडे पाण्याच्या साठवण नियोजनाचा अभाव दिसून येतो. मागील काही वर्षातील पर्जन्यमानाचा विचार केला तर त्यात मोठया प्रमाणात अनियमितपणा दिसून येतो. याला मानवच जबाबदार आहेत. पाणी ही राष्ट्रीय संपत्ती आहे. त्याचे रक्षण करणे सर्वांचेच कर्तव्य असले पाहिजे पावसाळयातील पाणी योग्य तंत्राद्वारे साठवून त्याचा योग्य वापर केला तर उन्हाळयात जाणवणारी पाणी टंचाईची तीव्रता कमी करता येते.

## उद्देश :

सदर शोध निबंध पुढील उद्देशाला अनुसरुन लिहिण्यात आला आहे.

१.  पाण्याचे महत्व समजून देणे.

२.  पाणी व्यवस्थापन व शाश्वत विकासाचा संबंध जाणून घेणे.

३.  पाणी व्यवस्थापनातील समस्या व उपायांचा शोध घेणे.

## अभ्यास पध्दती :

प्रस्तुत शोध निबंध लिहिण्यासाठी दुय्यम साधन सामग्रीचा उपयोग करण्यात आला आहे. तयात संदर्भग्रंथ, दैनिक वर्तमानपत्रे, मासिके, संकेतस्थळे, शासकीय अहवाल इ. साधनांचा वापर करण्यात आला आहे.

## पाण्याचे महत्व :

पृथ्वीतलावरील उपलब्ध पाण्यापैकी केवळ ३.५ टक्के पाणी पिण्यायोग्य आहे. जे लोकसंख्येच्या तुलनेत खूपच कमी आहे. देशातील अन्नधान्याची गरज भागविण्यासाठी एकूण उपलब्ध पाण्याच्या जवळपास ८५ टक्के पाणी शेतीसाठी लागते, देशातील प्रत्येक व्यक्तीच्या मुलभूत हक्कानुसार त्याला दररोज किमान ४० लिटर पाण्याची आवश्यकता असते. सध्याची पाणी उपलब्धता व मानसी पाण्याचा वापर यात असमतोल आहे. पाण्याशिवाय राष्ट्राचा सर्वांगीण विकास होऊ शकत नाही. पावसाचे अत्यल्प प्रमाण व पाणी जीरवण्याचे अयोग्य व्यवस्थापन यामुळे पाणी टंचाईचे संकट निर्माण झालेले आहे. तसेच उद्योगधंदे, विज निर्मिती प्रकल्प व शेतीसाठी पाणी मिळणे कठीण झालेले आहे. पाणी टंचाई हा महाराष्ट्रातील गंभीर प्रश्न आहे. सर्वांना समान पाणी वाटप करण्याबाबत शासनासमोर मोठे आव्हान आहे. धरणातील पाणी साठयात मोठया प्रमाणात गाळ साचल्याने पाणी साठवणुकीवर मर्यादा येत आहेत. विज निर्मिती प्रकल्प, विज पुरवठा व शेती उत्पादन यावर वाईट परिणाम होत आहेत. संयुक्त राष्ट्रसंघटनेच्या आर्थिक व सामाजिक समितीने २००२ मध्ये पाण्याच्या हक्काला मानवी हक्क म्हणून मान्यता दिली. जागतिक आरोग्य संघटनेच्या अहवालानुसार जवळपास १.९० कोटी लोकांना आजही पिण्याचे पाणी मिळत नाही. तसेच २.६५ व्यक्ती अस्वच्छ पाण्यामुळे होणाऱ्या आजारामुळे मृत्यु पावतात. तेव्हा पाण्याचे महत्व ओळखून त्याच्या साठवणूकीच्या व्यवस्थापन तंत्राचा विकास करणे आवश्यक ठरते.

## पाणी व्यवस्थापन व श्वाश्वत विकास :

मानवाकडून पाण्याचा अती गैरवापर होत आहे. भारतातील पीण्यायोग्य पाणी जनतेच्या व प्रशासनाच्या योग्य नियोजन अभावी समुद्राला जाऊन मिळते. मानवाने आपल्या आर्थिक व भौतिक विकासासाठी मोठ-मोठया उद्योग धंदयाची उभारणी केली. त्या उद्योग धंदयासाठी दररोज लाखो लिटर पाणी वापरले जाते. उद्योगातून वापरलेले घाण पाणी नदी, नाले, ओढे किंवा समुद्रात सोडले जाते. अशा प्रकारचे रसायन मिश्रीत घाण पाणी पिण्याच्या पाण्याचे स्त्रोत दूषित करीत आहेत. तसेच रसायन मिश्रीत पाण्याचे बाष्पीभवन होऊन त्याचा पर्जन्यमान व पर्यावरणावर विपरीत परिणाम होत आहेत. कधी अतिवृष्टी, कधी अल्पवृष्टी, कधी अम्लीवर्षा व दुष्काळ निर्माण होत असून मानवी व नैसर्गिक आपत्तीला सामोरे जावे लागत आहे. दरवर्षी २२ मार्च रोजी जागतिक जलदिन साजरा केला जातो. त्यातून गोडयापाण्याचे महत्व व त्याच्या शाश्वत व्यवस्थापनाकडे लक्ष वेधले जाते. अशा प्रकारचे प्रयत्न एकदिवस करुन चालणार नाहीत. व्यक्तीला आपला आर्थिक, कृषि व भौतिक विकास करुन घ्यावयाचा असेल तर पाण्याच्या योग्य व्यवस्थापनाकडे लक्ष देणे आवश्यक ठरते. त्यासाठी व्यक्ती, शासन व प्रशासनाने पर्यावरणाला हानी न पोहोचवता स्वतःचा विकास कसा होईल याचे नियोजन करणे आवश्यक आहे.

## पाणी व्यवस्थापनाच्या समस्या :

### १) देखभाल व दुरुस्ती व्यवस्थापनाचा अभाव:

राज्यात उपलब्ध असलेली जलसिंचन स्थळे नादुरुस्त अवस्थेत आहेत. मोठया प्रमाणात वाळू उपसा होत असल्यामुळे पाण्याचा विसर्ग हा मोठया प्रमाणात होत आहे. पाणी पुरवठा करणाऱ्या पाईप लाईन मधून पाण्याची गळती होते त्यामुळे पाण्याचा गैर वापर होतो. राज्यातील नदी, पाटबंधारे व पाईप लाईन याची देखभाल व दुरुस्ती वेळेवर केली जात नाही.

**२) भौतिक विकासः**

पंचतारांकित व इतर हॉटेल मधील बनावट जलतरण स्थळासाठी व इतर कामासाठी दररोज मोठया प्रमाणात पाण्याचा वापर केला जातो. जमिनीतील पाण्याचा उपसा अधिक व पाणी जिरवण्याचे अल्पप्रमाण अशा प्रकारचा असमतोल निर्माण झालेला आहे.

**३) जल प्रदूषण :**

प्रत्येक व्यक्तीच्या घरगुती वापरातून लाखो लिटर पाणी सांडपाण्याच्या रुपाने बाहेर सोडले जाते. वापरलेल्या पाण्यावर प्रक्रिया करुन ते पाणी भाजीपाला, शेतीसाठी पुन्हा वापरात आणण्याचे तंत्र नागरिकांना अवगत नाही. तसेच शेतकरी रासायनिक खतांचा व किटक नाशकांचा अमाप वापर करीत आहेत. घरगुती वापरातील अन्नकन मिश्रित व शेतीतील रसायन मिश्रीत पाणी थेट जमिनीत, इतर जलस्रोतात जाऊन मिळते. त्यामुळे मानवाला पिण्यायोग्य असलेले जलस्रोत दूषित होऊन मानवी आरोग्यास धोका निर्माण होत आहे.

**४) वाढती लोकसंख्या :**

भारतातील लोकसंख्या भरमसाठ वाढत आहे. त्यामुळे पाण्याचा वापर अधिक व व्यवस्थापन शुन्य असे चित्र निर्माण झालेले आहे. वाढत्या लोकसंख्येनुसार पाण्याचे साठे उपलब्ध नाहीत.

**५) औद्योगिकरण :**

पोलाद निर्मितीसाठी प्रतिटन ७२०० ते १४५०० लिटर पाणी लागते. यातील बहुतांश पाण्याचा सांडपाण्याच्या रुपाने विसर्ग होतो. ते पाणी पुन्हा वापरात घेतले जाऊ शकत नाही. यामुळे पाणी टंचाईची समस्या निर्माण झालेली आहे.

**६) योग्य नियोजनाचा अभावः**

पाणलोट विकास क्षेत्र, पाणी अडवा पाणी जिरवा असे उपक्रम राबविण्याचे शासनाचे प्रयत्न अनेक वर्षापासून चालू आहेत. परंतू त्यातील जनसहभाग अल्प असून या उपक्रमाला म्हणावे तेवढे यश प्राप्त झालेले नाही.

**उपाय :**

१. पर्यावरणाचा समतोल राखणे.
२. पाणी साक्षरता मोहिम राबविणे आवश्यक आहे.
३. पाणी वापराबाबत कठोर नियम करणे.
४. सांडपाण्याचा पुनर्वापर करणे.

**सारांशः**

पावसाच्या पाण्याचे व वाहत्या पाण्याची योग्य साठवणूक करुन कृषि सिंचनाच्या दृष्टीने त्याचा कृषि उत्पादकतेवर तसेच शेती लागवडीखाली आणण्यामध्ये उपयोग होवू शकतो. जमिनीतील पाण्याचा बेसूमार उपसा थांबवून पाणी साठविण्याच्या शाश्वत तंत्रामध्ये विकास घडवून आणणे गरजेचे आहे. केंद्र व राज्य शासनाद्वारे अनेक योजना ठरविण्यात आल्या. परंतू त्या योजनांची काटेकोरपणे व पारदर्शकपणे अंमलबजावणी होत नाही. सिंचन विषयक ध्येय धोरण ठरवित असताना त्यात जनतेला व त्यांच्या विचारांना सामावून घेणे आवश्यक आहे. त्यामुळे जनतेला व त्यांच्या विचारांना सामावून घेणे आवश्यक आहे. त्यामुळे जनतेला शासकीय प्रयत्नांचे, पाण्याचे महत्व समजून येईल व शासनाच्या ध्येय धोरणात आपोआपच सहभागी होतील. पावसाचे पाणी मानवाला ठरावीक काळातच मिळते. उरलेल्या काळासाठी साठविलेल्या मानवाला किंवा साठलेल्या पाण्यावरच अवलंबून राहावे लागते. तेव्हा साठविलेल्या पाण्याचा नियोजनपूर्वक वापर करणे म्हणजे जल व्यवस्थापन होय. जल व्यवस्थापनाचे महत्वच कैटिल्याने आपल्या अर्थशास्त्र या ग्रंथात व्यक्त केले. आधुनिक काळात विविध राष्ट्रात पाण्याचे राजकारण केले जाते. जे मानव विकासाला मारक ठरणारे आहेत. पाण्याची गरज व त्याच्या वापराबाबत समाज जागृती करणे आवश्यक आहे. पावसाचे बहुतांश पाणी जशासतशे नदी नाल्यात वाहून जाते. पावसाळ्यातील पाणी अडवून जिरवले गेले तर जमिनीतील पाणी पातळीमधील वाढ होऊन पाण्याचा वापर व बचत यात समतोल राखला जाऊ शकतो व जमिनीतील पाणी हवे तेव्हा उपयोगात आणले जाऊ शकते. प्राचीनकाळात लोकसहभागातून जलव्यवस्थापन केले जात होते. परंतू आज या बाबीकडे शासन व जनतेचे दुर्लक्ष होत आहे.

**संदर्भ :**

१. प्रा.रमेश पांडव पाण्याचे दुर्भिक्ष व निर्मुलनाचे उपाय
२. डमढरे एस.व्ही. - महाराष्ट्रातील जलसंपदा, २०११
३. डॉ.दि.मा.मोरे - महाराष्ट्र सिंचन सहयोग, जाने. २०१४
४. डॉ.तुकाराम खुरुपे व शिवाजीराव ठोंबरे - पाणलोट, २००७

# नांदेड जिल्ह्यातील ज्वारी पिकांचे प्रादेशिक वितरण:एक भौगोलिक अभ्यास

**प्रा. डॉ. एन. एन. पुरी**

सहाय्यक प्राध्यापक भूगोल विभाग,
स्वामीविवेकानंदमहा.शिरुरताजबंद,
अहमदपूर, जि.लातूर.

**प्रस्तावना :**

मराठवाड्याच्या पूर्वेकडील नांदेड जिल्ह्याचा अक्षवृत्तीय विस्तार १८°१६' ते१९°५५'उत्तरअक्षवृत्तव७६°५६' ते७८° १९'पूर्वरेखावृत्तयांच्यादरम्यानआहे.नांदेडजिल्ह्याचे एकूण क्षेत्रफळ १०५२८ चौ. कि.मी.आहे. २०११ च्या जनगणनेनुसार जिल्ह्याचीलोकसंख्या ३३,५६,५६६ एवढी आहे. राज्याच्या तुलनेत नांदेडजिल्ह्याचे लोकसंख्या प्रमाण २.९६ टक्के आहे. तर जिल्ह्याचे क्षेत्रफळ महाराष्ट्राच्या एकूण क्षेत्रफळाच्या३.४२ टक्के एवढे आहे.

जिल्ह्याच्या क्षेत्रापैकी २११.१ चौ.कि.मी.(२.०१ टक्के) क्षेत्र नागरी भागाचेअसून १०२९८.९ चौ.कि.मी.(९७.९९ टक्के) ग्रामीणभागाचेआहे. महाराष्ट्रात क्षेत्रफळाच्या बाबतीत जिल्ह्याचा १४ वा क्रमांक लागतो तर लोकसंख्येच्या बाबतीत १२ वा क्रमांक लागतो.

**उद्दिष्ट्ये (Objectives) :**

१. नांदेड जिल्ह्यातील सूधारीत उच्य उत्पादन देणाऱ्या ज्वारी या पिकांचे प्रादेशिक वितरण अभ्यासणे.

२. अभ्यासक्षेत्रातील तहसीलनिहाय ज्वारी या पिकांच्याउत्पादनातील वाढ अभ्यासणे.

३. ज्वारी या पिकांच्यावापरामूळे कृषी कार्यक्षमतेच्या स्तरामध्ये आणि कृषी विकासाच्या स्तरातील झालेला

बदल अभ्यासणे.

**माहितीसंकलनाचेस्त्रोतव अभ्यास पद्धती :(Data Collection)**

'नांदेड जिल्ह्यातील सूधारीत उच्य उत्पादन देणाऱ्या ज्वारी या पिकांचे प्रादेशिक वितरण' अभ्यासण्यासाठी २००० ते २०१० या कालावधीतील माहितीचा आधार घेतला आहे.प्रस्तूत संशोधनासाठी प्राथमिक व दुय्यम आकडेवारीचा आधार घेतला आहे. प्राथमिक माहिती ही सर्वेक्षण, प्रश्नावलीच्या माध्यमातून शेतकरी,तलाठी व मंडळ अधिकारी, कृषीशी संबंधीत व्यक्ती आणि अधिकारी यांच्याशीवैयक्तिक चर्चा आणि कृषी तज्ञासोबत चर्चा करुन त्यांच्याकडून मुलाखती घेऊनआकडेवारी संकलित केली आहे. दुय्यम स्वरूपाचीमाहिती ही जिल्हा आर्थिक व सामाजिक समालोचन १९९०-९१ ते २००९-१०, नांदेड जिल्हा जनगणना पुस्तिका १९९१ आणि २०१०, नांदेड जिल्हा गॅझेटियर २०११, जिल्हा कृषी विभाग, कृषी उत्पन्न बाजार समिती, जिल्हा परिषद, कृषी अधिक्षक कार्यालय, नांदेड. कृषी विभाग वार्षिकअहवाल,शासकीय व निमशासकीय कार्यालयातील अहवाल, मासिकेवइंटरनेट इत्यादी मधून घेतलेली आहे.

**विषय विवेचन :**

ज्वारी हे नांदेड जिल्ह्यातील प्रमूख अन्नधान्य पिक आहे. ज्वारी पिकांचे एकूण क्षेत्र १२५००० हेक्टर (४.४७टक्के) क्षेत्र व्यापलेले होते. तर रब्बी ज्वारीचे क्षेत्र ६४० हे. एवढे होते. अशाप्रकारे खरिप व रब्बी अशा दोन्ही हंगामामध्येघेतले जाणारे ज्वारीपिक आहे. ज्वारी या पिकाच्या संकरित बियानांच्या अनेक जाती विकसित केलेल्या आहेत. त्यासंकरित बियानांच्या जाती पुढीलप्रमाणे.

**नांदेड जिल्ह्यातील ज्वारी पिकांचे तहसिलनिहाय वितरण:**

तक्ता १.१ वरून असे निदर्शनास येते की, गटनिहाय ज्वारीया पिकांच्या उच्य उत्पादन देणाऱ्या पी.व्ही.के -८०१यावाणांचे क्षेत्र पुढीलप्रमाणे (२४ टक्के पेक्षा)क्षेत्र जास्त वितरणक्षेत्र गटामध्ये कंधार (२९ टक्के) क्षेत्र आणि हदगाव (२४ टक्के) क्षेत्र या तालुक्यांचा समावेश होतो.

मध्यम क्षेत्र (१९ ते २४ टक्के) गटामध्ये हिमायतनगर (२३ टक्के) क्षेत्र, लोहा, भोकर प्रत्येकी (२२ टक्के) क्षेत्र, मुखेड, अर्धापूर, उमरी (२१ टक्के) क्षेत्र, नांदेड (२० टक्के) क्षेत्र, बिलोली, देगलूर, नायगाव (१९ टक्के) क्षेत्र असलेलीतालुके आहे. कमी क्षेत्र गटामध्ये प्रामुख्याने (१९ टक्के) पेक्षा कमी क्षेत्र गटात मुदखेड, धर्माबाद, किनवट प्रत्येकी (१८ टक्के) क्षेत्र, आणि सर्वात कमी (१४ टक्के) क्षेत्र माहूर या तालुक्यामध्ये पहावयास मिळते.

पी.व्ही.के-८०९ या ज्वारी पिकाचे गटानुसार वितरणपाहता(१६ टक्के) जास्त पेक्षा क्षेत्र गटामध्ये माहूर (२१ टक्के) या एकाचतालुक्याचा समावेश होतो. मध्यम (१२ ते १६ टक्के) क्षेत्र गटामध्ये बिलोली १५ टक्के क्षेत्र, कंधार, धर्माबाद (१४ टक्के) क्षेत्र, देगलूर, लोहा, उमरी (१३ टक्के) क्षेत्र, मुखेड, मुदखेड, नायगाव (१२ टक्के) क्षेत्र,(१२ टक्के) पेक्षा कमीक्षेत्रगटामध्ये भोकर, अर्धापूर, हिमायतनगर (११ टक्के) क्षेत्र, हदगाव (९ टक्के), नांदेड, किनवट (८ टक्के) क्षेत्र असणारे तालुके या गटाचा समावेश होतो.पी.के.एस.एच. २३३ या ज्वारी पिकांच्या (११ टक्के) पेक्षा जास्त क्षेत्र गटामध्ये हदगाव, कंधार (१३ टक्के) क्षेत्र, किनवट, उमरी (१२ टक्के) क्षेत्र असलेले तालुके या गटामध्ये येतात. मध्यम (१० ते ११ टक्के) क्षेत्र गटामध्ये नांदेड, बिलोली, देगलूर, अर्धापूर, लोहा (११ टक्के) हिमायतनगर, भोकर, मुदखेड (१० टक्के) क्षेत्रअसणारेतालुकेसमाविष्टहोतात.

तक्ता क्र. १.१: ज्वारीपिकाच्याउच्चउत्पादनदेणाऱ्याबी- बियाण्याचेक्षेत्रवितरण(२०१०-११) (क्षेत्रटक्केवारीत)

| अ.क्र. | तालूके | पीव्हीके८० १ | पीव्हीके८०९ | पी.के.एस.एच-२३३ | सी.एसएच-१४ | सी.एसएच-१६ | सी.एस.व्ही -१३ | इतरबियाणे |
|---|---|---|---|---|---|---|---|---|
| १ | माहूर | १४ | २१ | ९ | १३ | ७ | ५ | ३१ |
| २ | किनवट | १८ | ८ | १२ | ८ | ८ | ९ | ३७ |
| ३ | हिमायतनगर | २३ | ११ | १० | ८ | ९ | ४ | ३५ |
| ४ | हदगाव | २४ | ९ | १३ | १२ | १० | ८ | २४ |
| ५ | अर्धापूर | २१ | ११ | ११ | १३ | ९ | ४ | ३१ |
| ६ | नांदेड | २० | ८ | ११ | ९ | ९ | ६ | ३७ |
| ७ | मुदखेड | १८ | १२ | १० | ९ | १३ | ११ | २७ |
| ८ | भोकर | २२ | ११ | १० | ११ | १२ | ७ | २७ |
| ९ | उमरी | २१ | १३ | १२ | १३ | १० | ६ | २५ |
| १० | धर्माबाद | १८ | १४ | ९.०० | ११ | ११ | ५ | ३२ |
| ११ | बिलोली | १९ | १५ | ११ | ९ | ९ | ९ | २८ |
| १२ | नायगाव | १९ | १२ | ९.०० | ११ | ९ | ७ | ३३ |
| १३ | लोहा | २२ | १३ | ११ | ११ | ११ | ९ | २३ |
| १४ | कंधार | २९ | १४ | १३ | १० | ९ | ५ | २० |
| १५ | मुखेड | २१ | १२ | ९ | १२ | ११ | ६ | २९ |
| १६ | देगलूर | १९ | १३ | ११ | ८ | ९ | ८ | ३२ |
| | एकूण | २०.५० | १२.३१ | १०.६९ | १०.५० | ९.७५ | ६.८१ | २९.४४ |

स्त्रोत:जिल्हाकृषिअहवाल,कृषी विभाग (२०१०-११),नांदेड जिल्हा परिषद,नांदेड

तरनायगाव, माहूर, धर्माबाद, मुखेड (९ टक्के) क्षेत्र, असणारे तालूके हे (१० टक्के) पेक्षाकमीक्षेत्र गटामध्ये समाविष्ट होते.ज्वारीचे सूधारीत नविन वाण सी.एस.एच १४ या पिकाच्या जास्त (१२ टक्के) पेक्षा जास्त क्षेत्र गटामध्ये प्रामुख्याने उमरी, अर्धापूर, माहूर या तालूक्यात (१३ टक्के) क्षेत्र, हदगाव आणि मुखेड (१२ टक्के) क्षेत्राचाया गटामध्ये समावेश होतो.

मध्यम (१० ते १२ टक्के) क्षेत्र गटामध्ये भोकर, धर्माबाद, लोहा, नायगाव या तालूक्यात (११ टक्के) क्षेत्र, कंधार(१०),नांदेड,बिलोली,मुदखेड (९ टक्के) आणि किनवट, देगलूर, हिमायतनगर (८ टक्के) क्षेत्र या तालूक्यामध्ये आढळून येते.

सी.एस.एच -१६ या सूधारीत वाणांच्या जास्त क्षेत्र गटात (११ टक्के) पेक्षा जास्त क्षेत्र, असणारे मुदखेड (१३ टक्के) क्षेत्र, भोकर (१२ टक्के) क्षेत्र, मुखेड, धर्माबाद, लोहा (११ टक्के) हे तालूके आहेत.

मध्यम (९ ते ११ टक्के) क्षेत्र गटामध्ये हदगाव, उमरी (१० टक्के) क्षेत्र, नांदेड, बिलोली, देगलूर, कंधार, अर्धापूर, हिमायतनगर, नायगाव (९ टक्के) क्षेत्र असणारे तालूके समाविष्ट होतात.

कमी (९ टक्के) क्षेत्रापेक्षा कमी क्षेत्रगटामध्येकिनवट (८ टक्के) क्षेत्र, माहूर (७ टक्के) क्षेत्र या तालूक्यामध्ये आढळून येते.

सी.एस.व्ही १३ या सुधारीत पिकांच्या (८ टक्के) पेक्षा जास्त क्षेत्र गटामध्ये मुदखेड (११ टक्के) क्षेत्र, लोहा, बिलोली, किनवट(९ टक्के) क्षेत्र, हदगाव, देगलूर (८ टक्के) क्षेत्र असणारे तालूके आहेत. मध्यम (६ते८ टक्के) क्षेत्र गटामध्ये भोकर, नायगाव (७ टक्के) क्षेत्र, नांदेड, मुखेड, उमरी (६ टक्के) क्षेत्र हे तालूके अंतर्भत होतात. तर (६ टक्के) पेक्षा कमीक्षेत्र गटामध्ये कंधार, धर्माबाद, माहूर (५ टक्के) क्षेत्र, अर्धापूर, हिमायतनगर (४ टक्के) क्षेत्र या तालूक्यात आढळून येते.

नांदेड जिल्ह्यामध्ये इतर ही अनेक बियाणे वापरली जातात. त्यांचे गटानुसार वितरण पाहता जास्त (३२ टक्के) पेक्षा जास्त क्षेत्र गटामध्ये नांदेड, किनवट (३७ टक्के) क्षेत्र, हिमायतनगर (३५ टक्के) क्षेत्र, नायगाव (३३ टक्के) क्षेत्र, देगलूर, धर्माबाद (३२टक्के) क्षेत्र या वरीलतालूक्यात आढळून येतात.मध्यम (२६ ते ३२ टक्के) क्षेत्र गटामध्ये अर्धापूर, माहूर (३१ टक्के) क्षेत्र, मुखेड (२९ टक्के) क्षेत्र,

नांदेडजिल्हा

उच्चउत्पादनदेणाऱ्या ज्वारीपिकाचेक्षेत्र( % ) २०१०-११
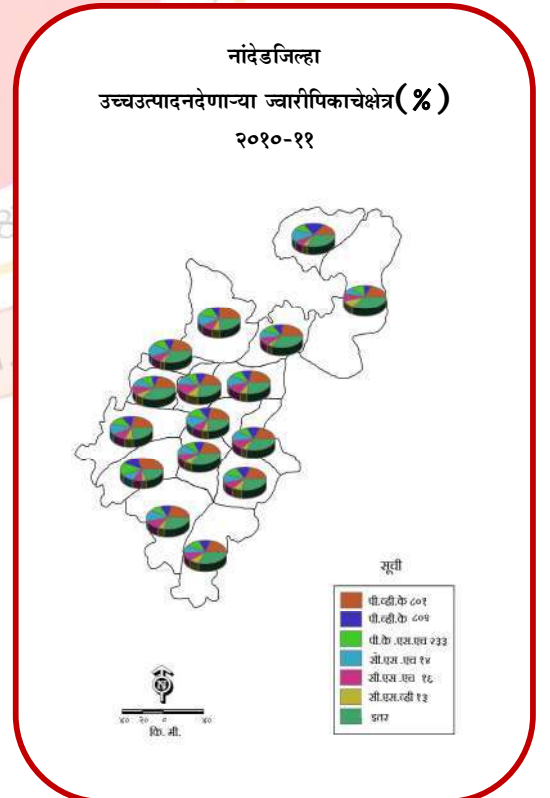
बिलोली (२८ टक्के) क्षेत्र, भोकर, मुदखेड (२७ टक्के) क्षेत्र, असलेले दिसून येते. इतरपिकांच्या (२६ टक्के) पेक्षा कमी क्षेत्र गटामध्ये उमरी (२५ टक्के) क्षेत्र, हदगाव (२४ टक्के) क्षेत्रलोहा (२३ टक्के) क्षेत्र, आणि कंधार (२० टक्के) क्षेत्र असणारे तालूके आहेत.

## निष्कर्ष:

ज्वारी हे जिल्ह्यातील प्रमूख अन्नधान्य पीक असून त्यांचे सन २०१०-११ मध्ये या पिकाने एकूण ११०४६० हेक्टर क्षेत्र व्यापलेले होते. रब्बी, ज्वारीचे क्षेत्र ६४० हेक्टर एवढे होते. त्यापैकी सर्वात जास्त पी.व्ही.के. ८०१ या जातीच्या बियाणांच्या वापराचे प्रमाण २०.५० टक्के एवढे होते पी.व्ही.के. ८०९ जातीच्या बियाणांचे प्रमाण १२.३१ टक्के       पी.के.एस.एच. २३३ वाणांचे प्रमाण १०.६९ टक्के सी.एस.एच-१४ जातीचे बियाणे १०.५० टक्के, सी.एस.एच. जातीचे बियाणे ९.७५ टक्के एवढे होते. तर सर्वात कमी सी.एस.व्ही-१३ या जातीचे प्रमाण ६.८१ टक्के आणि इतर ज्वारी बियाणांचा वापर २९.४४ टक्के एवढा झालेला पहावयास मिळतो.

## संदर्भ ग्रंथ (References):

१) डॉ.रामचंद्रनिवृत्तीसाबळे, कृषीघटकअनमोलप्रकाशनपुणे-२
२) जिल्हापरिषदकृषीअधिकारीअहवाल,नांदेडजिल्हासन२०१०-११
३) महाराष्ट्रशासन, कृषी विभाग,पिकउत्पादनतंत्रज्ञान,कृषीमार्गदर्शिका २०१०-११पृ.क्र.११-१३,२९-३५
४) विजयकुमारज.आवटे(२००६) 'शेतकरी मासिक' महाराष्ट्रसहकारीमुद्रणालय,शिवाजीनगर,पुणेपृ.क्र.३८
५) डॉ.एच.के.केणे 'कमी खर्चाचेसोयाबीनलागवड तंत्रज्ञान', पृ.क्र.५४ पृ.क्र.११,१२,३६,५५
६) डॉ.रामचंद्रनिवृत्तीसाबळे, कृषीघटकअनमोलप्रकाशनपुणे-२
७) Barwale, B. R. (1992): Private Seeds Industry, Agricultural Input  Marketing (Ed. By Seetharaman S. P.), Oxford and IBH publshing Co. Pvt. Ltd., New Delhi, p. 157.

# जागतीक तापमानातील वाढ व हवामान बदलाचा भारतावर झालेला परीणाम एक भौगोलीक अभ्यास

प्रा. डॉ सुर्यकांत लालचंद राठोड

भूगोल विभाग प्रमुख

बी.एस.एस. कला विज्ञान व वाणिज्य महाविद्यालय

माकणी ता. लोहारा. जि. उस्मानाबाद

## प्रस्तावना (Introduction) :

आज जागतीक लोकसंख्या वाढीमुळे आनेक समस्याना आपनास सामोरे जावे लागत आहे. आज जशी लोकसंख्या वाढत आहे तसी त्याची गरजाही वाढलेल्या आहेत. या मानवच्या गरजा पूर्ण करण्यासाठी मानव पर्यावरणार फार मोठया प्रमाणात हाल्ला करत आहे. या हाल्यामुळे जगात आनेक समस्या निर्माण झालेल्या आहेत. या आनेक समस्या पैकी जागतीक तापमाण वाढ ही एक समस्या जगाला आज भेडसावत आहे. कारण वाढत्या जागतीक तापमानाचा भारताला मोठा धोका असून, भारताला उष्णेच्या लाटांचा फटका बसेल,असा निष्कर्ष,आयपीसीसी या हवामान बदलाचा अभ्यास करणा-या आंतरराष्ट्रीय संस्थेने काढला आहे. जागतीक तापमान आता सर्वोच्च म्हणजे 1.5 डिग्री सेल्सियसपर्यंत पोहचत असून आताच नैसर्गिक आपत्तीना सुरुवात झाली आहे. हयापुढे तापमान गेल्यास जगाला आणि विशेषातः भारताला याचे गंभीर परीणम भोगावे लागतील, त्यात उष्णलहरीचे मोठे संकट भारतावर येईल, असा इशारा हवामान बदलाचा अभ्यास करणा-या आयपीसीसी (Intergovernmental Panel on Climate change) हया संस्थेने नुकत्याच रिपब्लिक ऑफ कोरीया येथे झालेल्या परिषदेत दिला आहे.

उदयोगातुन निघणारे हरितगृह वायू (ग्रीन हाऊस गॅसेस) कमी करण्यासाठी डिसेंबर 1997 मध्ये अनेक देशानी एकत्र येऊन क्योंटो प्रोक्टोकॉल स्वीकारण्याचे ठरविले, परंतु तो ख-या अर्थाने अस्तित्वात आला फेब्रुवारी 2005 मध्ये त्यात 2020पर्यंत कार्बन वायू (CO2)सहित इतर हारीत वायू उत्सर्जनावर संपूर्ण नियंत्रण आनावयाचे ठरविले. परंतू आजूनही भारतासहित अनेक देश त्यांच्या ऊर्जा समस्येवर नियंत्रण आणण्यात अपयशी ठरत आहेत.

पृथ्वीवर गेल्या लाखो वर्षापासून वातावरण, हवामान, आणि पर्यावरण हयांचा निसर्ग नियमाप्रमाणे समतोल राखला जात होता. सर्व सजिवांचा विकास सुद्धा आशाच पर्यावरणात झाला. सर्व नैसर्गिक हरितगृह वायू, प्रदुषके आणि कार्बन वायू (CO2)शोषुन घेण्याची क्षमता जंगलात होती. मानव आणि संजीवाचे पोषण करण्याची क्षमता वनांत होती मानव संजीवाचे संरक्षण करण्याची क्षमता वनांत होती. परंतु मानवाच्या वैज्ञानीक व यांत्रिक प्रगतीमुळे जीवनाचा आधार असलेली वने आपन तोडायला सुरूवात केली. औद्योगिक कातीच्या नावावर प्रदुषण वाढले. शहरीकरण झाले. लोकसंख्या वाढुलागली. आणि ज्या आधारावर सृष्टीची रचना झाली तो आधारच आपण हळूहळू काढून टाकायला सुरूवात केली. आता त्याचेच परिणाम तापमान वाढ, हवामान बदल, आणि नैसर्गिक आपत्तीच्या स्वरूपाने आपण पाहत आणि अनुभवत आहोत. थर्मल पॉवर स्टेशन्स, सिमेंट उद्योग, कागद उद्योग, आणि विविध कारखाण्यामुळे प्रदुषणात वाढझाली असून त्यामुळे ओझोन थर विरल होणे, धृवावरील बर्फ वितळणे, समुद्राची पातळी वाढणे, तापमान वाढ, हवामानात बदल, आणि नैसर्गिक आपत्ती अशा आनेक प्रश्न आपल्या समोर निर्माण होत आहेत.

भारत हा जगातील सर्वात जास्त हवामान बदलाला संवेदनशील देश असून, संवेदनशील आसल्या देशांच्या यादीत अव्वल स्थानी आहे. देशात हावामान बदलाचा परिणम लगेच शेतीवर होतो. भारतानंतर पाकिस्तान, फिलीपिन्स आणि बांगलादेशाचा नंबर लागतो. अशी माहिती एचएसबीसी ने प्रकाशित केलेल्या अहवालातून पूढे आली आहे. एचएसबीसी बॅंकेने जगातील हवामान बदलाचा परिणाम होण-या 67 विकसित ,उदयोन्मुख आणि आघाडीच्या बाजारपेठ असलेल्या देशांचा अभ्यास केला आहे. एचएसबीने अभ्यास केलेल्या 67 देश हे जगातील जवळपास एकतृतीयांश आहेत. या देशामध्ये जगातील 80 टक्के लोकसंख्या राहते आणि जागतिक सकल उत्पन्नात या देशांचा 94 टक्के वाटा आहे.

हवामाण बदला बद्दल उद्याचा विचार केल्यास असे निदर्शनास येते की, आपण वेळीच नाही सावध झालो तर येणारा काळ आपल्या माफ करणार नाही.कारण वाढलेली लोकसंख्या,औद्योगिकरण, नागरिकरण, उदारीकरण, सर्व प्रकारचे प्रदुषण, निसर्गाचे होणारे शोषण, निर्वनिकरण, यूध्द, अणूचाचण्या, तापमाणवृध्दि एकूणच सृष्टि चक्रांतील बीधाड, मानवाचे आस्तित्व संपवून टाकल्याशिवाय राहणार नाही.

**संशोधन पध्दती : ( Research Methodology)**

प्रस्तुत संशोधनासाठी दुय्यम स्त्रोताचा वापर करण्यात आला आहे. माहिती संकलन करण्यासाठी विविध शासकीय व अशासकीय व संदर्भग्रंथ, पुस्तके,मासिके,सांख्यिकीय अहवाल, राष्ट्रीय व स्थानिक वर्तमान पत्रे तसेच विविध संकेत स्थळाचा वापर करण्यात आला आहे.

**उद्दिष्टये :(Objectives)**

1. जागतीक तापमाणत वाढ होण्याची कारणे शोधने.
2. जागतीक लोकसंख्येत वाढ होत आहे ते कटाक्षाणे कायदे आमलात आनणे.
3. हवामान बदलाचा शोध घेणे.
4. हवामान बदलामुळे शेतीवर होणाऱ्या परिणमाचा अभ्यास करणे.
5. जागतीक तापमाण वाढीमुळे नैसर्गिक आपत्ती निर्माण होण्याची कारणे शोधणे.

**गृहीतके : Hypothesis**

1. हवामाण बदलाचा कृषी क्षेत्रावर परिणम झालेला आहे.
2. जागतीक तापमाण वाढीमुळे नैसर्गिक आपत्ती निर्माण होत आहे.
3. हवामान बदलामुळे जलचक्राचे संतुलन बीघडले आहे.

**अभ्यास क्षेत्र :(Study Area)**

सदर शोधनिबंधाचा अभ्यास करण्यासाठी भारतातील कृषी वर हवामानबदलाचा परिणाम या विषयी अभ्यास करण्याचा प्रयतन केला आहे. भारतात एकूण जमिनी पैकी 54 टक्के जमिन कृषी योग्य असून पैकी 46 टक्के प्रत्यक्ष लागवडी खाली आहे. सुमारे एकूण जमिनीपैकी 27 टक्के जमिनीस जलसिंचनाच्या सुविधा आहेत. देशात सर्वत्र भूस्वरूप, मृदा, हवामान, व भौगोलीक परिस्थिती भिन्न आहे. भारतात 72 टक्के कृषी पावसावर अवलंबून आहे. त्यामुळे कधी अवर्षण, दुष्काळ, व अतिवृष्टी, यामुळे भारतीय कृषी उत्पादनात चढउतार दिसुन येतात. त्यामुळे त्याचे सामाजिक व आर्थिक परिणाम दिसुन येतात. याचा या शोध निबंधातुन अभ्यास करण्याचा प्रयत्न केला आहे.

**विषय विवेचन : (Discussion)**

**१. जागतिक किंवा वैश्विक तापमाण वाढः**

वातावरणातील बाष्प कार्बनडायक्साईड, मिथेन, आणि इतर वायू मुळे सौर ऊर्जा पृथ्वीवर काही प्रमाणत राखून ठेवली जाते. तसेच मानवाच्या आधुनिक जीवनशैलीमुळे व हालचालीमुळे हरितगृह वांयुच्या प्रमाणत वाढ होत असल्याने वातावरणात पुर्वी पेक्षाजास्त प्रमाणत उष्णता राखली जात आसल्याने पृथ्वीचं तापमान वाढत आहे. विशेषतः हेच वायू पृथ्वीचे तापमान उबदार ठेवण्यास मदत करतात. या हरितगृह वांयूचे तापमान वाढीत असलेले योगदान असे आहे.पाण्याचीवाफ (बाष्प)20.6°सेल्सियस, कार्बनडाय आक्साईड(CO2)7.2° सेल्सियस, ओझोन (O3)2.40°सेल्सियस, नायट्रोजन ऑक्साईड (N2O)1.40° सेल्सियस आसे एकूण 33°सेल्सियस इतके आहे. यावरून स्पष्ट होते की, जागतीक तापमाण वाढीस हारीतगृह वायू कारणीभूत ठरतात. थोडक्यात " विविध नेसर्गिक व मानवी कृतीमुळे भूपृष्टाच्या व सागर जलाच्या सरासरी तापमाणास होणारी वाढ जी सर्व सजीवसृटिच्या विनाशास कारणीभूत ठरते. यालाच जागतिक किंवा ग्लोबल वार्मिंग असे म्हणतात."

गेल्या 100 वर्षाच्या तापमानाचा इतिहास पाहता, आपल्याला तापमानवाढ केव्हापासून सुरु झाली हे कळते. नासा आणि भारतीय हवामान विभागाची आकडेवारी तपासल्यास 1986 नंतर पृथ्वीचे तापमान वाढू लागले. तर आत्याधिक तापमान वाढायला 2001 पासून सुरुवात झाली. 2010 पासून दर वर्षी तापमान वाढीचे नवनवे विक्रम नोदले गेले. शेवटचे 2018 वर्ष हे गेल्या 150 वर्षातील सर्वाधिक तापमानाचे वर्ष ठरले आहे. 2010 पासूनच जगात ध्रुवावरील बर्फ ग्लेशिअर्स वितळणे, समुद्राची पातळी वाढणे, थंडी व उष्णतेची वादळे, चक्रीवादळे, ढगफुटी अशा विविध नैसर्गिक आपत्तीत वाढझाल्याचे निदर्शनास येते.

**2. प्रदुशणामुळे तापमाणात वाढः**

वातावरणात उद्योगाच्या विकासाच्या माध्यमातुन अनेक प्रदुषीत घटक पर्यावरणात सोडले जातात. परिणामी हावेची शुध्दता बिघडते. हवेतील कार्बनचे प्रमाण वाढते. हवेचे धुलीकणाचे प्रमाण वाढेते. पर्यायाने हवेच्या तापमाणात वाढ होते. यावरून हे स्पष्ट होते की, विविध प्रकारच्या प्रदुषणामुळे पर्यावरण समतोल बिघडवून हवामान बदलाला मदत होते.

**3. वृक्षतोडीमुळे तापमानात वाढः**

जगभर मोठमाठया शहराच्या विकासामुळे, औद्योगिकरणामुळे, मोठया प्रकल्पा मुळे, रस्ता विकासामुळे देशभरात मोठया प्रमाणात वृक्षतोड होत आहे. वृक्षतोडीमुळे पर्जन्यात घट होत आहे. वाळवंटिकरणात वाढ होत आहे. तापमाणात वाढ होत आहे. पर्यावरण संतुलनासाठी 33 टक्के वनाची आवश्यकता आहे. मात्र वेगाने होणाऱ्या वृक्षतोडीमुळे स्थानिक व जागतिक वनामध्ये घट निर्माण झाले आहे. या मुळे जागतिक तापमाणत वाढझाले आहे.

## 4. जागतिक लोकसंख्यावाढ :

जागतिक तापमान वाढीस मुख्य घटक म्हणजे लोकसंख्या आहे. कारण जशी लोसंख्यावाढ होत आहे. तसे लोकाची गरजा वाढत आहे. या गरजा पुर्ण करण्यासाठी पर्यावरणावर प्रहार केला जात आहे. पर्यावरणाचे समतोल ढासाळत आहे. त्यामुळे तापमाणात वाढ होवून वातावरणातील ओझोन वायूचा थर कमी होत आहे.

## 5. ओझोन थराचा क्षय :

पृथ्वीचे संरक्षण म्हणून ओझोन थर ओळखला जातो. सूर्याच्या अतिनिल किरणांपासून पृथ्वीचे संरक्षण करण्याचे काम ओझोन वायू करतो. पण या वातावरणातील कार्बनच्या प्रमाणत वाढझाल्यामुळे वातावरणात मर्यादे पेक्षा अधिक उष्णता ग्रहण केली जात आहे. ज्यामुळे ध्रुवीय क्षेत्रात ओझोन थराला छिद्र पडले आहे. ज्यातुन अतिनिल किरणे प्रत्यक्ष पृथ्वीवर येऊन येतील तापमानामध्ये वेगाने वाढ होत आहे.

## 2) हवामान बदलाचा कृषी क्षेत्रावर होणारा परीणाम :

भारत हा कृषी प्रधान देश आसून भारताची अर्थव्यवस्था ही शेतीवर आवलंबुन आहे.म्हणून भारतातील कृषी व्यवसाय भारतीय अर्थव्यवस्थेचा कना मानला जातो. देशाच्या एकूण राष्टिय उत्पनाद (GDP) शेतीचा वाटा 23 % च्या दरम्यान आहे. देशात सुमारे 65% लोक उदरनिर्वाहाचे साधन म्हणून शेतीवर अवंलबुन आहे.देशात सुमारे 65 % लोक उदनिर्वाहाचे साधन म्हणून शेतीवर अवलंबून आहे.विकसनशिल देशाचा आर्थीक विकास प्रामुख्याने कृषी विकासावर अवलंबून आसतो.भारतात हवामानात प्रचंड भिन्नता दिसून येते. भारतीय शेती प्रामुख्याने मान्सून पर्जन्यावर अवलंबून आहे. वातावरणातील बदलामुळे पावसाचे प्रमाण व तिव्रता यामध्ये बदल होत आहे.

## 3) भारताला सर्वाधिक धोका :

भारत हा देश उष्णकटिबंधीय प्रदेशात आहे. त्यामुळे हावामानातील थोडा बदल सुध्दा धोकादायक ठरू शकतो. भारतीय हावामान विभागाची 1886 पासून 1986 ची 100 वर्षाची हवामानाची आकडेवारी तपासली आसता आपला देश किती भयानक स्थितीकडे जात आहे. ह्याची त्यातुन कल्पना येते. भारतीय हवामान खात्याने 30 वर्षाचा हवामान बदलाचा काळ ठरविला आहे. त्यानुसार 1901–1930 हा कोरडा काळ, 1931–1960 हा ओला काळ, 1961–1990 हा पुन्हा कोरडा काळ, तर 1991–2020 हा ओला काळ ठरविला आहे. ह्यात भारताने 19 कोरडे दुष्काळ,तर 13 ओले दुष्काळ पाहिले आहेत. ह्या सर्व कालखंडात भारतात अपवाद वगळता कधीच अत्याधिक हवामान बदलाच्या घटना दिसल्या नाही. परंतु भारतात झालेली प्रचंड जंगलतोड, थर्मल पॉवर स्टेशन्सच्या संख्येतील वाढ आणि इतर अनेक उद्योगातून होणारे वायू प्रदुषण, ह्यामुळे 2001 पासून भारतात अत्याधिक हवामान बदलाच्या घटना घडू लागल्याचा निष्कर्ष आहे. या घटना 2010 पासून वाढत जावून 2018 पर्यत ही तापमान वाढ व हवामान बदलाची घौडदौड अव्याहत सुरु आहे.वाढत्या तापमानामुळे पाऊस पडायला लागला आसल्याचे निदर्शनास येत आहे. तापमान वाढी मुळे भविष्यात हिमालय ग्लेशिअर्स वितळणे आणि ढगफुटी, भूस्खलन, झाले पुढे ही मालीका हिमालयात, उत्तराखंड, केदारनाथ, बदगीनाथ, आणि विविध ठिकाणी दर वर्षी व्हायला लागली आहे.नुकताच केरळ मध्ये झालेला पाऊस हे देखील हवामान बदलाचे संकेत आहेत.

## उपाय योजना :Measure Plan

निसर्ग हा सजीव आणि निर्जिव पदार्थापासून बनला असून ते दोन्ही एकमेकावर अवलंबून आहेत. जीवनाचा पाया असलेले जंगल, हे अतिशय महत्वाचे आहे. सजीवाना प्राणवायू आणि अन्न देवून जीव जगवणारी, तापमान वाढविणारा कार्बनवायू नियत्रित करणारी वनेच आहेत.परंतु आपाण तीच तोडून आपल्या पायावर कु-हाड मारूण घेतली आहे. आता पृथ्वीचे आणि प्रादेशिक वाढते तापमान कमी करायचे आसेल, तर सर्वात उत्तम आणि मोठा उपाय म्हणजे युध्द पातळीवर वृक्ष लागवड आणि वनीकरण करणे हे होय. तापमान वाढविणरा दुसरा घटक म्हणजे कार्बन वायू (Co2) त्याचे उत्सर्जन पूर्ण कमी करणे गरजेचे आहे. कोळसा आधारित सर्व वीज आणि इतर प्रदुषण करणारे उदयोग त्वरीत बंद करून अपारंपारीक ऊर्जा स्त्रोत (सोलार, विज, हायड्रो आणि बायो एनर्जी ) वाढवले पाहिजेत. आपली उदयोग आधारीत अर्थव्यवस्था बदलून वन,वृक्ष, शेती आणि निसर्ग आधारित चिरंतन अर्थव्यवस्था निर्माण करणे काळाची गरज आहे. आपण आपले चैनीचे जीवन बदलून निसर्गाला पूरक अशी जीवनशैली आता अंगीकारली पाहिजे. अन्यथा जो निसर्ग आपल्याला जगवतो, तोच मारणार आहे. आता वेळ कमी आहे, त्वरीत पर्यावरण संवर्धनाकडे तातडीने लक्ष देणे , हीच काळाची गरज आहे.

## निश्कर्ष : Conclusion

हवामान बदलाचा परिणाम सर्वच मानवी क्रियावर होताना दिसून येतो. या मानवी क्रियामध्ये सर्वाधिक कृषी या घटकावर हवामान बदलाचा परिणाम होताना दिसतो. त्यासाठी पुढील निष्कर्षच्या आधारे आपन कृषीचे होणारे नुकसान टाळण्याचा प्रयतन करू शकतो.

1. कृषी क्षेत्रात नवीन बी– बियाण्यांच्या जातीवर संशोधन करून वाढत्या तापमाणास बळी न पडणाऱ्या जातीची निर्मीती करावी लागेल.

2. योग्य तापमान, योग्य पर्जन्यमान व हवेतील इतर घटक उदा. आर्द्रता, इतर वायू याचे प्रमाण सुव्यवस्थीत राहण्यासाठी शेतामध्ये व गायरान, पडिक जमिन, माळरान इत्यादीवर झाडे लावली पाहिजेत. तसेच 33 टक्के क्षेत्र जंगलाखाली आणणे गरजेचे आहे.

3. किड नियंत्रनासाठी रासायनिक किटक नाशकांपेक्षा सेंदिय व जैविक किडनाशकांचा जास्तीत जास्त वापर व प्रसार करणे गरजेचे आहे.

4.  मातीची सुपीकता जोपासण्यासाठी शेतीची बांधबंधिस्ती, चर खोदने, योग्य पीक पध्दतीची निवड करणे, पीकाचे फेरपालट करणे, उतारास आडवी पेरणी करणे, धूप प्रतिबंधक पिकांचा वापर करणे, यासारख्या उपाययोजना करणे आवश्यक आहे.

संदर्भग्रथ : References

1.  *आपत्ती व्यवस्थापन– संकल्पना आणि कृती, प्रा गोडबोले. महाराष्ट्र टाइम्स.*
2.  *पर्यावरण विज्ञान. प्रा अहिरराव,प्रा अलिझाड.*
3.  *www.rjournals.co.in*
4.  *महाराष्ट्र टाइम्स. U Updated:Oct,14,2018,04:OOAMIST*
5.  *हवामान बदलाचा भारताला झळा. प्रा. सुरेश चोपणे.*
6.  *शेतकरी, ऑगस्ट 2018*

# गंगाखेड तालुक्यातील पाणी टंचाई एक अभ्यास

**प्रा. डॉ. दयानंद उजळंबे**
उपप्राचार्य
कला, वाणिज्य व विज्ञान महाविद्यालय
गंगाखेड जि. परभणी

**प्रस्तावना :**

गंगाखेड तालूक्यातील पाणी टंचाई एक अभ्यास हा प्रस्तूत शोधनिबंधाचा अभ्यास असून परभणी जिल्हातील गंगाखेड तालूक्यातील पर्जन्याची स्थिती, मंडळ निहाय पर्जन्याचा आढावा, मंडळनिहाय गंगाखेड तालूक्यातील मासिक पर्जन्य आणि सरासरी पर्जन्य किती आहे. निरीक्षण विहीरीनुसार २०१८ मध्ये भूजलपातळीत झालेली वाढ आणि घट आणि त्यामुळे होणारी पाणी टंचाई, गंगाखेड तालूक्यातील माहे २०१८ मध्ये प्रकल्पनिहाय जिवंत पाण्याची स्थिती काय आहे. आणि यामुळे एकंदरीत गंगाखेड तालूक्यातील पर्जन्याची स्थिती आणि त्यामुळे निर्माण होणारा दुष्काळ, त्यातुन उद्भवणारी पाणी टंचाई कशी झालेली आहे आणि त्यावर कोणत्या उपाय योजना करता येतील हा प्रस्तुत शोधनिबंधाचा उद्देश आहे.

**बीजसंज्ञा :** पाणी टंचाई, प्रकल्पनिहाय जिवंत पाणी साठा, निरीक्षण गावातील विहीरीची भूजलपातळी.

**अभ्यास क्षेत्र :**

महाराष्ट्र राज्यातील दख्खनच्या पठारावर असलेल्या मराठवाड्यातील परभणी जिल्हातील गंगाखेड तालूक्यातील पाणी टंचाई एक अभ्यास हा शोधनिबंध असून परभणी जिल्हातील बालाघाट डोंगररागेत आणि गोदावरी नदीखेऱ्याच्या परिसरात गंगाखेड तालूक्याचे भौगोलिक स्थान असून, तालूक्याच्या उत्तरेला परभणी तालुका असून, इंशान्येला पूर्णा तालूका तर पुर्वेला पालम, पश्चिमेला सोनपेठ तालूका असून दखिणेकडे लातूर आणि बीड जिल्हाच्या सीमा लाभलेल्या असून या तालूक्याची समुद्रसपाटीपासूनची उंची ३८९ मिटर आहे २०११ च्या जनगणनेनुसार तालूक्याची एकूण लोकसंख्या २०२८६७ असून एकूण भौगोलिक क्षेत्र ६२५ चौ.कि.मी. असून तालूक्यात एकूण ११४ गावे आणि ०४ मंडळ आहेत.

**उदिष्ट्ये :**

१) गंगाखेड तालूक्यातील पर्जन्याची स्थिती जाणून घेणे.
२) मंडळनिहाय पर्जन्याची स्थितीचा अभ्यास करणे.
३) गंगाखेड तालूक्यातील भूजलपातळीची स्थिती जाणून घेणे
४) गंगाखेड तालूक्यातील प्रकल्पनिहाय पाण्याच्या साठ्याचा अभ्यास करणे.
५) गंगाखेड तालूक्यातील पर्जन्याचा पाणी टंचाईवर काय परिणाम झाला याचा अभ्यास करणे.

**सांख्यिकिय माहिती आणि अभ्यास पद्धती :**

प्रसतुत शोध निबंधामध्ये माहितीचे स्रोत दुय्यम स्वरुपाचे असून यासाठी गंगाखेड तहसील कार्यालयाने जमा केलेली आकडेवारी, जिल्हाधिकारी कार्यालय परभणी यांच्या संकेत स्थळावरुन आणि भारतीय जनगणना अहवाल २०११ यातून घेतली असून, प्रस्तुत जमा केलेल्या आकडेवारीचे सारणकरण करुन, आलेख काढुन त्याचे पृथक्करण केलेले आहे.

**गंगाखेड तालूक्यातील पाणी टंचाई :**

गंगाखेड तालूक्यातील पाणी टंचाईचा अभ्यास करत असताना तालूक्याला प्राप्त होणारा पाणीपुरवठा पर्जन्याच्या अधारे मिळत असल्यामुळे तालूक्यास पर्जन्याची स्थिती काय आहे. याचा अभ्यास केलेला आहे. पाठ बंधारे विभागाअंतर्गत प्रकल्पनिहाय जानेवारी २०१८ मध्ये पाण्याची काय स्थिती आहे हे सारणीवरुन अभ्यासण्यात आलेले आहे. प्रसतूत शोध निबंधासाठी गंगाखेड तालूक्यातील जून २०१८ ते आक्टोंबर २०१८ दरम्यान पर्जन्य स्थितीवरुन पूढील सहा महिन्यात तालूक्यात पाणी टंचाईची स्थिती कशी राहिल याचा अभ्यास केला आहे.

**सारणी क्र. (१):गंगाखेड तालूक्यातील पर्जन्य मी.मी. मध्ये**

| वर्ष | पर्जन्य मी.मी. मध्ये | टक्केवारी |
|---|---|---|
| २०१२ | ५७६ | ८३ |
| २०१३ | ७५४ | १०८ |
| २०१४ | ३२६ | ४७ |
| २०१५ | २७३ | ३९ |
| २०१६ | ८०३ | ११५ |
| २०१७ | ४२९ | ६२ |
| २०१८ | ४२० | ६० |
| सरासरी पर्जन्य | ६९७ | |

**संदर्भ :** तहसील कार्यालय, गंगाखेड यांनी प्रसिद्ध केलेली आकडेवारी.

**सारणी क्र. (२): गंगाखेड तालूक्यातील मंडळनिहाय पर्जन्य (२०१८) (सरासरी पर्जन्य ६९७ मी.मी.)**

| मंडळ | पर्जन्य मी.मी. मध्ये | टक्केवारी |
|---|---|---|
| गंगाखेड | ५४४ | ७८ |
| राणीसावरगाव | ३५१ | ५० |
| माखणी | ३७१ | ५३ |
| महातपूरी | ४१३ | ५९ |
| गंगाखेड तालूका | ४२० | ६० |

संदर्भ: *तहसील कार्यालय, गंगाखेड यांनी प्रसिद्ध केलेली आकडेवारी.*

**सारणी क्र. (३): महिना निहाय तालूक्याचे सरासरी पर्जन्य आणि प्रत्यक्ष पर्जन्यमान (२०१८)(गंगाखेड तालुका)**

| महिना | सरासरी पर्जन्य मी.मी. मध्ये | प्रत्यक्ष पर्जन्य मी.मी. मध्ये | टक्केवारी |
|---|---|---|---|
| जून | १०६ | १७८ | १६८ |
| जूलै | १९२ | ६७ | ३५ |
| ऑगस्ट | १९० | १५० | ७९ |
| सप्टेंबर | १६७ | २५ | १५ |
| आक्टोबर | ४२ | ०० | ०० |

संदर्भ: *तहसील कार्यालय, गंगाखेड यांनी प्रसिद्ध केलेली आकडेवारी.*

**सारणी क्र. (४): निरीक्षण विहीरीणुसार भूजल पातळी मध्ये फरक (गंगाखेड तालुका) (माहे आक्टोंबर २०१८)**

| गाव | भूजल पातळी मधिल फरक मिटरमध्ये |
|---|---|
| खळी | -२०६८ |
| मुळी | +०.५४ |
| धारखेड | +४.३० |
| बनपिंपळा | -१.२६ |
| गंगाखेड | -०.६० |
| महातपूरी | -०.८२ |
| धनगरमोहा | -१.७४ |
| डोंगरपिंपळा | -२.३४ |
| इसाद | -२.२२ |

संदर्भ : *गंगाखेड तहसिलने प्रसिद्ध केलेली आकडेवारी*

**सारणी क्र. (५): गंगाखेड तालूक्यातील पाटबंधारे प्रकल्पातील पाणी साठा % मध्ये (जानेवारी २०१८)**

| अ.क्र. | प्रकल्पाचे नांव | जिवंत पाणी साठा % मध्ये |
|---|---|---|
| १ | माजलगांव (मिळणारे पाणी) | ०० |
| २ | मासोळी | ०० |
| ३ | मुळी | ०० |
| ४ | राणीसावरगाव | १३.६ |
| ५ | टाकळवाडी | ५.२ |
| ६ | कोद्री | १७.८ |
| ७ | पिंपळगाव तलाव | ३.६ |
| ८ | दगडवाडी | ०० |
| ९ | डोंगरपिंपळा | ०० |
| १० | भेंडेवाडी | ०० |

संदर्भ : *गंगाखेड तहसिल कार्यालयाने प्रसिद्ध केलेली आकडेवारी*

सारणी क्र. १ वरुन गंगाखेड तालूक्यात २०१२ ते २०१८ दरम्यान वार्षीक सरासरी पर्जन्य आणि टक्केवारी दिलेली असून गंगाखेड तालूक्याची सरासरी पर्जन्य ६९७ मी.मी.असून २०१२ ते २०१८ दरम्यान सर्वात जासत पर्जन्य २०१३ मध्ये पडले होते तर सर्वात कमी २०१४, २०१५ आणि २०१८ मध्ये पर्जन्य सरासरीच्या खुपच कमी पडल्यामुळे तालूक्याला मिळणाऱ्या पाण्याच्या स्त्रोतात त्यामुळे घट झाली असून त्यामुळे गंगाखेड तालूक्यात पाणी टंचाईची भिषण स्थिती निर्माण झाल्याचे प्राप्त आकडेवारीवरुन निदर्शनास येते.

सारणी क्र. २ मध्ये गंगाखेड तालूक्यातील मंडळनिहाय पर्जन्याची स्थिती दाखविली असून २०१८ मध्ये सर्वात जासत पर्जन्य गंगाखेड मंडळामध्ये झाला असून सर्वात कमी पर्जन्य राणीसावरगाव आणि माखणी मंडळामध्ये झालेला असून हे दोन्ही मंडळे बालाघाटच्या डोंगररांगेमध्ये असल्यामुळे भौगोलिक परिस्थीती, खडकाची रचना जलधारित नसल्यामुळे या दोन मंडळामध्ये इतर दोन मंडळापैकी पाणी टंचाईची तिव्रता प्राप्त आकडेवार वरुन अधिक दिसते.

सारणी क्र. ३ वरुन २०१८ मध्ये गंगाखेड तालूक्यात जून २०१८ ते आक्टोंबर २०१८ दरम्यान पर्जन्याची स्थिती दाखविली असून सर्वात जास्त पर्जन्य जून मध्ये पडला असून सरासरी पर्जन्यापेक्षा खुपच अधिक आहे. माज जूलै, ऑगस्ट, सप्टेंबर, आणि आक्टोंबर २०१८ दरम्यान सरासरी पर्जन्याच्या तुलनेत खुपच कमी पर्जन्य पडल्याचे प्राप्त आकडेवारीवरुन निदर्शनास येते त्यामुळे जानेवारी २०१९ ते जून २०१९ पर्यंत तालूक्यात प्राप्त पर्जन्य आणि लागणारी पाण्याची गरज यात तफावत आढळते.

सारणी क्र. ४ वरुन गंगाखेड तालुक्यातील निवडक विहीरीतील पाण्याच्या स्थितीचा अभ्यास केला असता केवळ मुळी शिवरातील विहीरीच्या पाण्याची पातळी ०.५४ मिटरने वाढली असून बाकीच्या सर्व गाव शिवारातील पाण्याची पातळी सरासरी दोन मिटरपेक्षा जास्त घटली असून गोदावरी काठी असलेल्या धारखेड शिवारातील विहीरीतील पाण्याची पातळी ४.३० ने घटली आहे. मागिल अनेक वर्षापासून गोदावरी नदीला होणारा पाण्याचा पुरवठा कमी होणे हे त्या पाठीमागचे कारण सांगता येतील.

सारणी क्र. ५ मध्ये गंगाखेड तालूक्यातील आणि तालूक्याला मिळणाऱ्या पाणीपुरवठ्या संदर्भातील सारणीचा अभ्यास केला असता असे निदर्शनास येते की, माजलगाव, मासोळी, मुळी, दगडवाडी, डोंगरपिंपळा, आणि भेंडेवाडी प्रकल्पातील पाणी साठा शुन्य असून बाकीच्या प्रकल्पामध्ये पूढील सहा महिने पुरेल असा विशेष जिवंत साठा उपल्बध नाही. कोंद्री प्रकल्पात इतर प्रकल्पापेक्षा अधिकचा साठा असला तरी या परिसराची भौगोलिक रिस्थीती पाणीसाठवण्याची प्रतिकूल असल्यामुळे आणि वनाचे प्रमाण कमी असल्यामुळे एप्रिल, मे २०१८ दरम्यान याही प्रकल्पातील पाणी साठी मृतहोण्याचा मार्गावर आहे. कारण उन्हाळ्यात पाण्याचे बाष्पीभवन आधिक होते.

## निष्कर्ष :

२०१२ ते २०१८ दरम्यान गंगाखेड तालूक्यात पडलेल्या पर्जन्याचा अभ्यास केला असता २०१८ मध्ये सरासरीच्या ६०% पर्जन्य पडलेला असून मंडळनिहाय पर्जन्याचा आढावा घेतला असता माखणी आणि राणीसावरगाव या डोंगराळ भागात २०१८ मध्ये पडणाऱ्या पर्जन्याचे प्रमाण सरासरीच्या अनुक्रमे ५३% आणि ५०% असून या मंडळामध्ये पूढिल सहा महिन्यात (जानेवारी २०१९ ते जून २०१९) सर्वच क्षेत्रासाठी वापरण्यासाठी पाणी टंचाई खूप उद्भवणार आहे.

तसेच जून २०१८ ते आक्टोंबर २०१८ दरम्यान सरासरी पर्जन्याचाही आढावा घेतला असता जून २०१८ वगळता बाकीच्या सर्वच महिन्यात सरासरीच्या खुपच कमी पर्जन्य झाल्यामुळे पूर्ण तालूक्यातच पाणी टंचाईची तित्रता अधिक होणार आहे. गंगाखेड तालुक्यातील तहसील कार्यालयाने निवडक विहीरीची पाणीपातळी अभ्यासली असता मुळी वगळता बाकीच्या सर्वच गावात विहीरीची पाणीपातळी घटली असून मुळी बंधाऱ्यामुळे फक्त मुळी गावात पाणीपातळी ०.५ मिटरने वाढलेली आहे. तर तालूक्यातील कोंद्री, राणीसावरगाव, वगळता बाकीच्या सर्वच प्रकल्पातील पाणीसाठा मृतआवस्थेत असल्याचे प्राप्त आकडेवारी वरुन निदर्शनास येते.

## उपाय :

१) गंगाखेड तालूक्यात पर्जन्य वाढीसाठी वृक्षलागवड कार्याक्रमाचा दिर्घकालीन कृती आराखडा तयार करुन वृक्षलागवड आणि संगोपन करणे. त्यासाठी गावपातळीवर वनविभागा तर्फे राबवीन्यात येणाऱ्या हरित सैनेचा सदस्य बनुन वृक्ष लागवडीचा कृती आराखडा तयार करुन गाव शिवारात वृक्ष लागवड करणे गरजेचे आहे.

२) गाव शिवारातील पाणी गाव शिवारात च मुरविण्यासाठी जलसंधारणाची कामी शासकीय आणि एनजीओच्या माध्यमातुन पूर्ण करणे .

३) पाण्याचा उपसा कमी करण्यासाठी पाणीवापराबाबत सर्वच स्तरातील लोकांना प्रशिक्षण देणे.

४) औद्योगिक क्षेत्रात पाणी वापरासाठी नियमावली करुन त्यांना पाणीवापराबाबत अधिकचा कर आकरण्यासंदर्भात अमलबजावणी करणे .

५) गोदावरी आणि मासोळी नदीवर बॅरेजेसची शासणाने मंजूरी देऊन जागो जागी पाणी आडवून जलपातळी वाढवणे गरजेचे आहे.

६) शेतकरी आणि गाव खेड्यात आणि शहरात राहणाऱ्या लोकांना पाणी वापरासंदर्भात जनजागृती करुन पाणी वापरचे शास्त्रीय प्रशिक्षण देणे.

७) नगदी पीकासाठी वापरल्या जाणाऱ्या पाण्यासाठी टिबक सिंचन, तुषार सिंचनाच्या योजनेसाठी सबसिडी देणे विशेषत: डोंगराळ भागातील शेतकऱ्यांना ती अधिकची देणे गरजेचे आहे.

८) गंगाखेड तालूक्यात आणि शहरी भागात जानेवारी २०१९ ते जुन २०१९ दरम्यान तिव्र पाणी टंचाईला सामोरे जावे लागणार असल्यामुळे गाव शिरातील पाणी असलेल्या कुपनलिका आणि विहीरी अधिग्रहीत करुन लोकांना आणि जनावरांना पिण्याच्या पाण्याची सोय प्रशासणाने उपलब्ध करुन द्यावी.

## संदर्भ :

१) https://parghani.gov.in
२) http://Latlong.net
३) www.censusindia.co.in
४) https://indiakosh.com
५) Gangakhed.maharastra-wikipedia
६) तहसिल कार्यालय, गंगाखेड, माहित संकलन

# औरंगाबाद जिल्हयातील जलसिंचन प्रकल्प : भौगोलिक दृष्टीक्षेप

**डॉ. शोभा भानुदासराव दुधाटे**

सहायक प्राध्यापक,भूगोल विभाग

कै.बाबुराव पाटील कला व विज्ञान महाविद्यालय, हिंगोली.

**सारांश :**

अभ्यास क्षेत्रामध्ये पैठण येथे जायकवाडी हा बहूउद्देशिय प्रकल्प उभारण्यात आला.  या प्रकल्पाची उंची ३७.७३मिटर असून प्रकल्पा अंतर्गत येणारे ओलिताखालिल क्षेत्र ३७२९४०० हेक्टर क्षेत्र आहे. तर लाभ क्षेत्रातिल लागवडी लायक क्षेत्र २,३७,५५००० हेक्टर आढळते. तर ईगतपूरी येथे नांदूर मधमेश्वर प्रकल्प उभारण्याची प्रक्रिया सुरू असून हा प्रकल्प पुर्ण होण्याची तारीख २०१६ अशी आहे. या प्रकल्पाची उंची ३७.४५ मीटर असून त्याच्या अंतर्गत येणारे लाभक्षेत्र हे ५२८६४ हेक्टर असून लाभ घेण्याजोगे क्षेत्र ४३८६० हेक्टर आहे. या प्रकल्पा अंतर्गत येणाऱ्या काही भागातील जमिनी अती जलसिंचनामुळे क्षारयुक्त व नापीक बनल्या आहेत.

**प्रस्तावना :**

औरंगाबाद जिल्हयात लागवडी योग्य जमिनी बरोबरच डोंगराळ जमिनही बरीच आढळते. केवळ औरंगाबाद शहराला व दौलताबाद, वेरूळ, खुलताबाद इ. भागाला डोंगर रांगेमुळे पर्यटनाचे महत्व प्राप्त झाले असले तरी गंगापूर, वैजापूर,पैठण इत्यादी तालूक्यांमध्ये सुपीक गाळाची लागवडी योग्य मृदा असल्याने येथे कृषी व्यवसाय हे भरभराटीस आला आहे. पैठण तालूक्यातील गोदावरी नदीवरील जायकवाडी हा बहुउद्देशिय प्रकल्प त्याचे एकमेव स्त्रोत आहे. इतर तालूक्यामध्ये मात्र मध्यम व लघू प्रकल्प उभारण्यास आले आहेत.

**अभ्यास क्षेत्र :**

औरंगाबाद जिल्हयाचा अक्षवृत्तीय विस्तार १९º १८' उत्तर ते २०º ४०' उत्तर आणि रेखावृत्तीय विस्तार ७४º ३४' पुर्व ते ७६º ४०' पुर्व  असा विस्तारलेला असून महाराष्ट्राच्या मध्यावर त्याचे स्थान येते. जिल्हयाच्या पुर्वेस जालना आणि बुलढाणा जिल्हा  आहे पश्चिमेस नाशिक आणि अहमदनगर जिल्हे आहेत. उत्तरेस जळगाव जिल्हा असून दक्षिणेस पुन: जालना व बुलढाणा जिल्हयाचा भाग येतो.

**उदेश :**

१.   अभ्यास क्षेत्रातील जलसिंचनाचे प्रकल्प दृष्टीक्षेपात आणणे.

२.   अभ्यास क्षेत्रातील लागवडी लायक क्षेत्र अभ्यासणे.

**गृहितके :**

१.   अभ्यस क्षेत्रातील जलसिंचनाच्या सुविधा सर्वत्र सारख्या आढळत नाहीत.

२.   अभ्यास क्षेत्रात कृषी लागवडीखालील क्षेत्रामध्ये विविधता आढळते.

**संशोधनाच्या मर्यादा :**

१.   अभ्यास क्षेत्रातील जलसिंचनाच्या प्रकल्पाची माहिती केवळ इ.स १९६१ ते सन २०११ या कालावधीतील पुर्णत्वास आलेल्या प्रकल्पाची असल्याने निष्कर्ष त्यास अनुसरूनच आहेत.

**माहिती स्त्रोत :**

प्रस्तुत संशोधनासाठी दुय्यम स्वरुपाची माहिती संकलीत केली आहे. दुय्यम स्वरुपाच्या माहितीसाठी पुढिल स्त्रोताचा आधार घेतला आहे.

१.   भारतीय जनगनणा जिल्हा हस्तपुस्तिका .

२.   जिल्हा आर्थिक व सामाजीक समालोचन.

३.   वार्षिक सांख्यकीय अहवाल महाराष्ट्र राज्य, डी.जे.पुणे.

४.   विविध सांकेतिक स्थळ.

५.   गॅझेट्स.

६.   जिल्हा हस्तपुस्तिका.

**अभ्यास पध्दती :**

प्रस्तुत शोधनिबंधासाठी प्राथमीक आणि दुय्यम स्वरुपाची माहिती संकलीत झाल्यानंतर टक्केवारीच्या सहाय्याने सांख्यकीय व आलेख पध्दती द्वारे सादर केली आहे.

**जलसिंचन प्रकल्प :**

औरंगाबाद जिल्ह्यासाठी जायकवाडी बरोबरच नांदूर, मदनेश्वर आणि इगतपूरी सारखे मोठे प्रकल्प तयार झाल्यामुळे जलसिंचन क्षेत्राचा निर्देशांक वाढला व ओलिताखालील क्षेत्रामध्ये कायापालट झालेला आढळतो.

**औरंगाबाद जिल्ह्यातील मोठे जलसिंचन प्रकल्प**

| अ.क्र | प्रकल्पाचे नाव | प्रकल्पाचा अंदाजीत खर्चलाखामध्ये | प्रकल्पाची उंचीमिटर मध्ये | प्रकल्पाअंतर्गत येणारे ओलीताखालील क्षेत्रहेक्टर मध्ये | लाभक्षेत्रातील लागवडी लायक क्षेत्र |
|---|---|---|---|---|---|
| १ | जायकवाडी प्रकल्प, पैठण | १,२५,२१,३६ | ३७.७३ | ३७,२९४ | २,३७,५५० |
| २ | नांदूर मधमेश्वर प्रकल्प, इगतपूरी | ४६४.६७ | ३७.४५ | ४३,८६० | ५२,८६४ |

स्रोत :औरंगाबाद जिल्हा आर्थिक व सामाजिक समालोचन

**लाभक्षेत्रातील लागवडी लायक क्षेत्र**
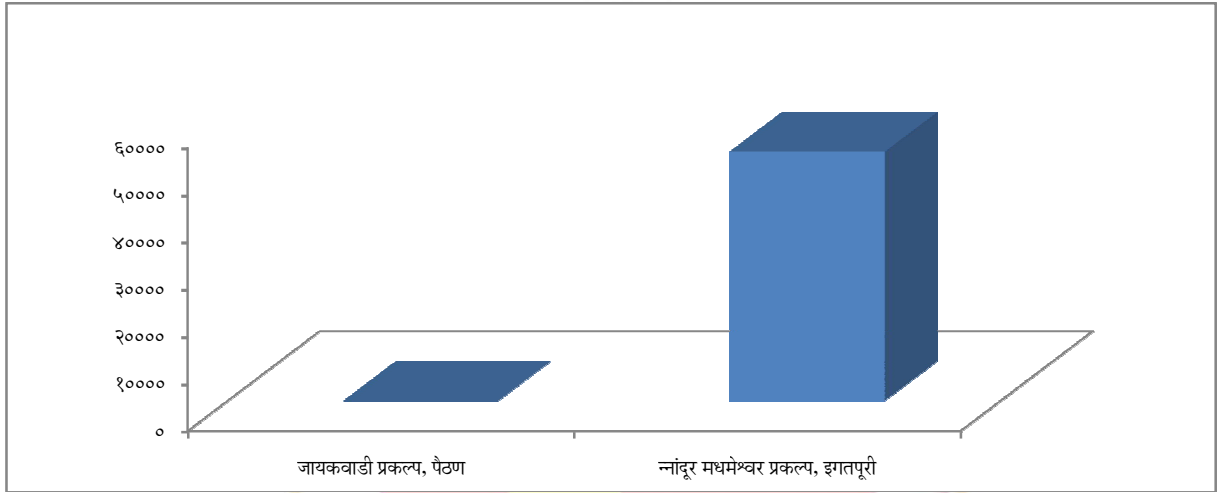


अभ्यास क्षेत्रामध्ये पैठण येथे जायकवाडी हा बहूउद्देशिय प्रकल्प उभारण्यात आला. या प्रकल्पावर १,२५,२१,३६/- लाख अंदाजित खर्च खर्च करण्यात आला. या प्रकल्पाची उंची ३७.७३मिटर असून प्रकल्पा अंतर्गत येणारे ओलिताखालिल क्षेत्र ३७२९४०० हेक्टर क्षेत्र आहे. तर लाभ क्षेत्रातिल लागवडी लायक क्षेत्र २,३७,५५,००० हेक्टर आढळते. तर इगतपूरी येथे नांदूर मधमेश्वर प्रकल्प उभारण्याची प्रक्रिया सुरू असून हा प्रकल्प पूर्ण होण्याची तारीख २०१६ अशी आहे. या प्रकल्पाची उंची ३७.४५ मीटर असून त्याच्या अंतर्गत येणारे लाभक्षेत्र हे ५२८६४ हेक्टर असून लाभ घेण्याजोगे क्षेत्र ४३८६० हेक्टर आहे.

अभ्यास क्षेत्रामध्ये जलसिंचन प्रकल्पाचा दर्शविले आहेत सन १९६२ मध्य वैजापूर तहसीलमध्ये डेकू प्रकल्प उभारण्यात आला. या प्रकल्पाची उंची १३.८२ मीटर असून एकूण लाभक्षेत्र ३८३० हेक्टर आहेत तर लाभक्षेत्रातील लागवडी लायक क्षेत्र ३५६४ हेक्टर आहे.सन १९६६ मध्ये सिल्लोड तहसीलमध्ये खेळणा प्रकल्प उभारण्यात आला.

**औरंगाबाद जिल्ह्यातील समध्यम जलसिंचन प्रकल्प**

| अ.क. | प्रकल्पाचे नाव | काम पुर्ण झालेले वर्ष / काम अपूरे असल्यास पुर्ण होण्याचे अपेक्षीत वर्ष | प्रकल्पाचा अंदाजीत खर्च लाखामध्ये | प्रकल्पाची उंची मिटर मध्ये | लाभक्षेत्रा खालील लागवडी लायक क्षेत्र (हेक्टर मध्ये) | एकूण लाभ क्षेत्र (हेक्टर मध्ये) |
|---|---|---|---|---|---|---|
| १ | ढेकू प्रकल्प, | १९६२ | ४०.४१ | १३.८२ | ३५६४.०० | ३८३०.०० |
| २ | खेळणा प्रकल्प | १९६६ | ७१.०० | २०.९६ | ४९३५.०० | ५०७१.०० |
| ३ | कोल्ही प्रकल्प | १९६६ | २३.०० | १४.८६ | १०६८.०० | १३३६.०० |
| ४ | सुखना प्रकल्प | १९६८ | ११६.०३ | १६.९२ | २५११.०० | ३१३६.०० |
| ५ | गडदगड प्रकल्प | १९७० | ४७ | २१ | ११८०.०० | १९७३.०० |
| ६ | लहुकी प्रकल्प | १९७९ | १०९ | १६.३० | १०९२.०० | १३२३.०० |
| ७ | गिरीजा प्रकल्प | १९८९ | १०२० | - | ३५९५ | ६२२० |
| ८ | शिवना टाकळी प्रकल्प | २००६ | १५४८९.२१ | १६.२८ | ६३८९ | ९७५० |
| ९ | वाकोद प्रकल्प | काम अंतिम टप्प्यात | ५०९३ | १४.२८ | २५६५ | २८६० |

स्रोत :-औरंगाबाद जिल्हा आर्थिक व सामाजिक समालोचन

**एकूण लाभ क्षेत्र  (हेक्टर मध्ये)**
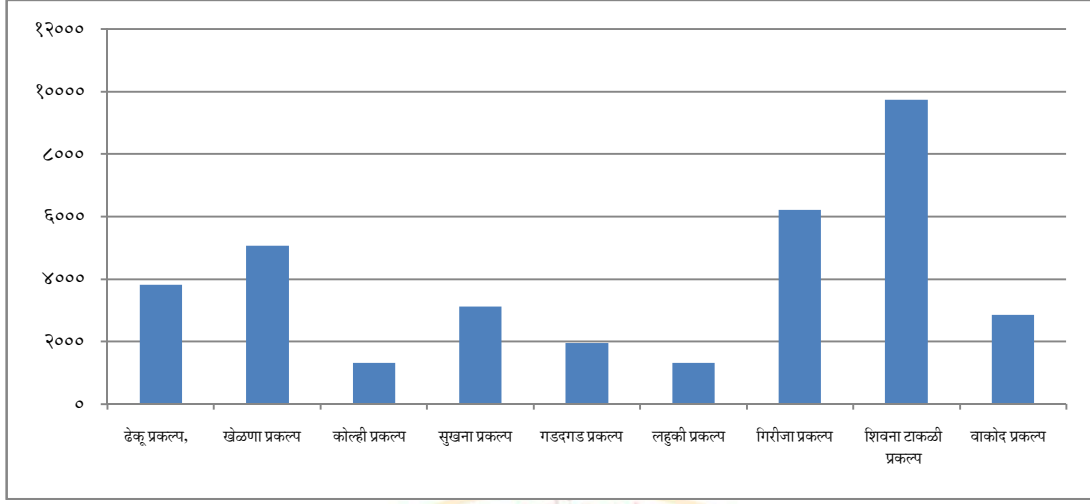


सन १९६२ मध्ये ढेकू प्रकल्प उभारण्यात आला. या प्रकल्पाची उंची १३.८२ मीटरअसून या अंतर्गत येणारे लाभक्षेत्र ३८३० कि.मी.आहे व लागवडी लायक ३५६४ हेक्टर आहे. सन १९६६ मध्ये खेळणा प्रकल्प उभारण्यात आला याची उंची २०.९६ मीटरअसून  या अंतर्गत येणारे लाभक्षेत्र ५०७१ कि.मी. आहे व लागवडी लायक ४९३५ हेक्टर आहे व याच वर्षामध्ये वैजापूर तालूक्यातील कोल्ही प्रकल्प उभारण्यात आला. या प्रकल्पाची उंची १४.८६ मीटरअसून या अंतर्गत येणारे लाभक्षेत्र १३३६ कि.मी.आहे व लागवडी लायक १०६८ हेक्टर आहे.सन १९६८ मध्ये औरंगाबाद तहसीलमध्ये सुकना प्रकल्प उभारण्यात आला. त्याची उंची १६.९२  मीटर असून त्याच्या अंतर्गत येणारे लाभक्षेत्र हे ३१६३ हेक्टर असून लाभ घेण्याजोगे क्षेत्र २५११ हेक्टर आहे. सन १९७० मध्ये कन्नड तालूक्यात गडदगड प्रकल्प उभारण्यात आला असून त्याची उंची २१ मीटरअसून त्याच्या अंतर्गत येणारे लाभक्षेत्र हे १९७३ हेक्टर असून लाभ घेण्याजोगे क्षेत्र ११८० हेक्टर आहे . सन १९७९ या वर्षमध्ये लहुकी प्रकल्प औरंगाबाद तहसीलमध्ये उभारण्यात आला. त्याची उंची १६.३० मीटर असून त्याच्या अंतर्गत येणारे लाभक्षेत्र हे १३२३ हेक्टर असून लाभ घेण्याजोगे क्षेत्र १०९२ हेक्टर आहे.सन १९८९ या वर्षी गिरीजा प्रकल्प खुलताबाद तहसीलमध्ये उभारण्यात आला असून त्याच्या अंतर्गत येणारे लाभक्षेत्र हे ६२२० हेक्टर असून लाभ घेण्याजोगे क्षेत्र ३५९५ हेक्टर आहे.सन २००६या वर्षातशिवना प्रकल्प कन्नड तहसीलमध्ये उभारण्यात आला असून या प्रकल्पाची उंची १६.२८ मिटर आहे.याच्या अंतर्गत येणारे लाभक्षेत्र हे ९७८० हेक्टर असून लाभ घेण्याजोगे क्षेत्र ६३८९ हेक्टर आहे.फुलंब्री तालुक्यामध्ये वाकोद हा प्रकल्प उभारण्यात येत असून या प्रकल्पाचे काम सध्या अंतिम टप्यामध्ये आहे.या प्रकल्पाचीउंची १४.२८ मीटर असून त्याच्या अंतर्गत येणारे लाभक्षेत्र हे २८६० हेक्टर असून लाभ घेण्याजोगे क्षेत्र २५६५ हेक्टरअसून या प्रकल्पाचे काम अंतिम टप्यात आहे.

**निष्कर्ष :**

अभ्यास क्षेत्रामध्ये पैठण येथे जायकवाडी हा बहूउद्देशिय प्रकल्प उभारण्यात आला.  या प्रकल्पाची उंची ३७.७३मिटर असून प्रकल्पा अंतर्गत येणारे ओलिताखालिल क्षेत्र ३७२९४०० हेक्टर क्षेत्र आहे. तर लाभ क्षेत्रातिल लागवडी लायक क्षेत्र २,३७,५५००० हेक्टर आढळते. तर इगतपूरी येथे नांदूर मधमेश्वर प्रकल्प उभारण्याची प्रक्रिया सुरू असून हा प्रकल्प पूर्ण होण्याची तारीख २०१६ अशी आहे. या प्रकल्पाची उंची ३७.४५ मीटर असून त्याच्या अंतर्गत येणारे लाभक्षेत्र हे ५२८६४ हेक्टर असून लाभ घेण्याजोगे क्षेत्र ४३८६० हेक्टर आहे. या प्रकल्पा अंतर्गत येणाऱ्या काही भागातील जमिनी अती जलसिंचनामुळे क्षारयुक्त व नापीक बनल्या आहेत. उत्पादन वाढीसाठी पाणी आवश्क असलेतरी प्रत्येक जमिनीची क्षमता व मृदेतील घटक भिन्न असतात म्हणून त्या भागातील शेतकऱ्यांनी मृदा  परिक्षण करुन त्यानुसार पीक प्रारुप बदलण्याची गरज आहे. त्याच बरोबर अभ्यास क्षेत्रामध्ये मध्यम व लघू प्रकल्प उभे करण्यात आले आहेत. त्या भागातील जमिनीस अप्रत्यक्ष फायदा होतो म्हणजेच भूजल पातळी वाढवण्याची गरज आहे, त्यासाठी शेततळया सारख्या पाणी आडवा पाणी जिरवा यासारख्या योजना राबविण्याची गरज आहे. त्याच बरोबर अभ्यास क्षेत्रातील विहिरींची संख्ये १९६१ च्या तुलनेत २०१० मध्ये कमी झालेली आढळते. जलसिंचन प्रकल्प असलेल्या भागामध्ये कोरडया पडलेल्या विहिरी भूजल पातळी वाढल्याने वापरात आल्या.

**संदर्भ सुची :**

*   १) *Cantar L.M. (1967) :  'A World Geography of Irrigation',  Oliver & Boyad PP.10-21.*
*   २) *Jasbir Sing & S.S.Dhillon. (1997) : 'Agricultural Geography ',  Total me Graw Hill Publishing.Co.Ltd. New Delhi . P.226.*
*   ३) *Shafir M. (1981) : 'Increasing our agricultural production', The Geographer,Vol,-XXXIII,No. 1.*
*   ४) *Safi Mohammad (1960) : Measurement of agricultural efficiency in Utter Pradesh , Economic Geography. PP. 226-305.*
*   ५) *T.S. Chouhan. (1987) :  'Agricultural Geography-  A case study of Rajasthan state ',  Academic Publish, Jaipur. P.108-109.*
*   ६) *आर्थिक व सामाजीक समालोचन, औरंगाबाद जिल्हा.*
*   ७) *औरंगाबाद जिल्हा हस्त पुस्तिका.*

# भारतातील अनुसूचित जमाती लोकसंख्या वृध्दीदर व वितरणाचा एक अभ्यास

**प्रा. डॉ. यु. टी. गायकवाड**
श्रीमती सुशीलादेवी देशमुख महिला महाविद्यालय, लातूर

**प्रस्तावना :**

लोकसंख्या शास्त्र हे परिवर्तनशील शास्त्र आहे. त्यात स्थळानुसार व काळानुसार भिन्न स्वरूपात ते आढळते. त्यातून मानवी भूगोलाची एक उपशाखा म्हणून लोकसंख्या भूगोल शास्त्र हे निर्माण झाले. इ.स. १९५३ मध्ये त्रिवार्था या भूगोल तज्ञाने लोकसंख्याशास्त्र या स्वतंत्र शाखेच्या अभ्यासास सुरूवात केली. इ.स. १९४७ मध्ये जॉर्ज यांने पाठ्यपुस्तकात लोकसंख्या भूगोलाचा समावेश केला. लोकसंख्या शास्त्राची भारतात अय्यर, सुब्रम्हन्यम, मेनन इ. भूगोल तज्ञांनी स्वरूप स्पष्ट केले. चेटर्जी यांनी लोकसंख्येचे वितरण तर दयाल यांनी लोकसंख्या बाढ ग्रामीण स्थलांतर यांचा शहरी सुविधावर होणारा परिणाम यांचा अभ्यास केला. प्रस्तुत शोध निबंधात भारतातील अनूसूचित जमातीच्या लोकसंख्या आणि दशवार्षिक बदल, पुरूष व स्त्रियांची लोकसंख्या, लिंगगुणोत्तर आणि टक्केवारी यांचा अभ्यास करण्याचा प्रयत्न केला आहे.

**उद्दिष्टये :**

प्रस्तुत शोध निबंधासाठी भारतातील अनुसूचित जमाती लोकसंख्येचे वितरण वृध्दीदर लिंगगुणोत्तर अभ्यासताना खालील उद्दिष्टांचा विचार केला आहे.

१. भारतातील अनुसूचित जमातीची लोकसंख्येतील नैसर्गिक वृध्दीदर शोधने
२. भारतातील अनुसूचित जमाती लोकसंख्येतील वितरण अभ्यासणे
३. भारतातील अनुसूचित जमातीची लोकसंख्येतील लिंगगुणोत्तरचा अभ्यास करणे

**अभ्यास क्षेत्र :**

भारतातील अनुसूचित जमातीची लोकसंख्येचे दशवार्षिक बदल, स्त्रि पुरूष यांची लोकसंख्या, लिंगगुणोत्तर एकूण लोकसंख्येशी अनुसूचित जमातीतील टक्केवारी याला अनुसरून हे वितरण असमान आहे त्यानुसार संपूर्ण भारत एक अभ्यास क्षेत्र निवडले आहे. भारतामध्ये जनगणना २०११ च्या अंतिम अकडेवारीनुसार अनुसूचित जमातीची लोकसंख्या १०.४३ कोटी आहे. एकूण लोकसंख्येच्या भारताचा अक्षवृत्तीय विस्तार ८°४' २८'' उत्तर अक्षवृत्त ते ३७° ६' ५३'' उत्तर अक्षवृत्त तर रेखावृत्त विस्तार ६८°७'३३'' पूर्व रेखावृत्त ते ९७°२५'४७'' पूर्व रेखावृत्त विस्तार असून भारताच्या ३२,८७,२६३ चौ.कि.मि. क्षेत्रफळ असलेल्या भारत भूभागावर अनुसूचित जमातीची लोकसंख्या ८.६ टक्के आहे. कारण वरील अक्षवृत्तीय व रेखावृत्तीय पट्यात मानवास जेथे अनुकूल हवामान आहे तेथे त्या जमातीची लोकसंख्या स्थायीक झाली आहे. त्यात स्थान परतवे भिन्नता आढळून येते.

**संशोधन पध्दत व माहितीचे संकलन :**

सदर शोधनिबंधासाठी मिळवलेले आकडेवारी द्वितीय स्वरूपाचे असून ते Demographic Status of Scheduled Tribes Population of India यातून घेतलेली आहे. प्रत्येक राज्यानुसार मिळालेल्या आकडेवारीचे पृथकरण केलेले आहे. भारताची लोकसंख्येची आकडेवारी २००१ ते २०११ वर्षांची असून त्याकरीता अनुसूचित जमातीची लोकसंख्या आणि दशवार्षिक बदल, पुरूष व स्त्रियांची लोकसंख्या, लिंग गुणोत्तर, अनुसूचित जमातीची टक्केवारी यांचा अभ्यास करण्यात आला आहे.

**विश्लेषण :**

भारतीय राज्यघटनेच्या कलम ३४२ (१) अनुसार राष्ट्रपतीने घोषित केलेल्या जमातींना अनुसूचित जमाती असे म्हणतात. एकाकी, डोंगरावर, जंगलात राहणारे व ज्यांना आधुनिक संस्कृती व जीवनाचा परिचय होऊ शकला नाही अशा लोकांना आदिवाशी असे म्हणतात. याचे मागासलेले पण हे मुख्यतः आर्थिक व सांस्कृतिक आहे. इतर सर्व भारतीया पेक्षा शैक्षणिक, आर्थिक, सांस्कृतिक दृष्या मागासलेला समाज म्हणजे अनुसूचित जमात होय.

भारतामध्ये जनगणना २०११ च्या अंतिम अकडेवारीनुसार अनुसूचित जमातीची लोकसंख्या १०,४२,८१,०३४ एवढी असून ती ८.६ टक्के आहे.

**भारतीय अनुसूचित जमातीची लोकसंख्या शास्त्रीय वैशिष्ट्चे :**

भारतामध्ये ग्रामीण भागात अनुसूचित जमातीची लोकसंख्या ९.३८ कोटी आहे. तर नागरी भागात ती १.०५ कोटी आहे. २००१ ते २०११ दरम्यान अनुसूचित जमातीच्या एकूण लोकसंख्येत दहा वर्षाच्या काळात २३.७ टक्यांनी वाढ झालेली आहे. तर ग्रामीण अनुसूचित जमातीच्या लोकसंख्येत २१.०३ टक्यांनी तर नागरी भागात ती ४९.७ टक्यांनी वाढ झालेली आहे. अनुसूचित जमातीची पुरूष व स्त्रीयांची लोकसंख्या २०११ च्या आकडेवारीनुसार ५,२४,०९,८२३ आहे. यापैकी ग्रामीण भागात पुरूष लोकसंख्या ४७१२६३४१ आहे. तर नागरी भागात ५२८३४८२ आहे. अनुसूचित जमातीच्या स्त्रियांची एकूण लोकसंख्या ५१८७१२११ आहे. यापैकी ग्रामीण भागात स्त्रियांची लोकसंख्या ४६६९२८२१ आहे. नागरी भागात ५१७८३९० आहे. अनुसूचित जमाती मधील लिंग गुणोत्तर २०११ च्या जनगणनेनुसार ९९० आहे. ग्रामीण भागाचे लिंग गुणोत्तर ९९१ तर नागरी भागात ९८० आहे. २००१ च्या जनगणनेनुसार अनुसूचित जमातीचे एकूण लिंग गुणोत्तर ९७८ आहे. ग्रामीण भागाचे लिंग गुणोत्तर ९८१ तर नागरी गुणोत्तर ९४४ आहे.

### भारत - अनुसूचित जमातीची लोकसंख्या आणि दशवार्षिक बदल

| अनुसूचित जमातीची लोकसंख्या (२०११) | | | दरवार्षिक बदल (२००१-२०११) | | |
|---|---|---|---|---|---|
| एकूण | ग्रामीण | नागरी | एकूण | ग्रामीण | नागरी |
| १०४,२८१,०३४ | ९३,८१९,१६२ | १०,४६१,८७२ | २३.७ | २१.३ | ४९.७ |

### भारत - अनुसूचित जमातीची पुरूष व स्त्रियांची लोकसंख्या - जनगणना २०११

| पुरूष | | | स्त्री | | |
|---|---|---|---|---|---|
| एकूण | ग्रामीण | नागरी | एकूण | ग्रामीण | नागरी |
| ५,२४,०९,८२३ | ४,७१,२६,३४१ | ५२,८३,४८२ | ५,१८,७१,२११ | ४,६६९२,८२१ | ५१,७८,३९० |

### भारत - अनुसूचित जमाती लिंग गुणोत्तर - २००१-२०११

| लिंग गुणोत्तर २००१ | | | लिंग गुणोत्तर २०११ | | |
|---|---|---|---|---|---|
| एकूण | ग्रामीण | नागरी | एकूण | ग्रामीण | नागरी |
| ९७८ | ९८१ | ९४४ | ९९० | ९९१ | ९८० |

**आदिवासी जमातीतील लिंग गुणोत्तर (२०११):**

भारतात २०११ च्या जणगनेच्या अंतिम आकडेनुसार आदिवासी जमातीतील लिंग गुणोत्तर ९९० आहे. २००१ जनगणनेत लिंग गुणोत्तर ९७८ होते. या काळात आदिवाशी जमातीच्या लिंग गुणोत्तरात १२ बिंदूनी वाढ झालेली आहे. २०११ च्या जनगणनेत ग्रामीण भागातील आदिवाशी जमातीतील लिंग गुणोत्तर ९९१ आहे. तर २००१ च्या जनगणनेत ९८१ होते. याकाळात लिंग गुणोत्तर १० बिंदूनी वाढ झाल्याचे दिसून येते. २०११ च्या जनगणनेत नागरी भागातील आदिवशी जमातीचे लिंग गुणोत्तर ९८० आहे. २००१ च्या जनगणनेत ९४४ होते याचा अर्थ नागरी आदिवासी लिंग गुणोत्तरात भरीव + ३६ बिंदूनी वाढ झालेली आहे.

भारतात सर्वसाधारण लिंग गुणोत्तरा पेक्षा आदीवासी जमातीमध्ये लिंग गुणोत्तर वाढत आहे. हे लक्षात घेतले पाहिजे.

### भारत - एकूण लोकसंख्येशी अनुसूचित जमातीची टक्केवारी २००१-२०११

| अनुसूचित जमातीची टक्केवारी २००१ | | | अनुसूचित जमातीची टक्केवारी २०११ | | |
|---|---|---|---|---|---|
| एकूण | ग्रामीण | नागरी | एकूण | ग्रामीण | नागरी |
| ८.२ | १०.४ | २.४ | ८.६ | ११.३ | २.८ |

भारतामध्ये २०११ च्या जनगणनेच्या अंतिम आकडेवारीनुसार आदिवासी जमातीचे एकूण लोकसंख्येचे ८.६ टक्के आहे.

### भारतातील आदिवासी जमातींचे प्रादेशिक वितरण :

**१. उत्तर व ईशान्येकडील प्रदेश :** पश्चिमेकडील भागात सिमला व लेह ही सीमेवरील ठाणी येतात तर पुर्वेकडील भागात लुशाई व मिश्मी हा भाग येतो. हा प्रदेश शेवटाकडे रूंद होत असून मध्यभागी थोडा अरूंद आहे. यामध्ये काश्मीर (लडाख), हिमाचल प्रदेश, उत्तराखंड व ईशान्य भारत या भागात राहणाऱ्या जमाती येतात. सिक्कीमचा समावेशही याच प्रदेशात होतो. या विभागात गुरूंगा, लिम्बू, लेपचा, आका, डफला, अबोर, मिरी, मिश्मी, सिंगफो, मिकिर, राभा, कचारी, गारो, खासी, नागा, कुकी, लुशाई, चकमा इत्यादी आदिवासी राहतात. हिमाचल प्रदेश, काश्मीर, लडाख इत्यादी आदी पर्वतीय क्षेत्रात पुशचारक आदिम जमाती उदा, गद्दी, खस, गुज्जर, भोटिया, थारू इत्यादी आदिवासी वास्तव्य करतात.

**२. मध्य भारतातील प्रदेश :** या विभागामध्ये पश्चिम बंगाल, झारखंड, उत्तर प्रदेशाचा दक्षिण भाग, राजस्थानचा दक्षिण भाग, ओडीशा, महाराष्ट्राचा उत्तर भाग, मध्य प्रदेश, छत्तीसगड व ओडीशा हे प्रदेश येतात. हा विभाग लोकसख्येच्या दृष्टीने व क्षेत्रफळाच्या दृष्टीने सर्वात मोठा आहे. या प्रदेशात संथाळ, मुण्डा, औरांव किंवा उरांव, हो, भूमिज, खडिया, बिरहोर, भुइ्या, ज्वांग, कन्ध, साओरा, गोंड, बैगा, भिल्ल, कोळी इत्यादी प्रमुख आदिवासी राहतात.

**३. दक्षिणेकडील प्रदेश :** यामध्ये आंध्र प्रदेश, कर्नाटक, तमिळनाडू, केरळ राज्यांचा समावेश होतो. कृष्णा नदीच्या दक्षिणेच्या प्रदेशाचा यामध्ये समावेश होतो. चेंचू, कोटा, कुरूम्ब, बडगा, तोड किंवा तोडा, काडर, मलयन, युथुवन, उरली, काणिकर इत्यादी आदिवासी राहतात. बंगालच्या उपसागरातील अंदमान व निकोबार बेटावर जरब, ओंग, उतरी सेंटीनली, निकोबारी आदिवासी जमाती राहतात.

### निष्कर्ष :

उत्तर व ईशान्येकडील प्रदेश, मध्य भारतातील प्रदेश आणि दक्षिणेकडील प्रदेश या विभागात अनुसूचित जमाती लोकसंख्या वाढीचा दर अधिक आहे. कारण रूढी परंपरा, धार्मिक स्थिती, निक्षरता, वैज्ञानिक प्रगतीचा अभाव, प्रजन्नन क्षमता जास्त व राहणीमानाचा दर्जा निकृष्ट. भारतातील लोकसंख्ये वाढीच्या वेगापेक्षा या जमातीचा लोकसंख्या वाढीचा वेग जास्त आहे. खालवलेला राहणीमानाचा दर्जा, साक्षरतेचे कमी प्रमाण, उच्च जन्मदर व उच्च मृत्यूदर यामुळे मानवी अस्तित्वासाठी अधिक मुले जन्मास घालने यामुळे लोकसंख्या वाढीचा वेग जास्त आहे.

### संदर्भ :

१. *Husain Majid, Human Geography Book Company Rawat Publication Jaipur 1999.*
२. *World Population Data Sheet (2011) Population Reference Bureque Washington, DC-USA.*
३. *सारंग सुभाषचंद्र - मानवी भू विज्ञान विद्या प्रकाशन नागपूर १९९७*
४. *Demographic Status of Scheduled Tribes Population of India.*

# भूमिपात : कारणे, परिणाम व व्यवस्थापन

**प्रा.डॉ. वाघमारे हरी साधू**

भूगोल विभाग प्रमुख तथा संशोधन मार्गदर्शक

संभाजी कॉलेज (आर्टस्, कॉमर्स व सायन्स)

मुरूड ता.जि.लातूर.

**प्रस्तावना :**

नैसर्गिक व मानवी घटकांमुळे भूमिपात ही आपत्ती घडून येते. डोंगराळ पर्वतीय प्रदेशात अशा घटना वारंवार घडतात. अपक्षय (विदारण) प्रक्रियेमुळे डोंगर कड्यांचे, सुळक्यांचे भाग कमकुवत होतात. जास्त पावसामुळे असे भाग ओले व जड बनतात. अपक्षयामुळे त्यांच्या तळाचा आधार नष्ट झालेला असेल तर गुरूत्वाकर्षणामुळे अशा कड्यांचे किंवा तीव्र उताराचे भाग खाली कोसळतात, याला भूमिपात असे म्हणतात. भूकंपासारख्या नैसर्गिक आपत्तीमुळे देखील डोंगर-कड्यांचे भाग दरीत कोसळतात. रेल्वेमार्ग, रस्ते, कालवे, बोगदे खणताना मानवी हस्तक्षेपामुळे देखील भूमिपाताच्या घटना घडतात.

**उद्देश :**

भूमिपाताची कारणे, परिणाम व व्यवस्थापनाचा अभ्यास करणे.

**आधार सामुग्री:**

सदरील संशोधन पर तयार करण्यासाठी संशोधकाने दुय्यम प्रकारच्या साधन सामुग्रीचा आधार घेतलेला आहे.

**भूमिपात- व्याख्या :**

- "गुरूत्वाकर्षण केंद्राच्या दिशेने होणारी माती, चिखल, खडक या घटकांची तीव्र हालचाल म्हणजे भूमिपात होय.''

- "अपक्षय (विदारण) प्रक्रियेमुळे डोंगर कड्यांचे, सुळक्यांचे भाग कमकुवत होतात. जास्त पावसामुळे असे भाग ओले व जड बनतात. अपक्षयामुळे त्यांच्या तळाचा आधार नष्ट झालेला असेल तर गुरूत्वाकर्षणामुळे अशा कड्यांचे किंवा तीव्र उताराचे भाग खाली कोसळतात, यास भूमिपात असे म्हणतात.''

- "पर्वतीय प्रदेशात किंवा कड्यालगत शिलापदार्थांचे उतारानुसार पायथ्यालगत पतन होणे यास भूमिपात /दरडी कोसळणे/भूघसरण असे म्हणतात.''

**भूमिपाताची कारणे**

**भूमिपात /दरडी कोसळण्याची प्रमुख कारणे पुढीलप्रमाणे.**

1. **भूकंप व ज्वालामुखी विस्फोट** – यांसारख्या नैसर्गिक आपत्तीमुळेदेखील भूमिपात घडून येतात भारतातील घडीच्या पर्वतरांगेत विशेषतः हिमालय पर्वतरांगेतील भूमिपाताचे हे एक अतिशय महत्त्वाचे कारण आहे. देशात टर्शरी कालखंडात निर्माण झालेल्या घडीच्या पर्वतरांगात अशा घटना वारंवार घडतात.

    उदाहरणार्थ, काश्मीर दरीत १९०५ साली झालेल्या भूकंपामुळे लेसर हिमालय/मध्य हिमालय /हिमाचल आणि बृहद्/हिमाद्री रांगांतील हजारो लोकांना आपले प्राण गमवावे लागले. डिसेंबर १९६७ च्या कोयनेच्या भूकंपामुळे सह्याद्री पर्वतात दरडी कोसळण्याच्या घटना घडल्या. यामुळे वाहतूक व्यवस्थेत व्यत्यय आला. वित्तहानी झाली.

2. **पर्जन्यवृष्टी व हिमवृष्टी** - अतिवृष्टी किंवा संततधार पर्जन्यामुळे पर्वत, डोंगर, उत्तारांचे कडे, सुळके, तीव्र उताराचे भाग पाणी मुरल्याने जड बनतात. तसेच उन्हाळ्यात बर्फ वितळून पाण्याच्या संपर्काने असे भाग जड बनतात. गुरूत्वाकर्षणाच्या तत्त्वानुसार असे भाग खाली कोसळतात. हिमालय पर्वतात तसेच सह्याद्री पर्वतरांगात असे भूमिपात वारंवार घडतात. पर्वत-उतारातील तीव्र उताराच्या प्रदेशातून राष्ट्रीय महामार्ग व इतर रस्त्यांनी निर्मिती केलेली असते.

    उदाहरणार्थ, जम्मू-काश्मीर राज्यांतील नश्री क्षेत्रात बतोटे- रामबाण-रामसु आणि बनिहाल दरम्यान अशा घटना वारंवार घडतात. जून २०११ मध्ये आंबोली घाटात दरड कोसळल्याने काही दिवस वाहतूक व्यवस्था बंद होती. अशाच घटना सह्याद्रीच्या इतर घाटातदेखील पावसाळ्यात घडतात.

3. **खाणकाम, खडीनिर्मितीव रस्ते खुदाई** – कोळसा व इतर खनिजांचे उत्खनन, खडीनिर्मिती, धरण कालव्याच्या योजना, औद्योगिक रस्ते खुदाई यामुळे देखील भूमिपात घडून येतात.

    उदाहरणार्थ, हिमालय पर्वतरांगा, पश्चिम घाट व पूर्व घाटातील रांगात अशा घटना अनुभवास येतात.

4. **निर्वनीकरण /जंगलतोड** – वृक्षतोड आणि इतर मानवी क्रियांमुळेदेखील भूमितपातसारख्या घटना घडून येतात. रस्ते-लोहमार्गनिर्मिती, धरण कालव्याच्या योजना, औद्योगिक वसाहती, मानवी वसाहती, खनिजांचे उत्खनन यांसारख्या मानवी क्रियांमुळे दरडी कोसळण्याच्या अनेक घटना घडतात. पर्यावरणाला हानी पोहोचणार नाही या दृष्टीने पर्वतीय प्रदेशात वृक्षतोडीला निर्बंध घालणे तीव्र उताराच्या प्रदेशात मानवी वसाहतीच्या उभारणीवर निर्बंध घालणे यांसारख्या उपाययोजना हाती घ्याव्या लागतील.

5. **इमारतींच्या निर्मितीचा भार** – डोंगराळ, पर्वतीय, टेकड्यांच्या प्रदेशात तेथील मृदा किंवा जनक खडक यांचा अभ्यास न करता अत्यंत अनियोजितपणे शहरे व नगरांची निर्मिती केली जात आहे.
उदाहरणार्थ, उत्तराखंडमधील नैनितालच्या पूर्वेकडील उताराचा भाग हा उपहारगृहे लॉजिंग/निवासस्थाने /निवासी मानवी वसाहती यांच्या भारामुळे खचू लागला आहे.

6. **खडे उतार** – तीव्र किंवा लंबवत उताराचे भाग डोंगराळ व पर्वतीय प्रदेशात सर्वत्र आढळतात. भ्रंश किंवा प्रस्तरभंग यांसारख्या नैसर्गिक घटकांमुळे असे भाग विस्कळीत होऊन भूमिपात होतात. घळईच्या तीव्र उताराच्या बाजू हिमद-या, खोल कालवे किंवा रस्ते ३५° पेक्षा जास्त कोनाचे असतील तर भूमिपात घडून येतात.

7. **तळाधार कमी होणे** – विदारण प्रक्रियेमुळे डोंगर-कड्यांचा तळभाग झिजला तर वरील खडकांचा आधार नष्ट होतो. काही वेळेस खनिजांच्या उत्खननात अंतर्गत भागात खुदाई होते. यामुळे खडकाचा तळाधार नष्ट होतो. भूमिपात घडून येतात. धबधब्याचे ठिकाणी पायथ्याशी अंतर्वक्र खनन होऊन धबधब्याचा आधार नष्ट होतो. धबधबा पात्रात कोसळतो. अशा घटना हिमालय पर्वतरांगा, पश्चिम घाटात अनुभवास येतात.

8. **सागरी लाटा**- सागरी लाटेमुळे समुद्रकड्यांच्या पायथ्याशी सागरी गुहा निर्माण होते. लाटांच्या सतत आघातामुळे गुहा मागे सरकते. समुद्रकड्यांचा आधार नष्ट झाल्याने कालांतराने त्या समुद्रात कोसळतात.

9. **भूमिगत पाणी** – चुनखडीच्या प्रदेशात भूमिगत पाण्याचे कार्य प्रभावी असते. भूमिगत पाण्यामुळे गुहा, कपारी, बोगदे तयार होतात. पाण्याच्या दाबामुळे गुहेच्या भिंतीचा तळभाग कोसळतो. काही वेळेस त्यावरील छत कोसळून अरूंद व खोल द-या निर्माण होतात.

## भूमिपात संवेदनशील विभाग

1. **अतिउच्च संवेदनशील विभाग** – यामध्ये हिमाचल पर्वतीय प्रदेश, अंदमान आणि निकोबार बेटे, पश्चिम घाट, निलगिरी पर्वताचे तीव्र उताराचे व अति पर्जन्याचे प्रदेश, ईशान्य भारतातील प्रदेश तसेच धरणे, रस्ते बांधणीच्या कामाची तीव्रता जास्त असणा-या प्रदेशांचा समावेश होतो.

2. **उच्च संवेदनशील विभाग** – यामध्ये अतिउच्च संवेदनशील विभागाप्रमाणेच स्थिती असते. परंतु घटनांची तीव्रता व वारंवारिता कमी असते. यामध्ये हिमालयातील राज्ये, ईशान्य भारतातील राज्ये (आसामचे मैदान वगळून) यांचा समावेश.

3. **मध्यम ते कमी संवेदनशील विभाग** – यामध्ये ट्रान्स हिमालयातील लडाख व स्पिटी क्षेत्रे, अरवली टेकड्या, पश्चिम घाट, पूर्व घाट आणि दख्खनच्या पठारावरील पावसाळी वादळी प्रदेशांचा समावेश होतो. याशिवाय झारखंड, ओडिशा, छत्तीसगड, मध्य प्रदेश, महाराष्ट्र, आंध्र प्रदेश, तेलंगणा, कर्नाटक, तामिळनाडू, गोवा, केरळ या राज्यांतील खाणकाम क्षेत्राचांही समावेश होतो.

4. **इतर क्षेत्रे** – राजस्थान, हरियाणा, बिहार, उत्तर प्रदेश, पश्चिम बंगाल (दार्जिलिंग वगळून), आसाम (कार्बोआंगलांग जिल्हा वगळून) आणि दक्षिण भारतातील किनारपट्टीचे प्रदेश या दृष्टीने सुरक्षित आहेत.



भारत
भूमिपात अरिष्ट/आपत्ती विभाग

सूची
भूमिपात घटनांची तीव्रता
उच्च ते अतिउच्च तीव्रता
उच्च तीव्रता
मध्यम ते उच्च तीव्रता
निम्न तीव्रता
प्रमुख भूमिपात स्थानके

## भूमिपाताचे परिणाम

1. **वित्त व जीवित हानी** – डोंगर-पर्वताचे कडे, सुळके कोसळल्याने पायथ्याशी असलेल्या वसाहतीचे प्रचंड आर्थिक नुकसान होते. वित्त व जीवित हानी होते. १८ ऑगस्ट १९९८ रोजी भारत-तिबेट सरहद्दीवरील
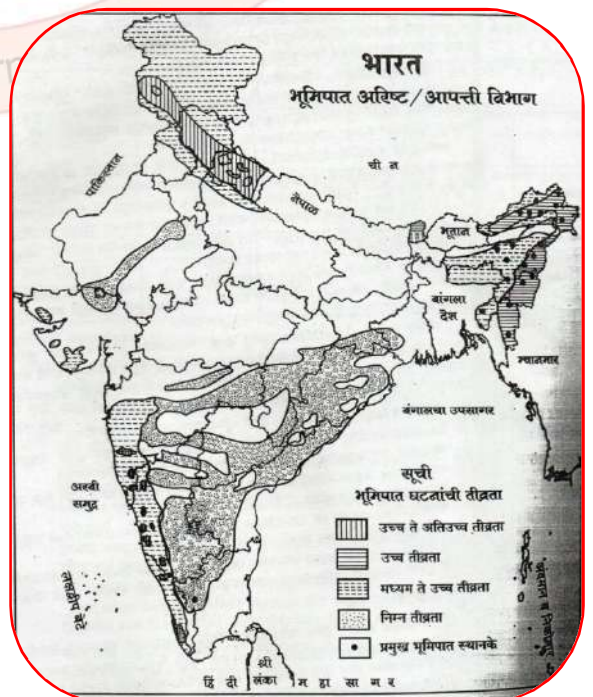
उत्तराखंडमधील पिठोरगड जिल्ह्यातील माल्पा येथे दरड कोसळून दोनशे लोक मृत्यू पावले. अशा दरडी कोसळल्याने मानवी वसाहती व कृषिक्षेत्रांचे नुकसान होते.

2. **वाहतूक व्यवस्थेत व्यत्यय** – डोंगर व पर्वतीय प्रदेशातील वाहतूक व्यवस्था काही काळ खंडित होते. हिमालयातील कल्का-सिमला रेल्वेमार्ग किंवा काश्मीर, कुलू-मनाली, बद्रीनाथ, गंगोत्रीकडे जाणारे रस्ते प्रचंड खुदाई करून तयार केले आहेत. पावसाळ्यात भूमिपात घडून आल्याने वाहतूक व्यवस्था विस्कळीत होते. रस्ते-लोहमार्ग दरडीखाली गाडले जातात.

3. **समुद्राकडे व जलप्रपातांचे मागे सरकणे** – सागरी लाटांमुळे समुद्राकडे तळाचा आधार नष्ट झाल्याने मागे सरकतात. संयुक्त संस्थानातील नायगारा धबधबा मागे सरकत आहे.

4. **सरोवरांची निर्मिती** – काही वेळेस नदीपात्रात दरड कोसळून बंधारा निर्माण होतो व बंधायामागे सरोवर निर्माण होते. उदाहरणार्थ, काश्मीर खो-यात नंगा पर्वताजवळील भूकंपाने सिंधू नदीच्या पात्रात भूमिपात होऊन बंधारा निर्माण झाला. बंधायामागे ६४ कि.मी. लांबीचे सरोवर निर्माण झाले.

### भारत-भूमिपात व परिणाम

| स्थान | दिनांक व वर्ष | भूमिपात व परिणाम |
|---|---|---|
| रतीघाट )उत्तराखंड( | १९९३ | नैनिताल टेकड्यांचा संपर्क तुटला. मार्ग पूर्ववत होण्यास पाच दिवस लागले. |
| निलगिरी टेकड्या )तामिळनाडू( | १९९३ | ४० लोक मृत्युमुखी. समोर सहाशे कुटुंबाना सुरक्षित स्थळी हलविले. रस्ते व घरे उद्ध्वस्त झाली. |
| माल्पा )उत्तराखंड( | १२ ते १८ ऑगस्ट,१९८८ | पूर्ण गाव वाहून गेले. सुमारे ३८४ लोक मृत्युमुखी, यामध्ये मानसरोवरला जाणारे ६० वारकरी होते. |
| उत्तर काशी )उत्तराखंड( | २४ सप्टेंबर ते १० ऑक्टोबर, २००३ | वरूणावत पर्वताचे कडे उत्तर काशी शहरावर पडले. भूमिपाताने ३६२ कुटुंबाना व ३००० लोकांना इजा झाली. गंगोत्री राष्ट्रीय महामार्गाचे अनेक ठिकाणी नुकसान झाले. |
| बद्रीनाथ )उत्तराखंड( | ६ जुलै, २००४ | भूमिपातामुळे बद्रीनाथला जाणारे वारकरी अडकले, २००० वारकरी निराधार झाले. १००० दुकानदार व २५०० खेड्त या आस्मानी संकटाच्या जाळ्यात अडकले. तीन दिवस संपर्क होऊ शकला नाही. |
| उत्तराखंड | १६ जून, २०१३ | पूर व भूमिपातामुळे अगणित जीवित व वित्त हानी झाली. |
| माळीण दुर्घटना )पुणे-महाराष्ट्र | ३० जुलै, २०१४ | पुण्यापासून ८० कि.मी. अंतरावर भीमाशंकरजवळील संपूर्ण माळीण खेडे ढिगा-याखाली गाडले. शंभरहून अधिक लोकांनी आपले प्राण गमावले. |

### भूमिपाताचे व्यवस्थापन

भूमिपाताचे व्यवस्थापन पुढील दोन प्रकारे करता येणे शक्य आहे-

1. **प्रतिबंधात्मक व नियंत्रणात्मक उपाय** – भूमिपातावर पूर्णपणे नियंत्रण ठेवणे शक्य नाही, परंतु जैविक व अभियांत्रिकी तंत्रज्ञानाने वेळोवेळी त्याची तीव्रता कमी करणे शक्य आहे. यामध्ये पुढील बाबींचा समावेश होतो

- पर्वत, डोंगर, टेकड्यांच्या उतारावर वृक्षारोपन करणे.
- लघुबंधारे बांधून खाचरे अपक्षरण प्रक्रियेवर नियंत्रण ठेवणे
- तीव्र उतारामध्ये बदल करणे.
- पावसाच्या पाण्याचा रेषीय पध्दतीने निचरा करणे, आधार-भिंती बांधणे, भिंतीच्या साह्याने पाणी जमा करणे.
- उघड्या उताराच्या पायथ्याच्या भागांचे स्थिरीकरण करणे, यामध्ये खाणकाम, खडीनिर्मिती, रस्ते बांधणी, कालवे खुदाई यांसारख्या उपक्रमांवर मर्यादा घालणे.
- भूमिपात प्रवण क्षेत्रात पाय-या-पाया-यांच्या शेतीला प्रोत्साहन देणे.

- जलाल १९८५ यांनी परिस्थितीकी विकासाची तीन उपक्रम सुचविले आहेत. यामध्ये वृक्षारोपण, दगडी बांधकाम (उताराला बळकटी देण्याकरिता) आणि कृषीमधील विविधिता यांचा समावेश होतो.

2. **मदत कार्य** – भूमिपातामुळे बळी पडलेल्यांना त्वरित मदत कार्य पुरविणे तितकेच महत्त्वाचे आहे.

- प्रत्येक राज्यात आपत्ती निवारण केंद्रे उभारणे.
- भूमिपात प्रवण क्षेत्रात तात्काळ निवारा व मदत छावणीची उभारणी करणे. यामध्ये जीवनावश्यक औषधे, वाहतूक व संदेशवाहनाच्या सुविधा असाव्यात.
- शाळा-कॉलेजमधून आपत्ती व्यवस्थापनाद्वारे लोकांमध्ये जाणीव जागृती व प्रशिक्षण याविषयी प्रबोधन करणे.
- राष्ट्रीय विषयसूचीवर आपत्ती व्यवस्थापन हे उद्दीष्ट असले पाहिजे.
- आपत्ती व्यवस्थापनात आंतरराष्ट्रीय स्तरावर तांत्रिक मदत व तंत्रज्ञानाची देवाण-घेवाण असली पाहिजे.
- स्वयंसेवी संस्था व विमा कंपन्या यांचा बळी पडलेल्यांच्या मदतीसाठी समावेश असला पाहिजे.

## भूमिपात नियंत्रण

1. **वृक्षारोपण** – वनस्पतींची मुळे जमीन घट्ट धरून ठेवतात. यासाठी डोंगराळ पर्वतीय प्रदेशात मोठ्या प्रमाणात वृक्ष लागवड आवश्यक आहे. हिमालयातील गढवाल प्रदेशातील अलकनंदा नदीच्या खा-यातील चिपको आंदोलन हे याचे उत्तम उदाहरण आहे. सुंदरलाल बहुगुणा व त्यांच्या अनुयायांनी छेडलेले हे आंदोलन जागतिक चळवळ बनली. वृक्षतोडीस आळा बसला. आज धरणीमातेला हिरवळीचे आच्छादन देणे आवश्यक आहे.

2. **डोंगर उताराचे तळाधार भक्कम करणे** – डोंग, पर्वत कड्यांचे तळाधार नष्ट झाल्याने ते खाली कोसळतात. यासाठी तळखडकात कॉंक्रीटच्या भिंती बांधतात. तळपायाखाली जाड वाळू, मध्यम भरड कणीचा गाळ भरतात. त्यामुळे पाझरणा-या पाण्याचा निचरा होतो.

3. **समुद्रकड्याचा भूमिपात टाळण्यासाठी** – लाटा धोपवून धरण्यासाठी टेट्राइट्स व भिंती बांधतात.

4. **रस्ते लोहमार्ग, बोगदे, खुदाई** – यावेळी लावले जाणारे सुरंग, कडे दरडी कोसळणार नाहीत अशा बाजूला घ्यावेत. किंबहुना, खडकांनी संधि, तडे, जोड यांचा अभ्यास करूनच कृती करावी.

5. **डोंगर पर्वतांचे तीव्र उताराचे भाग** – डोंगर पर्वतांचे तीव्र उताराचे भाग खणून तेथे मंद उतार निर्माण केल्यास भूमिपातावर नियंत्रण ठेवता येईल.

6. **खडकातील संधि, तडे, जोड** – खडकातील संधि, तळे, जोड यांचा अभ्यास करून डोंगर व पर्वतांचे कडे कमकुवत किंवा तळाधारहीन झाले असतील तर असे भाग कृत्रिम खुदाई करून टाकल्यास होणा-या हानीची तीव्रता कमी करता येणे शक्य आहे.

## निष्कर्ष :

1) भूमिपात ही आपत्ती नैसर्गिक व मानवनिर्मित कारणामुळे निर्माण होते.

2) भूमिपाताच्या कारणांचा शोध घेऊन योग्य त्या उपाययोजना केल्यास या आपत्तीची तीव्रता कमी करतायेऊ शकते.

3) भूमिपातांचे योग्य व्यवस्थापन केल्यास आपणास पर्यावरणाचे संतुलन राखता येते व त्यातून नैसर्गिक साधन संपत्तीचे संवर्धन साधता येते.

4) भूमिपाताची परिस्थिती लक्षात घेऊन मनवाने त्वरित योग्य ती दखल घेतल्यास जीवित हानी व वित्त हानी टाळता येऊ शकते.

## संदर्भग्रंथ :

1) *भारताचा समग्र भूगोल - सवदी-कोळेकर*
2) *कृषी भूगोल          - डॉ. विजया साळुंके*
3) *पर्यावरणशास्त्र       - डॉ. कुलकर्णी, प्रा. दीक्षित, प्रा. सोंडगे, प्रा. डिसले*
4) *संकेतस्थळावरील माहिती*

# भौगोलिक घटक आणि अपराधी प्रवृत्ती : एक अभ्यास

प्रा. डॉ. दैवशाला शिवाजी नागदे

शहीद भगतसिंग महाविद्यालय किल्लारी

ता. औसा जि. लातूर

**प्रस्तावनाः**

अपराध भूगोल ही एक भूगोलाची नवीन शाखा मानली जाते. भूगोलाच्या या शाखेत भौगोलीक घटकाचा मानवाच्या मानसीकतेवर परिणाम होतो व त्यातून गुन्हेगारी प्रवृती वाढते याचा अभ्यास केला जातो. अपराधाला समाजातील एक व्यंग मानले जाते. तसेच समाजातीचे एक अविभाज्य अंग आहे. प्राचीन काळात भारतीय समाज दोन भागात विभागला जात असे. अपराध, क्रूरता, निर्दयता इत्यादीला समर्थन देणारे यांना दानव तर सदाचार, सध्यता, मानवीयता यांना समर्थन देणारे मानव. एखादया सभ्य समाजात नियम, त्याचे आचरण, मानक यांचे आचरण करणाऱ्यांना मानाचे स्थान असते. परंतू यांचे उल्लंघन करणाऱ्याना अपराधी प्रवृतीचे समजले जाते.

सेल्मॉन्ड जॉन यांनी अपराधाची कायदयाच्या दृष्टीने जी व्याख्या केली त्यात असे म्हटले की "ज्यामुळे समाजावर संकट निर्माण होते व ज्यांनी ते निर्माण केले आहे त्यांना दंड व सजा देवून आपण ते कमी करू शकतो असे नाही तर अपराधी प्रवृत्तीला आळा घालून समाजाचे रक्षण करणे हो"

कौटिल्याच्या मतानुसार "कोणत्याही निष्काळजीपणामुळे झालेली चूक हा अपराध नसतो तर ती करण्यामागे त्याची मानसिकता वाईट (इरादा) असेल तर तो अपराध होऊ शकतो"

अपराध भूगोलाच्या अभ्यासात प्राकृतिक घटकाबरोबरच सांस्कृतिक घटकांना देखील अनन्य साधारण महत्व आहे. कोणत्याही प्रदेशातील प्राकृतिक व सांस्कृतिक घटक त्या प्रदेशातील अपराध व त्याची तीव्रता यांना कारणीभूत असतात. अपराध भूगोलाच्या अभ्यासकांना अपराधाचे व्यवहार व त्याची मानसिकता यांचे विश्लेशण करणे गरजेचे आहे.

अपराध भूगोल ही मानवी भूगोलाची एक नवीन शाखा आहे. या शाखेच्या अध्ययनात मोलाचे योगदान अमेरिकन भूगोल तंज्ञ टी. डेविड अर्बर्ट यांनी 1982 मध्ये त्यांच्या 'Geography of Urben Crime' या पुस्तकात केले आहे. त्याचे मत होते की इतर घटकाबरोबर अपराधावर भौगोलीक घटकाचा परिणाम होतो. प्रस्तुत शोध निबंधात गुन्हेगारी प्रवृतीवर भौगोलिक घटकांचा होणारा परिणाम मांडण्याचा प्रयत्न करण्यात आला आहे.

## शोध कार्याचे महत्वः

प्रत्येक राष्ट्राचे पहिले व महत्वपूर्ण कर्तव्य आहे की आपल्या देशातील नागरीकांना सुरक्षा देणे. भारतासारख्या लोकसंख्येने मोठया असणाऱ्या देशात सुरक्षेचा प्रश्न वारंवार निर्माण होतो. २० व्या शतकापासून अपराधी प्रवृत्तीच्या लोकांची संख्या भारतात दिवसेनदिवस वाढत आहे. बऱ्याच अपराधांना कारणेही नाहीत अशा लोकांचे प्रमाण देखील वाढत चालले आहे. पोलीस प्रशासनाचे काम आहे की कायदा व सुव्यवस्था समृध्द करणे, नागरीकांना सुरक्षा देणे, अपराध थांबविणे, अपराधाचा शोध घेणे व अपराध्यांना सजा देणे. परंतू देशातील बऱ्याच राज्यात हे काम योग्य पध्दतीने केले जात नाही. याला काही सामाजिक, आर्थिक, राजकीय कारणे कारणीभूत आहेत. आपल्या देशात एखादया प्रदेशातील भौगोलीक, सामाजीक घटक समजून घेण्याच्या अगोदरच पोलीसांची बदली होते. प्रत्येक पोलीसांना त्या प्रदेशातील भौगोलिक घटक ओळखीचे पाहिजेत जेणे करून त्या घटकांचा गुन्हेगारी प्रवृतीवर काय परिणाम होतो? कारणे काय आहेत ? हे शोधून काढता येते. जर प्रत्येक जिल्हयात अपराध भूगोलाची संशोधन पत्रिका निघत असेल तर पोलीस प्रशासनाला भौगोलीक घटक व अपराध यांच्याशी काय संबंध आहे ते कळु शकेल. अपराध भूगोलाचे हे महत्व लक्षात घेवून हा विषय संशोधनास निबंधासाठी निवडला आहे.

## संशोधनाची गृहितकेः

प्रस्तूत शोध निबंध जगातील अपराधाचे प्रमाण स्पष्ट करण्यासाठी ४ घटकांचा विचार करण्यात आला आहे.

१. आर्थिक दृष्टीकोणातून मागासक्षेत्र अपराधग्रस्त असतात.

२. ज्या प्रदेशात दरडोई कृषी उपलब्धता कमी आहे.

३. सीमावर्ती भागात अपराधाचे प्रमाण कमी आहे.

४. सामाजिक, आर्थिक, राजकीय घटकाबरोबर भौगोलीक घटकही अपराधास कारणीभूत आहेत.

## विश्लेषणः

वेगवेगळया देशातील भूगोलतंज्ञानी अपराध भूगोलत आपले योगदान देण्याचा प्रयत्न केला आहे व इतर घटकाबरोबर प्राककृतिक घटक गुन्हेगारी प्रवृतीवर परिणाम करू शकतात हे सिद्ध झाले आहे. याची सुरूवात अमेरीकन भूगोल तंज्ञ टी. डेविड अर्बर्ट यांनी केली.

## रूसो भूगोलतंज्ञ प्रिन्स पीटर क्रोपोरकिनः

यांच्या मतानुसार हवामानाचा गुन्हेगारीवर परिणाम होतो. तापमान व आर्द्रता हे घटक हत्यांच प्रमाण वाढवू शकतात. त्यासाठी त्यांनी खालील सुत्र मांडले.

तापमान X ७ + औसत आर्द्रता X २ एका महिण्यात होणारे खुनाची संख्या = महिण्याचे सरासरी तापमान X ७ + सरासरी आर्द्रता X २

वरिल सुत्रात प्रदेशातील लोकसंख्येचा विचार केला नाही परंतू सुत्राच्या आधारे हत्यांचे प्रमाण सरासरी तापमान व आर्द्रता यांचे प्रमाण काढता येते.

## एडविन डेक्सटरः

एडविन डेक्सटर यांनी मानवाच्या व्यवहारावर हवामान व वातावरणाचा प्रभाव होतो यांवर योगदान दिले. त्यांनी सयुक्त राज्य अमेरिकेतील न्युयार्क व डेनवर या शहरातील अपराधास तेथील हवामान कारणीभूत आहे असे सांगीतले. न्युयार्क मधील उच्च तापमान कमी वायुदाब व कमी आर्द्रता यांच्यामुळे मारामारी व हल्ला यांचे प्रमाण वाढले. यांचे रूपांतर संघर्ष याच्यात होवून मूत्युचे प्रमाण वाढले आहे.

अमेरिकन, ब्रिटन, फ्रांन्स व जर्मनी या देशात अपराध भूगोल विषयावर मोठया प्रमाणात संशोधन कार्य झाले आहे. पाश्चिमी भूगोलवेत्याच्या मतानुसार अपराधाचे जेव्हा स्थानीक दृष्टीकोणातून अध्ययन केले जाते तेव्हा मानवीय व्यवहार दुर्लक्षीत केले जातात. परंतू मानवीय व्यवहार अपराधाच्या दृष्टीकोणातून महत्वपूर्ण आहेत.

## मोटेस्क्युः

मोटेस्क्युच्या मतानुसार आपण जसेजसे भूमध्यरेषेच्या जवळ जातो तसेतसे अपराधाची संख्या वाढत असलेली बघायला मिळते. जेव्हा आपण ध्रूवाकडे जातो तिथे दारूडयाच्या संख्येत वाढ होतांना दिसून येते. हवामानाला अनुसरून आपल्या खाण्यापीण्याच्या सवयी बदलल्याने या प्रमाणात वाढझाली आहे परंतु अपराधाचे प्रमाण वाढले आहे.

## हिप्पोकेटसः

यांनी वद Air, Waters and Place या ग्रंथात भौगोलीक घटक मानवी क्रियाशी व विचारांशी कसे संबधीत आहेत असे मत मांडले. ग्रीकांच्या अध्यात्मीक गुणावर व व्यवहारावर हवामानाचा, भूमिस्वरूपाचा व मृदेचा प्रभाव जाणवतो. युरोपखंडातील लोकांच्या आशियातील लोकांवर राज्य करण्याच्या प्रवृत्तीला युरोपचे हवामान कारणीभूत आहे. युरोपचे समशितोष्ण हवामान त्यामुळे तेथील लोक स्वातंत्र्य प्रेमी व साहसी आहेत. उष्ण कटिबंधातील लोक बदला घेणाऱ्या प्रवृत्तीचे आढळतात यातून त्या प्रदेशातील गुन्हेगारीचे प्रमाण वाढले आहे.

## जीन बोदिनः

या तंज्ञाच्या मते अक्षांश, प्रदेशाची उंची, हवामान, भौगोलीक घटकांचा मानवाच्या सांस्कृतिक विकासावर परिणाम होतो. उत्तरेकडील शीत व समशितोष्ण प्रदेशातील लोक साहसी पण निर्दयी असतात तर दक्षिणेकडील उष्ण व उपोष्ण हवामानाच्या प्रदेशातील लोक चतूर, बुध्दामान व बदला घेणारे असतात. त्यामुळे कोणत्याही गोष्टीच्या पूर्णतेसाठी ते कोणत्याही गोष्टीची पर्वा न करता अपराधाला सुरूवात होते. या प्रदेशात अतिउंच्च हवामानाचा मानवीय व्यवहारावर प्रतिकुल परिणाम झालेला दिसून येतो.

## कु. ए. सी. सेम्पलः

या अमेरिकन विदुषीने भौगोलीक घटक मानवी क्रिया, आचार-विचार इत्यादीवर परिणाम करतात असे सांगीतले. भौगोलीक पर्यावणाचा प्रभाव मानवावर चार प्रकारे होतो असे त्यांचे मत होते.

१. साधे भौतिक प्रभाव– यात हवामान बदलाचा व भूपृष्ठाच्या उंचीचा शरीरावर परिणाम होतो. उदा. काळा, गोरो, रंग इत्यादी.
२. मानसिक प्रभाव – निसर्गाच्या प्रभावाने विचारात भिन्नता येते.
३. आर्थिक व सामाजिक प्रभाव– व्यवसाय भिन्नता ही पर्यावरणाच्या अनुकुलतेवर व प्रतिकुलतेवर अवलंबून असते.
४. मानवी गती– पर्यावरण व आर्थिक साधनात गती मिळते. उदा. वस्ती व स्थलांतर

वरिल तज्ञाशिवाय ऑरिस्टॉटल, स्ट्रॅबो, हंबोल्ट कार्लरिटर, फेडरिक रॅटझेल यांनीही भौगोलीक घटकांचा मानवीय व्यवहारावर परिणाम होतो असे मत व्यक्त केले. ज्या प्रदेशात शीत हवामान असते त्या भागातशुकशुकाट असतो.त्यामुळे दरोडयाचे प्रमाण वाढते. भारतात उत्तरप्रदेश, मध्यप्रदेश, दिल्ली या भागात धूक्याचे प्रमाण वाढल्याने त्या भागात शुकशुकाट जास्त असतो. अशा प्रदेशात गुन्हेगारी प्रवृती वाढण्यास अनुकुल वातावरण असते.

एखादया व्यक्तीच्या जर इच्छा जर पूर्ण होत नसतील तर त्या पूर्ण करण्यासाठी गैर मार्गाचा अवलंब करून विद्रोह करून अपराधाचे प्रमाण वाढते. पश्चिमी राष्ट्रात अपराधाचे प्रमाण वाढल्याचे कारण त्यांची मानसिकता आहे. आर्थिक उपेक्षा, सामाजिक उपेक्षा, बदला घेण्याची भावना, पोलीस प्रशासनाचा बदलता आक्रोश यामुळे अपराधाचे प्रमाण दिवसेनदिवस वाढत आहे. भारतात अपराध भूगोल या भूगोलाच्या शाखेचे संशोधनाचे कार्य खूपच कमी प्रमाणात होत आहे. अपराधाचे प्रमाण कमी करण्यासाठी प्रशासकीय व शैक्षणिक पातळीवर अपराध भूगोल या शाखेचे संशोधन कार्य मोठया प्रमाणात होणे गरजेचे आहे. अपराध भूगोलावर केलेले संशोधन निश्चितच अपराधाचे प्रमाण नियंत्रणात ठेवण्याचे कार्य करेल.

## सारांशः

अपराधी एक सामान्य व्यक्ती असतो. व्यक्ती अपराधी का बनतो? याची कारणे शोधून अपराध्याला दंड देण्याचे कार्य पोलीसप्रशासन व कायदयाचे आहे. त्यासाठी न्यायपालीका क्रियाशील असावी लागते. अपराधी प्रवृत्तीला आळा घालण्याचे कार्य

पोलीसप्रशासपन, कायदा, सामाजिक संस्था व भूगोलतंज्ञाकडून होणे गरजेचे आहे. शैक्षणिक स्तर, रोजगार निर्मिती, औदयोगीकीकरण यांच्यात वाढझाल्यास अपराधी प्रवृत्ती कमी होऊ शकते. अपराध्याला दंड, सजा देतांना त्याची मानसिक स्थिती जाणून घेणे गरजेचे असते. प्रत्येक व्यक्तीला रोजगार उपलब्ध होईल अशापध्दतीने समाज रचना तयार करण्याची गरज दिसून येते. भारतातील छत्तीसगड, गडचिरोली, भंडारा, यटापल्ली, नागपूर इत्यादी प्रदेशात अपराधाचे प्रमाण वाढले आहेत कारण त्यांच्याकडे आपली उपजीवीका भागवण्यासाठी रोजगार नाही. त्यासाठी प्रतिकुल हवामान प्रदेशात अनुकुलता उपलब्ध करून देणे गरजेचे आहे.

संदर्भः

1. *अपराधोके भौगोलीक आयाम– डॉ. एस. पी. शाक्यpp.49,03*
2- *Bernaldo Q- modern Theoriest of criminology Bosten -1991*
3- *Brantighan P. J. – Environmental Criminology- Wavelan 1991*
4. *भौगालीक विचारधारा– डॉ. वेळापूरकर, कनकुरे, राठोड, उगावे*
5- *Kropoticin pp.- Modern Theries of Criminility- Boston 1911 P. 34*

# पर्यावरण विषयक समस्या आणि व्यवस्थापन

**प्रा. श्रीमती हिरा बलभीम नाडे**

भूगोल विभाग,

यशवंतराव चव्हाण महाविद्यालय, अंबाजोगाई,

ता. अंबाजोगाई, जि.बीड

**प्रस्तावना :**

मागील कांही वर्षातील लोकसंख्या वाढीमूळे अन्न, पाणी, घरे, विद्यूत इत्यादी अनेक साधनांमध्ये आपोआपच वाढ झाली आणि यातूनच पर्यावरणीय समस्यांचा उगम झाला. वायु, जल, भूमी, कचरा यासारख्या प्रदुषणारनीं अवघी पृथ्वी भस्मासुरासारखी, गिळंकृत केली. मानवाच्या हव्यासापोटी पृथ्वीचे आतोनात शोषण होत गेले, तिच्या संवर्धन आणि संगोपनाकडे अवघ्या जगाचेच दूर्लक्ष झाले. त्यामूळे मानवाचा स्वतःचा अंत आता जवळ असून त्याचे कायमचे अस्तित्व संपण्याच्या मार्गावर आहे. यासंदर्भात विचार करण्यासाठी संयुक्त राष्ट्र संघाने १९८७ साली जागतिक पर्यावरण व विकास आयोगाची स्थापना केली या आयोगाने प्रकाशित केलेल्या our common future या अहवालात शाश्वत आणि धारणक्षम विकासाची संकल्पना जगापूढे मांडली अशा प्रकारचा विकास साध्य करण्यासाठी पृथ्वीवरील सामाजिक आणि पर्यावरणीय गंभीर समस्यांचे परीक्षण करणे, त्यांचे निराकरण करण्यासाठी व्यावहारिक उपाययोजना सुचविणे, यासर्व बाबींचा जाणीवपूर्वक विचार करणे आवश्यक आहे. तसेच १९७१ साली पर्यावरण विषयक पहिली जागतिक परिषद स्वीडन मधील स्टॉकहोम या शहरात घेण्यात आली यामध्ये वेगवेगळे पर्यावरणीय प्रश्न, समस्या व प्रदुषणावर चर्चा करण्यात आली.

**उद्दिष्टे :**

१. शाश्वत पर्यावरणीय समस्या जाणून घेणे.

२. पर्यावरणीय समस्यांची तीव्रता मानव समाजास करून देणे.

३. शाश्वत पर्यावरणीय समस्यांवर उपाययोजना सूचविणे.

**संशोधन पध्दती :**

प्रस्तुत शोध निबंधाचा अभ्यास करण्यासाठी दुय्यम स्त्रोतांचा आधार घेण्यात आला आहे. त्यात संदर्भ ग्रंथ, वर्तमानपत्रे, मासिक इ. चा आवश्यकतेनूसार वापर केलेला आहे.

**पर्यावरणीय समस्यांचा थोडक्यात आढावा :**

१. आज दिवसेंदिवस वातावरण व पर्यावरण बिघडत चालले असून याबद्दलची चिंता वाढत चाचली आहे. मानव आपले अस्तित्व त्याच्या स्वतःच्या हातानेच संपुष्टात आणत आहे. कारण पृथ्वीच्या क्षमतेपेक्षा अधिक वापर हा प्राण्यापेक्षा अधिक मानवच करत आहे.

२. आतापर्यंत जगभरामध्ये एकही कृत्य मानवाने पृथ्वीच्या संरक्षणाच्या दृष्टिने केलेले पहावयास मिळत नाही. त्यामूळेच त्सुनामी पूर, दुष्काळ, वादळे, भूकंप यासारख्या पर्यावरणीय आपत्तीना/समस्यांना मानवास तोंड द्यावे लागत आहे.

३. सर्व प्राणी मात्रांना व मानवास पृथ्वीवरील सर्वच गोष्टींचा उपयोग आणि उपभोग घेण्याची आवश्यकता आहे. कारण पृथ्वीवरील विविध घटकांशिवाय प्राणी व मानव यांना पर्यायच नाही परंतु मानव त्याच्या उपभोगापेक्षा अधिक वापर पृथ्वीचा करत असल्याने तो स्वतःच प्रदुषणाच्या विळख्यात अडकला आहे.

४. कृषी उत्पादकता दिवसेंदिवस कमी होत आहे ती जवळपास ३०% प्रमाणे कमी होताना आढळते भारतातील सद्यःस्थितीत शेतीतील मृदेमध्ये सुपीकतेचे प्रमाण कमी, जलसिंचनाचा अभाव, उत्कृष्ट व अत्याधुनिक साधनांचा अभाव, विद्यूत पूरवठा कमी शेतीविषयक शासनाचे उदासिन धोरण, तसेच रासायनिक खतांचा अतिरिक्त व अवाजवी वापर यासर्वांचा परिणाम पीक उत्पादकता व मृदा यावर होतो.

५. भारताला लाभलेल्या सागरी किनाऱ्यावर मोठ्या प्रमाणात पेट्रोलियमचे खनन केल्यामूळे तेथील नैसर्गिक वातावरणात व पाण्यात याचे प्रमाण वाहून अनेक रोग त्या भागातील जनतेस होत आहेत. तसेच सागरी किनारे पर्यटन स्थळ म्हणून विकसित होण्याऐवजी मासेमारी व्यवसायामूळे दुषित झाले आहेत.

६. जसजसे नागरीकरण वाढले तसे धातूंचे जमिनीतील प्रमाण वाहून मृदा दुषित झाली. यामूळे याठिकाणी पिकविल्या जाणाऱ्या पिकांमधून, भाज्यांमधून ते मानवाच्या सेवनात जातात व यामूळे मानवास अनेक रोग होऊन त्याचे आरोग्य धोक्यात आले आहे. उदा. पंजाबमध्ये अति फवारणीमूळे तेथे कॅन्सरचे प्रमाण वाढले व तेथे एक रेल्वे 'कॅन्सरट्रेन' या नावाने सुध्दा ओळखली जाते.

७. वाढत्या लोकसंख्येची समस्या लक्षात घेवून माल्थसने असा सिध्दांत मांडला की, साधन संपत्ती जर टिकवायची असेल तर लोकसंख्या कमी करावी लागेल. अन्यथा निसर्ग आपल्या मार्गाने ती कमी करेल. म्हणजेच अनेक आपत्ती निर्माण होवून आपोआपच लोकसंख्या आटोक्यात येईल.

**महात्मा गांधीनी सुध्दा याबद्दल आपले विचार व्यक्त केले आहेत :**

"God forbid that India should ever take to industrialism after the manner of the west.... keeping the world in chains. If [our nation] took to similar economic exploitation it would strip the world bare like locusts"

**पर्यावरणीय समस्यांवरील उपाययोजना किंवा समस्यांचे व्यवस्थापन :**

१. वृक्ष लागवड करून त्याचे संगोपन व संवर्धन करणे. ज्यामूळे दुष्काळ, पूर व वातावरण चांगले राहण्यास मदत होईल.

२. पूर येणाऱ्या नद्यांचे पाणी इतर नद्यांमध्ये किंवा कालव्याद्वारे दुष्काळग्रस्त भागामध्ये पोहचविणे.

३. वृक्षतोडीवर कायद्याने प्रतिबंध घालणे.

४. सामाजिक वनीकरण क्षेत्रामध्ये वाढ करणे.

५. नागरिकरणास आळा बसविणे.

६. लोकसंख्या वाढीवर कायद्याने बंदी आणणे.

७. सौरऊर्जेचा वापर जास्तीत जास्त वाढविणे.

८. वाहनांची संख्या कमी करणे.

९. धरणे व कालवे बांधणे.

१०. शहरातील घाणीचे व कचऱ्याचे व्यवस्थित व्यवस्थापन व विल्हेवाट लावणे इत्यादी अनेक उपाययोजना राबविल्या तर मानवी आरोग्य व पर्यावरणाचे आरोग्य सुध्दा निरोगी राहील अन्यथा राहणार नाही.

**सारांश :**

आजच्या विज्ञानयुगात एवढेच सांगावे वाटते की, प्रत्येक व्यक्तिने निसर्गाचा कमीत कमी वापर करणे, वृक्षतोड न करणे व लोकसंख्येवर अकुंश घालणे गरजेचे आहे. जाणिव व जागृती मनामध्ये ठेवूनच पृथ्वीच्या घटकांचा वापर करावा लागेल अन्यथा पृथ्वीसह मानव आपले अस्तित्व नष्ट करील.

**संदर्भ :**

१. पर्यावरण भूगोल - डॉ. प्रदिपकुमार.

२. २१ वी शताब्दी की पर्यावरणीय समस्याएँ मिनाक्षी सिंह.

३. Internet विकिपिडिया मुक्त ज्ञानकोश से.

४. पर्यावरण एवं पर्यावरणीय संरक्षण - आलोककुमार बंसल.

# नैसर्गिक अपत्ती : एक गंभीर समस्या

**प्रा. डॉ. संदेश ना. उबाळे,**

संभाजी महाविद्यालय, मुरुड

**प्रस्तावना:**

नैसर्गिक आपत्ती हा निसर्ग धोक्याचा एक प्रकार असतो. उदा. पूर झंझावत, चक्रीवादळे, भूकंप, ज्वालामुखी, उष्णतेची लाट इ. यामुळे आर्थिक , पर्यावरणात्मक जीवीत हानी होऊ शकते. ही हानी प्रभावीत लोकसंख्येच्या हानीप्रवणतेवर हानी आवलंबुन असते. धोका जेव्हा हानीप्रवणतेस भेटतो तेंव्हा अपत्ती येत असते. म्हणून जी क्षेत्र हानीप्रवण नसतात तेथे नैसर्गिक धोकाही नैसर्गिक हानी आणू शकत नाही. उदा - निर्जन भागात घडून आलेला तिव्र भूकंप ही अपतती आनु शकत नाही यात नैसर्गिक शब्दाबद्दल वाद आहेत. कारण मणुष्य त्यात समाविष्ट असल्याखेरीज एखादी घटना धोका किंवा अपत्ती ठरत नाही. पूर्वीच्याकाळी निर्माण होणारी संकटे ही बहुतांश नैसर्गिक असत मानवाची जस जशी प्रगती होत गेली तसतशी मानव निर्मित संकटात वाढ होत गेली. स्वत:ची प्रगती करुण घेण्यासाठी मानवाने नैसर्गिक व्यवस्थेमध्ये ढवळाढवळ केली. नैसर्गिक अपत्ती हा त्याचाच परिणाम होय.

**उद्दिष्टये:**

१) नैसर्गिक अपत्तीच्या कारणांचा व परिणामांचा अभ्यास करणे.

२) नैसर्गिक अपत्ती संदर्भात उपायांचा शोध घेणे.

३) नैसर्गिक अपत्तीच्या वेळी प्रथमोपचारचा अभ्यास करणे

**अभ्यासपध्दती:**

सदरील शोध निबंधासाठी दुय्यम अभ्यास साधनांचा उपयोग करण्यात आलेला आहे. अभ्यास घटकाशी संबंधीत संदर्भ ग्रंथ, पुस्तके, मासिके, वर्तमानपत्रे, संशोधन अहवाल, शोध निबंध आणि इंटरनेट वरील संकेत स्थळांचा आधार घेतला आहे.

**नैसर्गिक अपत्ती व्याख्या:**

"सजीव सृष्टीवर आचानक आलेले संकट किंवा अरिष्ट, अपघात किंवा दु:खद घटना महापूर, भूकंप ज्वालामूखी उद्रेक, आग, वादळ, विज कोसळणे, रोगराई, अवर्षण इ. म्हणजे नैसर्गिक अपत्ती होय.''

"नैसर्गिक अपत्ती ही पर्यावारणीय विनाशकारी घटना आहे.''

" नैसर्गिक अपत्ती नैसर्गिक धोक्याचा एक प्रभाव असतो यामुळे आर्थिक पर्यावरणात्मक अथवा जीवीत हानी होऊ शकते.''

**विषय विवेचन:**

मानव निर्मित आणि निसर्ग निर्मित असे अपत्तीचे दोन प्रकार आहेत. विशेषत: हवानातील बदलामुळे नैसर्गिक अपत्ती अचानकपणे उदभवते. त्यामुळे अशा नैसर्गिक अपत्तीस जीवीत व वित्त हानी नाकारता येत नाही. आपण दैनंदिन व्यवहारात बघतो जर एखाद्या वाहनाला फार मोठा अपघात झाला किं एखादी व्यक्ती अपघाताता जखमी झाली तर तीच्या उपचारासाठी तीचे प्राण वाचवण्यासाठी समाजातील अनेक लोक धावपळ करतात. एकंदरीत मानवी संवेदनामुळे ही कृती घडून येते. तसेच या प्रशासनाकडून देखील योग्य दखल घेतली जाते.

जीवनाची जीवन पध्दत बदलणारी अपत्ती नैसर्गिक किंवा मानवी स्वरुपाची असु शकते. अपत्ती म्हणजे अशी घटना की ज्यामुळे अगदी अकस्मितपणे प्रचंड जीवीत हानी व अन्य प्रकारची हानी होते.

**नैसर्गिक अपत्तीची कारणे:**

१) पृथ्वीचे अमर्याद उत्खनन आणि विधन विहरी (ज्यामुळे भूकंप घडून येतात.)

२) अतिरिक्त वातावरणीय प्रदुषण

(हेच पावसाळयात अनियमित आणि अतिरीक्त पाऊस पडण्याचे आणि अतिरिक्त उष्णता निर्मितीचे कारण आहे.)

३) मानवाने मोठया प्रमाणात वृक्ष तोड केली आहे. त्याचेच परिणाम तापमानात वाढ झाली आहे. पर्जन्यात घट झाली. ओझोन थराचा ऱ्हास होऊ लागला.

४) अणुस्फोटाचे वाढते प्रमाण: अणुस्फोटाचे प्रमाण दिवसें दिवस वाढत चालले आहे. अणुस्फोटाच्या वेळी अतिशय घातक स्वरुपांचे द्रव्य किरणोत्सर्गी द्रव्य वातावरणात मिसळले जातात. तयामुळे ओझोनचा क्षय होतो.

५) औद्योगिकरण :आज औद्योगिकरणाचे प्रचंड प्रमाण वाढले आहे. त्यामुळे कार्बणकण, कार्बन मोनोऑक्साईड हे वायु वातावरणात सोडले जात आहेत.

**दखलपात्र नैसर्गिक अपत्ती**

**अ. भूकंप**

| अ.क्र. | वर्ष | ठिकाण | तीव्रता | मृत्यूंची संख्या |
|--------|------|--------|---------|------------------|
| १ | २००४ | हिन्दी महासागर | ९.३ | २,२९,००० |
| २ | २००५ | काश्मिर | ७.७ | ७९,००० |
| ३ | २००६ | जावा | ७.९ | |
| ४ | २००८ | चीन | ७.९ | ६१,५०० |
| ५ | २०१० | चिली | ८.८ | ५२५ |
| ६ | २०११ | टोहकू | ९.३ | १३,००० |

## ब. पूर (सर्वात दखल पात्र)

| अ.क्र. | वर्ष | ठिकाण | मृत्यूंची संख्या |
|--------|------|-------|------------------|
| १ | १९३१ | हूआंग (पित नदी) | ८,००,००० ते ४०,००,००० |
| २ | १९९३ | अमेरिका | --- |
| ३ | १९९८ | चीन (यांगत्से) | १.४ कोटी बेघर |
| ४ | २००० | मोझांबिक | १०९४ |

## क. अवर्षण

| अ.क्र. | वर्ष | ठिकाण | मृत्यूंची संख्या |
|--------|------|-------|------------------|
| १ | १९०० | भारत | २.५ कोटी ते ३.० कोटी |
| २ | १९२१ - १९२२ | सोव्हीएट युनियन | ५० लाख |
| ३ | १९२८ ते १९३० | वायव्य चीन | ३० लाख |
| ४ | १९३६ | चीन | ५० लाख |
| ५ | १९४१ | चीन | २५ लाख |
| ६ | २००६ | चीन | ८० लाख |

## नैसर्गिक अपत्तीच्या वेळी प्रथमोपचार व तज्ञांचे कार्य

नैसर्गिक अपत्तीच्या वेळी जीवीत हानी टाळण्यासाठी प्रथमोचपार करणे अत्यंत गरजेचे आहे.

१)  घातक पदार्थापासून पेशंटचे रक्षण करणे.

२)  रुग्ण जीवीत आहे की मृत , बेशुध्द आहे की शुध्दीवर हे तात्काळ ओळखणे.

३)  सर्व प्रथम रुग्णाच्या श्वासनलिकेचा भाग मोकळा करणे.

४)  घटनास्थळी असलेल्या सामुग्रीचा जास्तीत जास्त चांगला वापर करावा.

५)  रुग्णांना घटना स्थळावरुण त्वरित हलविण्याची व प्रत्यक्ष वैद्यकीय सुविधा उपलब्ध करुण देण्याची व्यवस्था करावी.

## निष्कर्ष:

१)  नैसर्गिक अपत्तीचया वेळी पुरेशी खबरदारी घेतली असता होणारे जीवीत व आर्थिक नुकसान कमी करता येते.

२)  नैसर्गिक अपत्ती वेळी प्रथमोपचार व्यवस्थीत झाले तर जीवीत हानी कमी करता येते.

३)  नैसर्गिक अपत्ती संदर्भात जन जागृती करणे गरजेचे आहे.

४)  अवर्षण, पुर या सारख्या अपत्तींना आळा घालण्यासाठी मोठया प्रमाणात वृक्ष लागवड करुण तीचे संवर्धन करणे गरजेचे आहे.

## संदर्भ:

१)  *अपत्ती व्यवस्थापन, प्रा.प्र. मराठे, प्रा.व्ही.जे. गोडबोले, डायमंड पब्लीकेशन, पूणे.*

२)  *प्राकृतिक आपदा एवंम प्रबंधन, रमेश गुलाटी, पूजा पब्लीकेशन, कानपूर.*

३)  *नैसर्गिक अपत्ती आणि व्यवस्थापन, डॉ. आर.जी. पाटील, ओमसाई इंटरप्रायजेस, प्रथम आवृत्ती २०१०.*

# जालना जिल्ह्यातील ग्रामीण वस्तीच्या प्रकारांचा भौगोलिक अभ्यास

**डॉ. देविदास सदाशिव केंद्रे**

भूगोल विभागप्रमुख
उज्वल ग्रामीण महाविद्यालय,
घोणसी ता.जळकोट जि.लातूर

**प्रस्तावना:**

ग्रामीण वस्त्यांचे प्रकार आणि प्रारूपे यांच्यामध्ये मूलभूत फरक आहे. ग्रामीण वस्तीचे प्रकार घरांच्या अंतरावरून आणि घरांच्या संख्येवरून निश्चित केलेले असतात. वस्तीच्या प्रकारावर भौगोलिक, सांस्कृतिक, धार्मिक, आर्थिक आणि ऐतिहासिक घटकांचा प्रत्यक्ष-अप्रत्यक्ष परिणाम होत असतो.

अरूसो (१९२०) यांच्या मते, ग्रामीण वस्तीच्या विविध प्रकारांची निर्मिती घरांचे गट आणि त्यांचे आंतरसंबंध यातून झाली आहे. ग्रामीण वस्तीच्या रचनेतूनच त्या वस्तीचे स्वतंत्र भौगोलिक अस्तित्व प्रकट झालेले दिसून येते. ग्रामीण वस्तीच्या सर्व प्रकाराला नियंत्रित करणारे भौगोलिक घटक महत्त्वपूर्ण आहेत. नदीच्या खोऱ्यामध्ये सधन वस्तीचे प्रमाण जास्त असते. पर्वतीय प्रदेशात साधनसंपत्तीचे वितरण असमान असल्यामुळे विखुरीत ग्रामीण वस्ती आढळतात. फिंच आणि त्रिवार्था यांच्या मते, १) एकाकी किंवा विखुरीत ग्रामीण वस्ती २) केंद्रीत ग्रामीण वस्ती असे ग्रामीण वस्तीचे प्रकार आहेत. हडसन (१९७६) केंद्रीत ग्रामीण वस्ती आणि विखुरीत ग्रामीण वस्ती असे दोन प्रमुख प्रकार ग्रामीण वस्तीचे आहेत.

**उद्दिष्ट्ये:**

प्रस्तुत शोधनिबंधात जालना जिल्ह्यातील ग्रामीण वस्त्यांच्या प्रकारांचा अभ्यास करण्याचा प्रयत्न केला आहे.

१) जालना जिल्ह्यातील ग्रामीण वस्त्यांच्या प्रकारांचा अभ्यास करणे.

२) जालना जिल्ह्यातील ग्रामीण वस्त्याच्या प्रकारावर परिणाम करणाऱ्या भौगोलिक व सांस्कृतिक घटकांचा अभ्यास करणे.

ही प्रमुख उद्दिष्ट्ये समोर ठेवून हा शोधनिबंध तयार केला आहे.

**अभ्यास क्षेत्र:**

प्रस्तुत शोधनिबंधासाठी मराठवाडा विभागातील जालना हा जिल्हा निवडलेला आहे. भौगोलिकदृष्ट्या जालना जिल्हा महाराष्ट्र राज्याच्या मध्यभागी येतो. जालना जिल्ह्याच्या क्षेत्राचा विस्तार १९°१। उत्तर ते २०°३।। उत्तर अक्षवृत्त आणि ७५°४। पूर्व ते ७६°४।। पूर्व रेखावृत्ताच्या दरम्यान झालेला आहे. सन २०११ च्या जनगणनेनुसार जिल्ह्याचे एकूण क्षेत्रफळ ७७१८ चौ.कि.मी. असून ते महाराष्ट्र राज्याच्या क्षेत्रफळाच्या तुलनेत २.५१ टक्के आहे. आणि लोकसंख्या १९.५९ लक्ष एवढी आहे. एकूण लोकसंख्येपैकी १५.८१ लक्ष म्हणजे ८०.७३ टक्के लोकसंख्या ग्रामीण आहे व उर्वरित ३.७७ लक्ष लोकसंख्या नागरी भागात आहे. जालना जिल्ह्यात एकूण (०८) आठ तालुके आणि ९७१ गावे आहेत. त्यापैकी ९६३ गावे वस्ती असलेली व ८ गावे ओसाड आहेत.

**माहिती संकलन व अभ्यास पद्धती:**

प्रस्तुत शोधनिबंधासाठी दुय्यम स्वरूपाची आकडेवारी वापरली आहे. ती जालना जिल्हा सामाजिक व आर्थिक समालोचन आणि जनगणना पुस्तिका (२०११) मधून घेतलेली आहे. वस्तीच्या प्रकाराचा अभ्यास करण्यासाठी आर.बी. मंडल यांच्या सूत्राचा वापर केला आहे. (आर.बी. मंडल, १९७७)

$$DI = \frac{Rpi \times vi}{Ai^2}$$

DI= विखुरण सूची

Rpi= तालुक्यातील एकूण ग्रामीण लोकसंख्या

Vi= तालुक्यातील एकूण ग्रामीण वस्ती

Ai= तालुक्यातील एकूण क्षेत्रफळ

**ग्रामीण वस्तीचे प्रकार:**

जालना जिल्ह्यातील एकूण ग्रामीण वस्ती, एकूण क्षेत्रफळ आणि एकूण ग्रामीण लोकसंख्या यांच्या आंतरसंबंधावरुन ग्रामीण वस्तीच्या प्रकाराची निश्चिती केली आहे. ते खालीलप्रमाणे आहेत.

१) केंद्रीत ग्रामीण वस्ती

२) संमिश्र वस्ती

३) विखुरलेली वस्ती

४) एकाकी वस्ती

विखुरण सूचीचे मूल्य प्राप्त झालेल्या मूल्याच्या आधारे ग्रामीण वस्तीचे प्रमुख प्रकार, त्याचे क्षेत्रफळ आणि टक्केवारी, ग्रामीण वस्तीची लोकसंख्या आणि त्यांची टक्केवारी, सरासरी लोकसंख्या यांचे विवरण सारणी क्रमांक १ मध्ये दर्शविले आहे.

१) **केंद्रीत ग्रामीण वस्ती:**

या वस्तीत घरे जवळजवळ व संख्येने जास्त असतात. या वस्तीस दाट वस्ती (Compact Settlement), केंद्रीत वस्ती (Concentrated settlement), एकत्रित वस्ती (Agglomerated Settlement) असेही म्हणतात.

विखुरण सुचीचे मूल्य २७.७ पेक्षा जास्त असलेल्या तालुक्यांमधील ग्रामीण वस्ती केंद्रित प्रकारच्या गटामध्ये समाविष्ट केल्या आहेत. अभ्यासक्षेत्रात केंद्रित प्रकारच्या ग्रामीण वस्ती भोकरदन तालुक्यात आढळून येतात. या प्रकारच्या ग्रामीण वस्तीने एकूण क्षेत्रफळाच्या १५.७८ टक्के क्षेत्र व्यापलेले असून या क्षेत्रामध्ये एकूण ग्रामीण वस्तीपैकी १६.६१ टक्के ग्रामीण वस्ती आढळतात. या प्रकारच्या ग्रामीण वस्तीमध्ये सरासरी लोकसंख्या १४९५ एवढी आहे.

**सारणी क्र. १: जालना जिल्हाः वस्तीचे प्रकार, व्याप्त क्षेत्र, ग्रामीण वस्तीची संख्या आणि सरासरी लोकसंख्या**

| अ. क्र. | विखुरण सूचीचे मूल्य | वस्तीचे प्रकार | क्षेत्रफळ चौ.कि.मी. | व्याप्त क्षेत्राची टक्केवारी | ग्रामीण वस्तीची संख्या | ग्रामीण वस्तीची टक्केवारी | सरासरी लोकसंख्या |
|---|---|---|---|---|---|---|---|
| १ | २७.७ पेक्षा जास्त | केंद्रित | १२०३ | १५.७८ | १६० | १६.६१ | १४९५ |
| २ | २२.० ते २७.७ | संमिश्र | २६५४ | ३४.८१ | ३६२ | ३७.६० | १२८१ |
| ३ | १६.३० ते २२.०० | विखुरलेली | २६४८ | ३४.७० | ३२४ | ३३.६५ | १४७८ |
| ४ | १६.३० पेक्षा कमी | एकाकी ग्रामीण वस्ती | ११२२ | १४.७१ | ११७ | १२.१४ | १४७९ |

*स्रोत : संशोधकाने संकलित केलेल्या अधिकृत माहितीवर आधारित*

**२) संमिश्र वस्ती:**

संमिश्र वस्ती ही केंद्रित वस्ती व विखुरलेली वस्ती यांच्यामधील टप्पा असतो. बऱ्याच वेळा एखाद्या ठिकाणी केंद्रित वस्ती निर्माण होऊन जेव्हा त्या केंद्रित वस्तीची लोकसंख्या वाढू लागते तेव्हा त्या मुख्य वस्तीच्या भोवती नवीन लहान आकाराच्या (वाड्या) अस्तित्वात येतात. त्या वस्तीस संमिश्र वस्ती असे म्हणतात. मुख्य ग्रामीण वस्ती आणि वस्तीच्या आसपास क्षेत्रावरच्या वाड्या मिळून संमिश्र वस्ती निर्माण झालेल्या दिसून येतात.

विखुरण सूचीचे मूल्य २२.०० ते २७.७० या दरम्यान असलेल्या तालुक्यातील ग्रामीण वस्ती संमिश्र प्रकारच्या तालुक्यातील ग्रामीण वस्ती संमिश्र प्रकारच्या गटामध्ये समाविष्ट केल्या आहेत. अभ्यासक्षेत्रामध्ये संमिश्र प्रकारच्या ग्रामीण वस्त्या जालना, जाफ्राबाद व मंठा या तालुक्यात जास्त प्रमाणात आढळून येतात. या प्रकारच्या ग्रामीण वस्तीने एकूण क्षेत्रफळाच्या सर्वात जास्त क्षेत्र व्यापले असून या क्षेत्राची टक्केवारी ३४.८१ एवढी आहे. या क्षेत्रामध्ये एकूण ग्रामीण वस्तींपैकी सर्वात जास्त ग्रामीण वस्तीची टक्केवारी ३७.६० एवढी आहे. या प्रकारच्या ग्रामीण वस्तीत लोकसंख्येची सरासरी १२८१ एवढी आहे.

**३) विखुरलेली ग्रामीण वस्ती:**

विखुरलेल्या वस्तीत घरे दूरदूर आणि संख्येने कमी असतात. एकाकी घरे हे या वस्तीचे महत्त्वाचे वैशिष्ट्य असते. जालना जिल्ह्यातील ज्या तालुक्याचे विखुरण सुचीचे मूल्य ११.३ ते २२.०६ या दरम्यान आलेले आहे. अशा तालुक्यातील ग्रामीण वस्ती विखुरीत प्रकारच्या गटामध्ये समाविष्ट केल्या आहेत. अभ्यासक्षेत्रात बहुतांश विखुरीत प्रकारच्या ग्रामीण वस्त्या परतूर, अंबड आणि बदनापूर तालुक्यात मोठ्या प्रमाणात आढळतात. या प्रकारच्या ग्रामीण वस्तीने एकूण क्षेत्रफळाच्या ३४.७० टक्के क्षेत्र व्यापले असून या क्षेत्रामध्ये एकूण ग्रामीण वस्तीपैकी ३३.६५ टक्के एवढ्या ग्रामीण वस्ती आढळतात. या प्रकारच्या वस्तीमध्ये सरासरी लोकसंख्या १४७८ एवढी आहे.

**४) एकाकी ग्रामीण वस्ती:**

या वस्तीत घरे जवळ जवळ असतात. अशा वस्तीतील काही घरांचा समूह दुसऱ्या घरांच्या समूहापासून काही अंतरावर असतो. पण ही सर्व घरे मिळून एकाच सामूहिक वस्ती असते. विखुरण सूचीचे मूल्य १६.३ पेक्षा कमी असलेल्या तालुक्यातील ग्रामीण वस्ती अपखंडित प्रकारच्या गटामध्ये समाविष्ट केल्या आहेत. अभ्यासक्षेत्रामध्ये अपखंडित प्रकारच्या ग्रामीण वस्ती घनसावंगी तालुक्यात काही प्रमाणात आढळतात. या प्रकारच्या ग्रामीण वस्तीने एकूण क्षेत्रफळाच्या सर्वात कमी १४.७१% क्षेत्र व्यापले आहे. या क्षेत्रामध्ये एकूण ग्रामीण वस्तीपैकी सर्वात कमी १२.१४% ग्रामीण वस्ती आढळतात. या प्रकारच्या ग्रामीण वस्तीमध्ये सरासरी लोकसंख्या १४७९ एवढी अहो. या क्षेत्रामध्ये शेती क्षेत्राजवळ अपखंडित प्रकारच्या ग्रामीण वस्ती आढळतात.

**निष्कर्ष:**

जालना जिल्ह्यातील ग्रामीण वस्तीच्या प्रकारांचा अभ्यास करण्यासाठी विखुरण सूचीच्या सूत्राचा उपयोग केला आहे. जालना जिल्ह्यात संमिश्र प्रकारच्या ग्रामीण वस्त्यांचे प्रमाण जास्त आहे. मुख्य ग्रामीण वस्ती आणि वस्तीच्या आसपास शेतावरच्या वाड्या मिळून संमिश्र वस्त्या निर्माण झालेल्या दिसून येतात. या प्रकारच्या वस्त्या जालना, जाफ्राबाद व मंठा तालुक्यात आढळून येतात. संमिश्र वस्त्या नंतर विखुरलेल्या वस्त्यांचे प्रमाण जास्त आहे. या वस्त्या परतूर, अंबड व बदनापूर तालुक्यात आढळून येतात. केंद्रित प्रकारच्या ग्रामीण वस्त्या भोकरदन तालुक्यात आढळून येतात. जालना जिल्ह्यात एकाकी ग्रामीण वस्त्यांचे प्रमाण सर्वात कमी आहे. या प्रकारच्या ग्रामीण वस्त्या घनसावंगी तालुक्यात आढळून येतात.

**संदर्भ ग्रंथ:**

१) डॉ.एस.डी. मौर्य (२०११), अधिवास भूगोल, शारदा पुस्तक भवन, इलाहाबाद
२) रामयज्ञ सिंह (२००५), अधिवास भूगोल, रावत पब्लिकेशन्स, जयपुर और नई दिल्ली
३) डॉ.सुरेशचंद्र बंसल (२००९-१०), ग्रामीण वस्ती भूगोल, मीनाक्षी प्रकाशन, मेरठ
४) भारतीय जनगणना अहवाल, २०११
५) सामाजिक व आर्थिक समालोचन २०१३
६) भारतीय भूस्थलदर्शक नकाशा १:५००००
७) कळसकर एस.एन. (२००१), परभणी जिल्ह्यातील ग्रामीण वस्तीचा अभ्यास, अप्रकाशित
शोधप्रबंध स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

# सामाजिक संशोधन अहवाल लेखनशैली व समस्या

**वितेश भारत निकते**

लोकप्रशासन व राज्यशास्त्र विभाग,
महात्मा बसवेश्वर महाविद्यालय,
लातूर

**प्रस्तावना :**

कोणत्याही संशोधकाच्या संशोधनातील सर्वात महत्त्वाचे व अंतिम कार्य म्हणजे संशोधनाचा अहवाल लिखाण व त्याचे सादरीकरण होय. पीएच.डी. पदवी प्राप्तीसाठी प्रबंध लिहून सादर करावा लागतो व ते सादरकरण्याचा एक ठरविक कालखंड निश्चित करण्यात येत असतो. याशिवाय त्याच्या संशोधनास कोणताच अर्थ राहत नाही. संशोधकाच्या संशोधनास मृत रुप देण्याचे कार्य अहवाल लेखन व सादरीकरणाद्वारे करण्यात येते. परंतु या संशोधन अहवालाचा उपयोग केवळ संशोधकासच होतो असे नाही तर तो लिखित स्वरुप व प्रबंध स्वरुपात असेल त्याचा उपयोग हा समाजातील ज्ञानवृध्दीसाठी, नवीन संशोधकास मार्गदर्शक, समाजातील संबंधीत घटकांना, शासन-प्रशासनास होत असतो. ज्यामुळे संबंधीत समस्येचे निराकरण करण्यास मार्ग प्राप्त होतो. यामुळे संशोधनात अहवाल लेखनास अधिक महत्त्व आहे म्हणून त्याबद्दलची शैली किंवा सादरीकरणाच्या बाबतच्या आकृतीबंधाचा अभ्यास असणे आवश्यक असते.

**संशोधनाची उद्दिष्टये :**

- संशोधन कार्यातील संशोधन अहवालाची शैली जाणून घेणे.
- संशोधनातील संशोधन अहवालातील विविध स्तरांचे ज्ञान प्राप्त करुन घेणे.
- संशोधन अहवालातील समस्यांचा समजून घेणे.

**संशोधनाची गृहितके :**

- संशोधन अहवाल हा संशोधन कार्यास मृत रुप प्रदान करते.
- संशोधन कार्यातील अंतिम टप्पा म्हणजे संशोधन अहवाल लेखन होय.
- संशोधन अहवाल लेखणात विविध समस्या अस्तित्त्वात असतात.

**संशोधन पध्दती :**

प्रस्तुत लघु शोध निबंध अध्ययन करण्यासाठी वर्णनात्मक संशोधन पध्दतीचा उपयोग करण्यात आला आहे. तसेच यामध्ये तथ्य संकलन करण्यासाठी दुय्यम साधनांचा वापर करण्यात आला आहे. यामध्ये विविध संशोधन पध्दतीचे संदर्भ ग्रंथ, इंटरनेट, ई-बुक चा उपयोग करण्यात आला आहे.

**संशोधन अहवाल लेखनाचा आकृतीबंध :**

सामाजिक संशोधन कार्यामध्ये अहवाल लेखन करताना त्याच्या शैलीचा उपयोग करणे आवश्यक असते. यामध्ये लेखन शैली ही अधिकाधिक सोपी, सुलभ आणि स्पष्ट स्वरुपाची असावी ज्यातून एक आणि एकच अर्थ समोर येणे आवश्यक आहे. संशोधन लेखणाची भाषा ही संशोधनात्मक सोबत सरळ व सोपी असावी. यामध्ये वाचकांना ज्ञान प्राप्तीची उत्सुकता निर्माण करणे आवश्यक आहे. शक्य तितक्या निसंदिग्ध स्वरुपात भाषा असावी. अहवाल लेखन करीत असताना यामध्ये आवश्यक त्या बाबींचा समावेश करणे आवश्यक आहे जसे- सारणी, आलेख, आकृती, नकाशे इत्यादी. ज्यामुळे संशोधन करताना वाचक व परिक्षकास एका नजरेमध्ये संपूर्ण संशोधन प्रबंधाचा आत्मा लक्षात येणे आवश्यक आहे. यासाठी सामाजिक संशोधनामध्ये एक निश्चित असा आकृतीबंध ठरविण्यात आला आहे.

**संशोधनातील अहवाल लेखणाचा आकृतीबंध :**

संशोधन कार्यात अहवाल लेखण करताना तो सुस्थितीत व सोप्या पध्दतीत सादर करण्यासाठी पुढील आकृतीबंधाचा स्वीकर करणे हे शास्त्रीय दृष्ट्या उपयुक्त असते. त्याचे प्रामुख्याने प्राथमिक विभाग, मुख्य विभाग, संदर्भ विभाग या तीन टप्प्यात विभाजन करण्यात येते.

**१) प्राथमिक विभाग :**

हा अहवालाचा दर्शनी भाग म्हणून ओळखला जातो. यामध्ये

१. मुखपृष्ठ    २. प्रथमपृष्ठ    ३. प्रमाणपत्र    ४. प्रतिज्ञापत्र    ५. ऋणनिर्देश किंवा मनोगत ६.अनुक्रमणिका

**२) मुख्य विभाग :**

या विभागात संशोधनासंदर्भात प्रस्तावना, संशोधन पध्दती, विषयाचा मुख्य गाभा, तथ्य विश्लेषण, निष्कर्ष व शिफारशी यांचा समावेश होतो. थोडक्यात यामध्ये संपूर्ण संशोधन प्रकरणाचा समावेश करण्यात येतो. यामध्ये पुढील बाबींचा समावेश होतो.

प्रस्तावना- यामध्ये समस्येचे वर्णन, संशोधनाचे महत्त्व, संशोधन समस्यांचा निवडीचा उद्देश, त्यांची उपयुक्ता याचा आढावा घेण्यात येतो. त्यानंतर संशोधन पध्दतीचा समावेश होतो. यामध्ये-

१. प्रस्तावना   २. संशोधनाचा उद्देश   ३. संशोधनाची गृहितकत्ये ४. संशोधनातील सैध्दितांतिक आधार ५. अध्ययनातील उपयोगात आणललेल्या घटकांची व्याख्या  ६. संशोधन व्याप्ती  ७. संशोधन क्षेत्र  ८. संशोधनाची मर्यादा  ९. संशोधन पध्दती १०.नमुना निवड ११. तथ्य संकलन पध्दती,- सांख्यिकीय तथ्य संकलन इ. १२. माहिती स्रोत, - प्रथम व द्वितीय स्रोत

१३. संशोधन साहित्याचा आढावा    १४. प्रकरण आराखडा

तसेच दुसऱ्या टप्प्यातच तथ्यसंकलन, विश्लेषण व निर्वचन व निष्कर्ष, सूचना किंवा शिफारशी व उपयुक्तता यांचा समावेश होतो.

## ३) संदर्भ विभाग :

हा संशोधन अहवालाचा अंतिम विभाग होय. यामध्ये

१. ग्रंथ सूची — यामध्ये ग्रंथ व पुस्तके, संशोधन पत्रिका, नियतकालिके, अहवाल, दस्तावेज, अप्रकाशित स्रोत व इंटरनेट संकेत स्थळे यांचा समावेश होतो. याची सूची देताना अल्फाबिटीकल पध्दतीने मांडणी करण्यात येते.

२. सूचीपत्र,

३. परिशिष्ट,

४. तांत्रिक सामुग्रीची यादी —प्रश्नावली, मुलाखत अनुसूची इ.

५. संशोधन कार्यातील संकल्पनाचे शार्टफार्म वापरले असतील तर त्याची सूची समाविष्ट करण्यात येते.

६. आकृत्या, नकाशे, चित्र, छायाचित्र यांचा समोवश संशोधन कार्यानूसार करण्यात येतो.

वरिल प्रमाणे बाह्य आकृतीबंधानूसार संशोधन अहवाल सादर केल्यास त्यामध्ये वाचक व परिक्षकास अत्यंत सूलभता प्राप्त होते. तसेच पुढील संशोधकास याचा उपयोग होतो. परंतु यामध्ये काही समस्या उदभवतात यामध्ये

## संशोधन अहवालातील प्रमुख समस्या :

### १) भाषेची समस्याः

संशोधन हे पुर्ण विज्ञाननिष्ठ संशोधनात्मक भाषेत असावे असा प्रयत्न केला जातो. परंतु हे करत असताना त्यामध्ये अनेक संकल्पना, शब्दावली, वैज्ञानिक शब्द, पांडित्यपूर्ण भाषेचा उपयोग करण्यात येतो. यामुळे संशोधन कार्य हे क्लिष्ट व पांडित्यपूर्ण मानले जाते जे सर्वसामान्यापासून दूर जाते. ही समस्या प्रमुख दिसून येते. साधी सरळ बोली भाषा वापरण्यास बंधने येतात.

### २) सत्यतेची समस्या :

संशोधनामध्ये सत्य किंवा वास्तिवक तथ्यांची मांडणी करणे अत्यंत अवघड कार्य असते कारण या सत्याचा परिणाम हा कोणत्यांना कोणत्या घटकांवर समाजावर होणार असतो. त्याचा विपरीत परिणाम होतो. तसेच तथ्य संकलन करताना प्राप्त तथ्य देखील अस्पष्ट सांगितले जाते त्यामुळे सत्यतेची समस्या संशोधनअहवाल लेखनात दिसून येते.

### ३) वस्तुनिष्ठतेचा अभाव :

संशोधनाचा अहवाल पूर्णतः निरपेक्ष व निःपक्ष ठेवणे आवश्यक असले तरी संशोधकावर पडलेला समाजाचा प्रभाव, त्याची मूल्ये, आदर्श, विचारसरणी, त्याची परिस्थिती याचा प्रभाव नकळतपणे हा जाणवतोच पुर्णपणे तटस्थता संशोधक राहू शकत नाही ही एक समस्या आहे.

### ४) तसेच बौध्दिक स्तराची समस्या यामध्ये अभ्यासक्षेत्रातील नागरीकांची बौध्दिकक्षमता, दृष्टीकोन यामुळे अचूक तथ्य प्राप्त होत नाहीत व अहवाल लेखन ही अचूक येत नाही.

## सारांश :

सारांश रुपात विवेचन करीत असताना  संशोधन अहवाल कितपत योग्य व अयोग्य सांगणे कठीण आहे कारण अनेकदा बाह्य रुपावरुन त्याचे परिक्षण केले जाते. शिर्षकापासून ते अंतिम  पृष्ठापर्यंतची मांडणी व प्रस्तुती  सुबक, आकर्षक व सुंदर असावी यात शंका नाही परंतु आकर्षकतेच्या नावाखाली त्याचा अतिरेक मात्र होऊ नये याची काळजी घेणे आवश्यक आहे.

## संदर्भग्रंथ सूची :

१.  डॉ. जरारे विजय लक्ष्मण, (२००४), संशोधन प्रणाली, अद्वैत प्रकाशन, अकोला.

२.  डॉ. शर्मा आर.डी., (२००६), रिसर्च मैथोडोलोजी, सुमित एंटरप्राइजेज, नई दिल्ली.

३.  आहूजा राम, (२००४), सामाजिक अनुसंधान, रावत पब्लिकेशन, जयपूर एंव नई दिल्ली.

४.  डॉ. शेवाळे, डॉ. पवार, प्रा. शबनम, (२०१६), संख्यात्मक तंत्रे व संशोधन पध्दती, विद्या बुक्स पब्लिशर्स, औरंगाबाद.

५.  डॉ. जाधव सुनील, (२०१२), सामाजिक संशोधन पध्दती, अरुणा प्रकाशन, लातूर.

६.  डॉ. हिस्सल वंसत, (२०१३), संशोधन पध्दती (अर्थशास्त्र), अरुणा प्रकाशन, लातूर.

# सामाजिक संशोधनात वस्तुनिष्ठतेची उपयुक्तता

**प्रा. डॉ. यशवंत वळवी**

राज्यशास्त्र विभाग प्रमुख,

महात्मा बसवेश्वर महाविद्यालय,

लातूर

**प्रस्तावना :**

निसर्गातील रहस्य शोधून काढण्याचा ध्यास मानवाने घेतला आहे. व तसा अट्टाहास ही सतत चालू आहे. आपल्या आजूबाजूला काय आहे आणि काय सुरु आहे. हे जाणून घेण्याचा प्रयत्न मानव करित असतो. माणसा-माणसातील परस्परसंबंध आणि त्यासंबंधीच्या समस्यांचे मूळ शोधून काढण्याचा मानवाचा सतत प्रयत्न असतो. त्यांच्या जिज्ञासू वृत्तीमुळे तो यशस्वी सुध्दा होतो. लॉफ ऍरिक्सन यांनी अमेरिकेचा शोध लावला किंवा कोलंबसने अमेरिकेचा शोध लावला. यात जो भाव आहे तो म्हणजे अमेरिका अस्तित्वात होती परंतु ज्ञात नव्हती. नवीन ज्ञान प्राप्तीच्या व्यवस्थीत प्रयत्नाला सामाजिक संशोधन म्हणतात. प्रत्येक युगात नवीन तथ्ये व नवीन विचार अस्तित्वात आलेले आहेत.

विज्ञान व तंत्रज्ञानातील प्रगतीने सामाजिक जीवनात बदल घडवून आणला आहे. यामुळे आजचे युग हे संशोधनाचे व क्रांतीकारी युग म्हणून सर्वत्र मान्यता प्राप्त होत आहे. सामाजिक संशोधनासाठी अनुभवलेल्या बाबी, गृहितकृत्य, वास्तविक स्थिती, सिध्दांत, परिकल्पना, संग्रहित ऐतिहासिक संदर्भ, कार्यालयीन दस्ताऐवज यासर्व बाबी आणि प्रक्रिया सामाजिक संशोधन कार्याला पूर्णत्वाला नेण्यासाठी आवश्यक आहे. सामाजिक शास्त्राच्या कोणत्याही विषयाच्या अध्ययनासाठी संशोधनाची भूमिका महत्त्वाची आहे. सामाजिक संशोधन हे समाज जीवनाशी संबंधीत असते. सामाजिक घटनांचा अभ्यास, सामाजिक समस्यांचा अभ्यास, सामाजिक प्रक्रियांचे विश्वसनीय अध्ययनाचे पुर्व अध्ययनास प्राधान्य देवून नवीन जाणून घेण्याचा प्रयत्न करणे, सामाजिक संशोधनाच्या अध्ययनात नवीन तथ्ये उजेडात आणणे, जुन्या तथ्यांचे प्रामाण्य सिध्द करणे, अशा अनेक बाबींच्या अध्ययनाचा विचार केला जातो.

वैज्ञानिक अभ्यासपध्दतीचे आवश्यक लक्षण म्हणून वस्तुनिष्ठतेला अधिक महत्त्व आहे. सामान्यपणे अभ्यासाचे दोन प्रकार आहेत. १) व्यक्ती निष्ठ, २) वस्तुनिष्ठ या अभ्यास पध्दतीत संशोधक आपल्या मनाचा किंवा पूर्वग्रहाचा प्रभाव पडू न देता विषयाचा यथार्थ अभ्यास करण्यावर भर देतो. वस्तुनिष्ठ पध्दतीत विश्लेषणात्मक स्वरुप असते. या अभ्यासात बुध्दीचा उपयोग करुन जे वाटते त्याचा आधार घेऊन निष्कर्ष काढला जातो. वस्तुनिष्ठ पध्दतीत निष्कर्ष हे अवलोकन, परिक्षण, विश्लेषणावर आधारलेले असतात. निष्कर्षात भावना विचार यांना स्थान नसते. सामाजिक संशोधन ही वैज्ञानिक अभ्यास पध्दत आहे. त्यात संशोधन सत्यान्वेषणासाठी असते. सत्यान्वेषण, अचूक, यथार्थ व्हावे म्हणून अभ्यासकाल वस्तुनिष्ठतेचा अवलंब करणे आवश्यक असते. व संशोधकाने संशोधन हे निष्ठेने केले पाहिजे.

**अभ्यासाचे हेतू :**

१. वस्तुनिष्ठतेची संकल्पना जाणून घेणे.

२. सामाजिक संशोधनातील वस्तुनिष्ठतेची उपयुक्तता जाणून घेणे.

३. वस्तुनिष्ठतेने शास्त्रीय अभ्यासाचे महत्त्व समजून घेणे.

**गृहितके :**

१. सामाजिक संशोधनात वस्तुनिष्ठेची नितांत गरज आहे.

२. सामाजिक संशोधनात वस्तुनिष्ठे शिवाय संशोधन अशक्य आहे.

३. सामाजिक संशोधनात वस्तुनिष्ठेमुळे निष्कर्ष अचूक काढता येतो.

**वस्तुनिष्ठतेचा अर्थ व्याख्या :**

शास्त्रीय अभ्यासात वस्तुनिष्ठतेला महत्त्व असते. वस्तुनिष्ठतेवर शास्त्रांचा विकास अवलंबून असतो.

**ग्रीन —** तथ्यांचे निष्पक्षतेने किंवा तटस्थेने परिक्षण करण्याची इच्छा व योग्यता म्हणजे वस्तुनिष्ठता होय.

**कार —** ऐहिक घटनेकडे पाहण्याची श्रध्दा, आशा व भयरहित दृष्टी ह्या दृष्टीत भावना व कल्पनांचा रंग नको अशा तटस्थ वृत्तीने अवलोकन करण्याची इच्छा म्हणजे वस्तुनिष्ठ दृष्टी होय.

या व्याख्यांवरुन वस्तुनिष्ठतेची कल्पना येऊ शकते. अगदी सोप्या व सरळ भाषेत सांगावयाचे म्हणजे तटस्थ व पक्षपातरहित निरिक्षणाच्याद्वारे तथ्यांचे वास्तविक संकलन व विश्लेषण करणे म्हणजे वस्तुनिष्ठता होय. म्हणून म्हटले जाते की, वस्तुनिष्ठता ही वैज्ञानिक दृष्टीकोनाची आधारशिला आहे. ती सत्यशोधनाची गुरुकिल्ली ही आहे. वैज्ञानिक अभ्यासाच्या साहाय्याने जर व्यवहारिक पातळीवरचा निष्कर्ष काढला आला तर तो उपयुक्त ठरत असतो. ज्या विभागाला वस्तुनिष्ठतेचा आधार असेल त्याला शास्त्रीय कसोटीवर तपासले जात असेल. त्याला शास्त्रीय कसोटीवर तपासले जात असते. त्यासाठी काही महत्त्वाच्या घटकांचा विचार केला जातो. अनुभव प्रामाण्य, वस्तुनिष्ठता, तटस्थता, सामान्यीकरण, व्यवस्थीकरण, भविष्यकथन, प्रकटपध्दती हे सर्व सामाजिक संशोधनाच्या वस्तुनिष्ठतेला अनुकूल परिस्थिती निर्माण होण्यास उपयुक्त ठरतात.

**सामाजिक संशोधनात वस्तुनिष्ठतेची उपयुक्तता :** सामाजिक संशोधनात वस्तुनिष्ठतेला अनन्यसाधारण महत्त्व आहे. कारण त्याशिवाय संशोधन पूर्णत्वाला जाऊ शकत नाही. आणि शास्त्रीय व वैज्ञानिक कसोटीतून ते संशोधन खरे उतरु शकत नाही. यावरुन कोणत्याही सामाजिक शास्त्रातील अध्ययनात वस्तुनिष्ठता किती उपयुक्त आहे. हे या अध्ययनातून दिसून येते.

- **वैज्ञानिक मान्यतेसाठी सामाजिक शास्त्राच्या अभ्यासात वस्तुनिष्ठता आवश्यक:**

सामाजिक घटनांचा वस्तुनिष्ठ पध्दतीने अभ्यास करणे शक्य नाही असे काही विद्ववानांना वाटते. ह्या आरोपातून मुक्त होण्यासाठी आणि सामाजिक शास्त्राला वैज्ञानिक मान्यता प्राप्तीसाठी वस्तुनिष्ठतेचा अवलंब करणे नितांत आवश्यक आहे.

- **निष्पक्षपाती निष्कर्ष काढण्यासाठी वस्तुनिष्ठतेची गरज :**

सामाजिक शास्त्रांच्या अभ्यासात वस्तुनिष्ठतेचा अंतर्भाव केला नाही तर नि:पक्षपाती निष्कर्ष काढता येणार नाही म्हणून नि:पक्षपाती निष्कर्ष काढण्यासाठी वस्तुनिष्ठतेचा अभ्यास आवश्यक आहे.

- **सामाजिक संशोधनाच्या ज्ञानवर्धनेसाठी वस्तुनिष्ठतता उपयोगी :**

सामाजिक घटनाविषयी ज्ञान व त्याच्या वास्तविक कारणांविषयी चुकीच्या धारणा नष्ट करुन समाजशास्त्रीय ज्ञानाचा विकास करणे, नवी भर टाकणे नवे सिंध्दात शोधून काढण्यासाठी वस्तुनिष्ठतेचे अध्ययन उपयुक्त आहे.

- **सामाजिक संशोधनाच्या अध्ययनात वस्तुनिष्ठतेला अनन्य महत्त्व :**

वस्तुनिष्ठतेचा सामाजिक संशोधनाच्या अध्ययनात आवश्यकता आहे कारण त्याशिवाय तथ्ये संकलन करता येणे शक्य नाही म्हणून योग्य प्रतिनिधीच्या निवडीसाठी वस्तुनिष्ठता आवश्यक आहे.

- **वस्तुनिष्ठता हाच सामाजिक संशोधनाचा आधार :**

वैज्ञानिक पध्दत व वस्तुनिष्ठता ह्या दोन्ही एकाच नाण्याच्या दोन बाजू आहेत. वस्तुनिष्ठता ही सामाजिक संशोधनातील आधार म्हणून उल्लेख केला जातो.

- **सामाजिक संशोधनातील वास्तविक ज्ञान प्राप्तीसाठी :**

सामाजिक संशोधनाच्या अध्ययनातून वास्तविक ज्ञान प्राप्त करण्यासाठी वस्तुनिष्ठ दृष्टीकोन महत्त्वाचा असतो. त्यातून सत्यस्थिती जाणून घेता येते.

- **सामाजिक शास्त्राची वैज्ञानिकता वस्तुनिष्ठतेवरआधारित :**

सामाजिक शास्त्राची वैज्ञानिक स्वरुप आणि शास्त्रशुध्द मांडणी करण्यासाठी वस्तुनिष्ठतेची आवश्यकता असते. परंतु वैज्ञानिक स्वरुप निर्माण करण्यासाठी वस्तुनिष्ठतेचा आधार आवश्यक असतो.

- **सामाजिक संशोधनात वस्तुनिष्ठतेच्या प्राधान्यामुळे नवीन संशोधकाला प्रेरणा :**

सामाजिक संशोधनात वस्तुनिष्ठतेला दिलेल्या प्राधान्यामुळे नवीन संशोधनास चालना मिळते आणि संशोधनाला नवी दिशा प्राप्त होत असते.

**निष्कर्ष :**

सामाजिक संशोधनात वस्तुनिष्ठतेला अत्यंत महत्त्वाचे स्थान आहे. कारण कोणत्याही समाजिक शास्त्रातील संशोधन हे वस्तुनिष्ठतेशिवाय पूर्ण होऊ शकत नाही. कारण सत्यशोधण्यासाठी आणि नि:पक्षपाती संशोधन करण्यासाठी सामाजिक संशोधनात वस्तुनिष्ठता व्यक्तीनिष्ठता या दोन्ही बाबी तेवढ्याच महत्त्वाच्या आहेत. या शिवाय निष्कर्षअंती पोहचता येत नाही. म्हणून सामाजिक संशोधनात वस्तुनिष्ठता उपयोगी आणि आवश्यक आहे.

**संदर्भ ग्रंथ :**

१. बोधनकर सुधिर, सामाजिक संशोधन पध्दती, साईनाथ प्रकाशन, नागपूर,१९९९
२. आगलावे प्रदिप, संशोधन पध्दती शास्त्र व तंत्रे, विद्या प्रकाशन, २०००
३. डॉ. बोधनकर व प्रा. अलोनी, सामाजिक संशोधन पध्दती, २०११
४. डॉ. काचोळे दा.धो., सामाजिक संशोधन पध्दती, कैलास पब्लिकेशन, औरंगाबाद, २००३
५. पवार श.नि., समाजशास्त्र संशोधन पत्रिका, १९९५
६. प्रा. कऱ्हाडे, संशोधन पध्दती, पिपंळापुरे प्रकाशन, नागपूर, २००७

# सामाजिक प्रक्रिया – तत्त्वे व प्रकार

**बी. पी. पवार**

समाजशास्त्र विभाग

महात्मा बसवेश्वर महाविद्यालय,

लातूर.

**प्रस्तावना :**

व्यक्तीशिवाय समाज नाही. एकट्या व्यक्तीचा समाज बनलेला नसतो. तर तो अनेक व्यक्तींनी मिळून समाजाची निर्मीती होते. तसेच व्यक्ती स्वयंपूर्ण नसतो. मानवी मुल किती तरी दिवस परावलंबी असते. लहान मुला प्रमाणेच मोठ्या माणसाचे परावलंबन आपणास सतत जाणवत असते. कारण व्यक्तीच्या कक्षेबाहेरच्या अशा अनेक गोष्टी असतात की त्याला करणे शक्य नसते. ती याबाबतीत परावलंबी असते. शेती, नौकरी, व्यापार, कारखाना इ. क्षेत्रात काम करणाऱ्या व्यक्ती आपल्या कार्यसेवेत अगदी निपुन असतात. पण त्या स्वयंपूर्ण नसतात. त्याच्यापैकी प्रत्येकाला अनेक बाबीसाठी दुसऱ्यावर अवलंबून रहावे लागते. ही अवलंबनाची भावना त्यांच्या क्षेत्राव्यतिरिक्त असलेल्या मुलभूत गरजातून निर्माण झालेली असते. तेव्हा आपल्या गरजपुर्तीसाठी आणि गरज ज्या स्वरुपाची असेल त्या गरजेच्या स्वरुपातून व्यक्तीला दुसऱ्याशी संबंध ठेवावे लागतात. विविध प्रकारच्या संबंधाला वर्तनाची जोड द्यावली लागते. संबंध अनेक प्रकारचे असतात. तेव्हा जसा संबंध असेल तशाच प्रकारचे व्यक्तीला आपले वर्तन ठेवावे लागते. म्हणजे संबंधानूसार वर्तनाची दिशा बदलत असते. व्यक्तीला आपल्या वर्तनाची जाणीव ठेवावी लागते.

**संशोधनाची उद्दिष्टये :**

- समाजिक प्रक्रियेचा अर्थ व स्वरुप याचा अभ्यास करणे.
- सामाजिक प्रक्रियेची तत्त्वे समजून घेणे.
- सामाजिक प्रक्रियेची प्रकार यांचा आढावा घेणे.

**संशोधनाची गृहितके :**

१. सामाजिक प्रक्रियेमध्ये सामाजिक संबंधास अधिक महत्त्व असते.
२. सामाजिक आंतरक्रिया आणि सामाजिक प्रक्रिया वेगवेगळ्या नसतात.
३. सामाजिक प्रक्रियेत मानव हा केंद्र बिंदु असतो.

**संशोधन पध्दती :**

प्रस्तुत लघु शोध निबंधासाठी वर्णनात्मक संशोधन पध्दतीचा उपयोग करण्यात आला आहे. तसेच तथ्य संकलन करणयासाठी दुय्यम तथ्य स्त्रोतांचा उपयोग करण्यात आला आहे यामध्ये संदर्भ ग्रंथ, इंटरनेट, मासिक आदी.

**सामाजिक प्रक्रिया - व्याख्या :-**

**१. व्हिन विजे :-**

"आम्ही सर्व व्यक्ती एकमेकांशी संबंधीत असून एकमेकांना जोडलेल्या परस्परावर अवलंबून आहोत. सामाजिक संबंधाच्या गत्यात्मक बाजूस सामाजिक प्रक्रिया असे म्हणतात."

**२. बिसाझ :-**

"आंतरक्रियेच्या विभीन्न स्वरुपांना सामाजिक प्रक्रिया असे म्हणतात. (The various forms of interaction are called Social Process.)

सामाजिक आंतरक्रिया आणि सामाजिक प्रक्रिया वेगवेगळ्या नाहीत. आंतरक्रियेच्या भिन्न भिन्न रुपांना सामाजिक प्रक्रिया असे म्हणतात. म्हणजे सामाजिक आंतरक्रिया ही एकदाच होते तर सामाजिक प्रक्रिया वारंवार होत असते. हे आपणाला खालील उदाहरणावरुन स्पष्ट करता येईल.

उदा :- दुकानदार आणि ग्राहक यांचा संबंध खरेदी विक्रीच्या माध्यमातून निर्माण होतो. पहिल्यांदा निर्माण होणाऱ्या संबंधात जी क्रिया घडते तिला आंतरक्रिया असे म्हणतात परंतू गिऱ्हाईक त्याच दुकानदाराकडे पुन्हा पुन्हा जात असेल आणि अनेक वस्तू खरेदी करत असेल या खरेदी - विक्रीतून त्यांच्यात भावनिक संबंध निर्माण झाले असतील तर या ठिकाणी आंतरक्रियेतून सामाजिक प्रक्रिया निर्माण होते.

**सामाजिक प्रक्रियेचे आवश्यक तत्व किंवा वैशिष्ट्ये :-**

**१. घटनेचा क्रम :-**

कोणतीही घटना ही कमी महत्वाची असो अथवा अधिक महत्वाची असो त्याला सामाजिक प्रक्रिया असे म्हणता येत नाही. सामाजिक प्रक्रिया निर्माण होण्यासाठी विभिन्न घटनामध्ये एक क्रम असणे आवश्यक असते.

**२. घटनेची पुनरावृत्ती :-**

सामाजिक प्रक्रिया मध्ये घटनेची पुनरावृत्ती होणे आवश्यक असते परंतू काही घटना एकच वेळी घडतात त्याला सामाजिक प्रक्रिया असे म्हणता येणार नाही.

**३. घटनेमध्ये संबंध असणे :-**

सामाजिक प्रक्रियेमध्ये विभिन्न घटकाची निर्मीती वेगळी असते परंतू सर्व घटकामध्ये संबंध असणे आवश्यक असते. जर त्यामध्ये संबंध प्रस्थापित होत नसतील तर त्याला सामाजिक प्रक्रिया असे म्हणते यणार नाही.

**४. निरंतरता (सातत्य) :-**

सामाजिक प्रक्रियेमध्ये केवळ घटनाची पुनरावृत्ती होणे आवश्यक नाही तर त्यामध्ये सातत्य असणे आवश्यक असते. उदा. सहयोग एक सामाजिक प्रक्रिया आहे. याचे कारण म्हणजे सामाजिक जीवनामध्ये सहयोगाची आवश्यकता असते. सहयाग व्यक्त करणाऱ्या घटना समाजात संघटीत होतात. त्यांच्यामध्ये सातत्यता असते.

**५. विशिष्ट परिणाम :-**

विशिष्ट परिणाम सामाजिक घटनेचे एक महत्वाचे वैशिष्टय आहे. सामाजिक प्रक्रिया घटनेचा असा क्रम असतो की, ज्याच्यामध्ये सातत्यता हा गुण असतो. आणि ज्याच्या मधून विशिष्ट परिणाम घडून येतात. उदा. सहयोग एक अशी सामाजिक प्रक्रिया आहे की ज्यामध्ये व्यक्ती आणि समुह सुत्रामध्ये बांधले जातात. आणि त्यामुळे समाजाचा विकास होतो.

**सामाजिक प्रक्रियेचे प्रकार :- (Tyeps of Social Process)**

**अ) सहकार्य :- (co-operation) :-**

व्यक्तीला सहकार्याशिवाय सामाजिक जीवन जगता येणे शक्य नसते. जन्मापासून मृत्युपर्यंत व्यक्ती आपले जीवन इतराच्या सहकार्यानेच जगत असतो. तेव्हा सहकार्य ही एक संघटनात्मक प्रक्रिया आहे. कारण या प्रक्रियेशिवाय समाजात व्यक्तीला जगणे शक्य नसते.

सहकार्य प्रक्रिया संघटीत करण्याचे कार्य करीत असते. समाजात अनेक व्यक्ती आणि समुहाचे आपापसात कोणत्याही कारणांनी संघर्ष होतात. प्रत्येक व्यक्ती किंवा समुहाच्या ठायी संघर्ष दडलेला असतो. स्वार्थापोटी लोक एकमेकाची डोळी उडविण्यास कमी करत नाहीत. यामुळे समाज सर्वनाशच्या काठावर पोहचण्यास वेळ लागत नाही.

सहकार्यासाठी समुहातील अनेक व्यक्तीची ध्येय आणि दिशा एकच असन्नी पाहिजे. ध्येय आणि दिशा यांच्यात जर एकवाक्यता नसेल तर विशिष्ट बाबी साद्य करण्यात अडथळे निर्माण होतात. व्यक्तीपरत्वे ध्येय किंवा मार्ग वेगळे असतील तर समुहात सहकार्य निर्माण होणार नाही. तसेच सहकार्याची एक विशिष्ट दिशा ठरलेली असते. म्हणजे एकच व्यक्तीही प्रक्रिया सुरु करु शकत नाही. या प्रक्रियेस प्रारंभी कमीत कमी दोन व्यक्तीची आवश्यकता असते. दोन किंवा अधिक व्यक्तीनी एक काम मिळून मिसळून केले पाहिजे. यामध्ये व्यक्तीसंघटन असले पाहिजे तर सहकार्य प्रक्रिया अस्तित्वात येते.

**ब) समायोजन/व्यवस्थापन :- (Accommodation)**

समायोजन ही दुसरी संघटनकारी प्रक्रिया आहे. या प्रक्रियेसाठी सहकार्य या प्रक्रियेची मोठ्या प्रमाणात मदत होते. कोणताही व्यक्ती किंवा समूह समाजामध्ये संघर्ष करु शकत नाही. अशावेळी त्याला सामाजिक परिस्थिती बरोबर समायोजन करावे लागते. समायोजन जीवन जगण्याची आणि राहण्याची एक कला आहे. ही एक मानसिक किंवा सामाजिक समझौता आहे. मानव समाजाला अनुसरुन किंवा बदलून समाजामध्ये परिवर्तन घडून आणू शकतो. ज्यावेळी दोन विरोधी गट संघर्ष नष्ट करुन परस्पर सहकार्याच्या भावनेने राहणार असल्यास त्यांना सर्वप्रथम एक दुसऱ्याशी समझौता करावा लागतो त्यालाच समायोजन असे म्हणतात. समायोजनाचा अर्थ असा नाही की समायोजन करणारी व्यक्ती भविष्यात संघर्ष करणार नाही असे नसते कारण या मध्ये संघर्षाचे वी विदयामान राहते आणि संघर्ष पुन्हा निर्माण होवू शकतो. वास्तवत: समायोजन संघर्षात काही वेळेसाठी टाळण्याचे साधन आहे. शेवटी आपणास असे म्हणता येईल की, समायोजन संघर्षाद्वारे सहकार्याकडे वळण्याची प्रक्रिया आहे. ज्यामध्ये संघर्ष व्यतिरिक्त व्यक्ती किंवा समूह एक दुसऱ्याप्रती आपला दृष्टीकोन किंवा विचारामध्ये परिवर्तन करणे आणि आपापसामध्ये समायोजन करणे असा होतो. समायोजन संघर्षाचे स्वाभाविक परिणाम आहे. ही मुख्यत: अचेतन क्रिया आहे. ती सर्वभौमीक स्वरुपात असते. यामध्ये प्रेम आणि घृणा किंवा संघर्ष आणि सहकार्याचे मिश्रण आढळते.

**क) सम्मीलन (Assimilation)**

ही सामाजिक समायोजनेचे रुप आहे. ही अशी सामाजिक प्रक्रिया आहे की ज्याद्वारे व्यक्ती किंवा समुह नविन परिस्थिती मध्ये हळूहळू अचेतन स्वरुपात समायोजनाकडे मार्गक्रमण करते. सम्मीलन ही सांस्कृतिक प्रक्रिया आहे. ज्यावेळी विभिन्न संस्कृती दुसऱ्याच्या संपर्कामध्ये येतात तेव्हा सुरुवातीला त्यांच्यामध्ये संघर्ष होतो. पंरतू त्याच्या परिवर्तन किंवा तडजोड घडून येवून एक दुसऱ्याशी मिळण्याचा प्रयत्न होतो. सम्मीलन ही एक प्रगतशील सामाजिक प्रक्रिया आहे. ज्यामध्ये विभिन्न व्यक्ती किंवा समुह यांच्यामध्ये मतभेद कमी प्रमाणात असतो आणि क्रिया किंवा विचार यामध्ये सामान्य हितासाठी सम्मन आणि समानता यांच्यामध्ये वृद्धी होते. ज्यावेळी व्यक्ती किंवा समुह यांच्यामध्ये सम्मीलन होते त्यावेळी त्याच्यामध्ये असलेले विद्यमान मतभेद समाप्त होतात. आणि त्याचा उद्देशामध्ये समानता येते.

सम्मीलन एक अशी सामाजिक प्रक्रिया आहे की ज्यामध्ये भिन्न संस्कृती किंवा व्यक्ती किंवा समुह एक समान संस्कृती मध्ये समाविष्ट होतात. उदा :- भारतीय संस्कृती, यामध्ये वेळोवेळी बाहेरुन येणाऱ्या व्यक्ती किंवा समुह विभिन्न संस्कृती असणाऱ्या शहरात किंवा देशात येवून राहतात आणि तेथील भाषा, प्रथा, रितीरीवाज, संस्कृती यांचा स्विकार करता त्यावेळी त्याला सम्मिलन असे म्हणतात.

**निष्कर्ष :**

व्यक्ती-व्यक्तीशी किंवा समुहाशी ज्या वेळेस संबंध प्रस्थापित होतात तेव्हा या संबंधाना आंतरक्रिया असे म्हणतात. आंतरक्रियेमुळेच समाजातील व्यक्ती एकमेकांच्या सानिध्यात येतात. एकाची गरज भागवने दुसऱ्याचे वर्तन असते. तर दुसऱ्याची गरज भागवने पहिल्याचे कर्तव्य असते. प्रत्येकजण या ना त्या नात्याने एकमेकांशी गुंफलेला असतो. सर्वजण एकमेकांवर अवलंबून असतात. म्हणजेच देवाण-घेवाणाची क्रिया दोन्ही बाजूने सतत चालू असते.

**संदर्भ ग्रंथ सूची :**

७. बोधनकर सुधिर, सामाजिक संशोधन पध्दती, साईनाथ प्रकाशन, नागपूर,१९९९
८. आगलावे प्रदिप, संशोधन पध्दती शास्त्र व तंत्रे, विद्या प्रकाशन, २०००
९. डॉ. बोधनकर व प्रा. अलोनी, सामाजिक संशोधन पध्दती, २०११
१०. डॉ. काचोळे दा.धो., सामाजिक संशोधन पध्दती, कैलास पब्लिकेशन, औरंगाबाद, २००३
११. कृषी भूगोल - डॉ.सुरेश फुले

# मराठवाडयातील गोदावरी नदीखोऱ्याच्या सिंचन क्षेत्राचा जिल्हानिहाय तौलनिक अभ्यास

प्रा डॉ. भगवत ना. पस्तापुरे

**प्रस्तावनाः**

भारतीय शेतीवर मौसमी हवामानाचा अधिक प्रभाव आहे. संपुर्ण भारतात पडणा–या मौसमी पर्जन्याचा लहरीपणा दिवसेनदिवस वाढत चालला आहे. हि तिव्रता महाराष्ट्रातल्या मराठवाडयात अधिक जाणवत आहे. गोदावरी नदीनदीखोऱ्यातील एकूण लागवडीखालील क्षेत्रापैकी जिल्हानिहाय व वर्षनिहाय सिंचनक्षेत्राची सरासरी टक्केवारी काढली असुन असे लक्षात येते की २००५-०६ या वर्षी सरासरी एकूण लागवडीखालील क्षेत्रापैकी १२.३५ टक्के म्हणजे २००५-०६ ते २०१४-१५ या दहा वर्षाचा विचार करता सर्वात कमी क्षेत्र आहे. मराठवाडा अभ्यास क्षेत्राचा समावेश उर्ध्व गोदावरी खोऱ्यात होतो. याचा विस्तार १७° ३५' उत्तर ते २०° ४१' उत्तर अक्षवृत्त आणि ७४° ४०' पूर्व ते ७८° १६' पूर्व रेखावृत्तादरम्यान आहे. अभ्यास क्षेत्राच्या सीमा उत्तरेला जळगाव, बुलढाणा, वाशिम आणि यवतमाळ जिल्ह्यापासून पूर्वेला कामारेडी, निजामबाद, अदिलाबाद या आंध्रप्रदेशामधील जिल्ह्यापर्यंत दक्षिणेला गुलबर्गा आणि कर्नाटकातील जिल्ह्यांचा समावेश होतो. तर पूर्वेला नाषिक, अहमदनगर, सोलापूर, या जिल्ह्यांचा समावेष होतो. या अभ्यास क्षेत्राचा सर्वसाधारण आकार हा त्रिकोणाकृती आहे,

**गोदावरी नदीखोऱ्याचा स्थानदर्शक नकाशाः**

या विभागाचे क्षेत्रफळ ६४५६० चौ.किमी आहे हे क्षेत्र महाराष्ट्राच्या क्षेत्रफळाच्या २१.०१ टक्के आहे. प्रशासकीयदृष्टया औरंगाबाद विभागात आठ जिल्ह्यांचा समावेश होतो आणि या विभागात एकूण ७६ तहसिल विभाग आहे

**उदिष्टये :**

गोदावरी नदीखोऱ्यातील मराठवाडयातील सिंचन क्षेत्राचा जिल्हानिहाय तौलनिक अभ्यासकरणे

**माहिती संकलन व अभ्यास पद्धती :**

हवामान बदलाचा मराठवाडयातील सिंचनक्षेत्राचा तौलनिक अभ्यास करतेवेळी प्राथमिक व द्वितीयक स्वरूपाची माहिती संकलीत करून सरासरी टक्केवारीचे तुलनात्मक विश्लेषन केले आहे.

**प्राकृतिक रचना :**

मराठवाडा हा दख्खनच्या पठाराचा एक भाग असून त्यांचा उतार हा सर्वसाधारणपणे दक्षिणेकडे आहे. मराठवाडा विभाग सह्याद्रीच्या पूर्वेस पसरलेला आहे (अरुणाचलम,१९६७). या विभागात अनेक लहान मोठे पठार आहेत टेकड्याच्या रांगा, उच्च दर्जाची जमीन आहे. या विभागाच्या मध्यभागात गोदावरी नदीचा उगम होतो. हा भाग उत्तर आणि दक्षिण या दोन भागात अजिंठा टेकडया व बालाघाट डोंगररांगा यामुळे विभागला गेला आहे.



सर्वसाधारणपणे ३०० ते ६०० मी. उंचीचा प्रदेश या विभागात आढळतो. मोसमी वाऱ्याचा कालावधी सोडला तर या विभागाचे हवामान कोरडे आढळते. मराठवाड्यात काळी मृदा जास्त प्रमाणात आढळते. प्राकृतिक रचनेच्या दृष्टीने हे अभ्यासक्षेत्र **अजिंठा टेकडया , गोदावरी खोरे आणि बालाघाट टेकडया**तीन भागात विभागले आहे

**नदीप्रणाली :**

गोदावरी खोरे मराठवाड्याच्या सर्व जिल्ह्यात समाविश्ट आहे. त्यातील उस्मानाबाद आणि बीड जिल्ह्यातील काही भाग अपवादात्मकरित्या वगळला आहे. या दोन्ही जिल्ह्यात तेथील स्थानिक टेकड्यामुळे जलविभाजन झाले आहे. जो भाग गोदावरी खोऱ्यात येत नाही तो कृष्णा नदीखोऱ्याला मिळतो. गोदावरीला मराठवाड्यात पुर्णा नदी पुर्णा तालुक्यातील कंठेश्वर या ठिकाणी मिळते. अन्य प्रमुख उपनद्या डाव्या बाजूने सिना, शिवभद्रा, येलगंगा, शिवना व आसना तर उजव्या बाजूने बिंदुसरा, सिंदफना, सरस्वती, कुंडका इत्यादी नद्या ठिकाणी मिळतात. मांजरा नदीचे खोरे हे मराठवाड्यातील दुसरे महत्वाचे खोरे आहे.

**हवामान :**

हिवाळा हंगाम मध्य डिसेंबर पासून फेब्रुवारी पर्यंत तर उन्हाळा हंगाम मार्च ते मे आणि पावसाळा हंगाम जून ते सप्टेंबर या दरम्यान असतो. तर परतणारे मोसमी वारे ऑक्टोबर ते मध्य डिसेंबर पर्यंत असतात. या काळात मराठवाड्यात ११° ते १३° एवढे तापमान असते. तसेच याच काळात रात्रीचे किमान तापमान ७° ते ८° ग्रेडपर्यंत असते. मार्च एप्रिल व मे या तीन महिन्याच्या कालावधीत उन्हाळा असतो. उष्ण कटिबंधीय अर्धशुष्क हवामान असते. उन्हाळ्यात बीड, औरंगाबाद, नांदेड जिल्ह्यात तापमान ४५° ग्रेडपर्यंत वाढत जाते, तर पर्जन्य हे नैऋत्य मोसमी वाऱ्यापासून पडतो. पावसाळ्यात हवेतील आर्द्रतेचे प्रमाण ७० ते ८० टक्के असते. तर उन्हाळ्यात १५ ते २० टक्के एवढीच हवेत आर्द्रता असते येथे उष्णकटीबंधीय दमट व कोरड्या हवामानाच्या
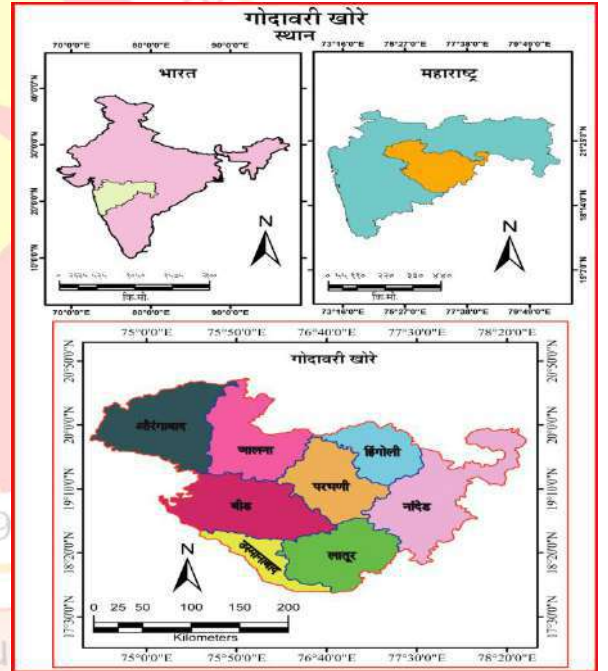
विभागात जालना, परभणी व नांदेड हे जिल्हे येतात. या भागात उन्हाळयात तापमान ४०° ते ४५° ग्रेडपर्यंत वाढत जाते.(सेमन, १९६७)

### सारणी क्र.१गोदावरी नदीखोऱ्यातील मराठवाडयातील सिंचन क्षेत्राची जिल्हानिहाय टक्केवारी (२००५-०६ ते २०१४-१५)

| अनु | जिल्हे | २००५-०६ | २००६-०७ | २००७-०८ | २००-०६ | २००८-१० | २०१०-११ | २०११-१२ | २०१२-१३ | २०१३-१४ | २०१४-१५ | एकुण सरासर१ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| १ | औरंगाबाद | १७.२१ | २८.५६ | १३.५४ | २८.५ | १३.५४ | २६.४ | १३.४९ | २८.५६ | १३.५४ | १३.४९ | १६.६८ |
| २ | जालना | १२.५५ | १२.५५ | ४४.२६ | १३.४९ | १७.२१ | २८.५६ | ४४.२६ | १३.४९ | ८.६२ | ८.६२ | २०.४२ |
| ३ | बीड | १०.५ | १०.५ | १०.५ | १०.६ | १५.५६ | १५.५६ | ३८.८४ | ३८.८४ | ३८.८३ | ३६.६१ | १९.०८ |
| ४ | परभणी | १०.८ | १०.६ | १०.६ | १०.७ | ६.७६ | १६.६६ | २७.७६ | २०.६५ | ३२.०३ | ३६.६१ | १८.६७ |
| ५ | हिंगोली | ६.०४ | ६.०४ | ६.८ | १३.८२ | १२.६३ | १४.१ | १२.१६ | १२.५७ | १७.४३ | ३४.०९ | १४.५८ |
| ६ | नांदेड | ६.०६ | ६.४६ | ८.६ | ८.६ | ८.६६ | १७ | १७.२ | १७ | १०.२२ | ७.४२ | ११.४९ |
| ७ | लातूर | १७ | १७ | १८ | १८ | १९.१ | ६.६३ | १७ | १७.५७ | १५ | ११ | १५.६३ |
| ८ | उस्मानाबाद | १२.६१ | १२.६१ | १७ | १२.६१ | ६ | १०.४२ | १७.६२ | १७.२३ | १६.३८ | १६.३८ | १४.२१ |
| | एकुण सरासरी | १२.३५ | १३.८३ | १६.५७ | १३.०४ | १३.२६ | १७.३० | २१.३५ | २०.७७ | १७.०० | १८.८६ | १६.७३ |

स्त्रोतः जिल्हा कृषी अधिक्षक कार्यालय मराठवाडा विभाग

प्रस्तुत सारणी क्र १ वरून असे आढळुन येते की गोदावरी नदीनदीखोऱ्यातील एकुण लागवडीखालील क्षेत्रापैकी जिल्हानिहाय व वर्षनिहाय सिंचनक्षेत्राची सरासरी टक्केवारी काढली असुन असे लक्षात येते की २००५-०६ या वर्षी सरासरी एकुण लागवडीखालील क्षेत्रापैकी १२.३५ टक्के म्हणजे २००५-०६ ते २०१४-१५ या दहा वर्षाचा विचार करता सर्वात कमी क्षेत्र आहे. तर २०११-१२ या वर्षीचे सरासरी सिंचनाखालील प्रमाण सर्वात जास्त म्हणजे २१.३५ टक्के इतके आहे. तसेच २००५-०६ ते २०१४-१५ पर्यंतच्या कालावधीचा विचार करता सिंचनसाठयात वाढ होत असल्यामुळे सिंचनक्षेत्रात क्रमाने २०११-१२पर्यंत वाढत गेल्याचे लक्षात येते.परंतु २०१३-१४ व २०१४-१५ या वर्षी सिंचनाच्या सरासरी टक्केवारीत घट जाणवते कारण मराठवाडयातील पडणारे पर्जन्याचेकमी प्रमाण हे दिसुन येते.

तसेच जिल्हानिहाय सिंचनाचा सरासरी विचार केला आसताजालना जिल्हयाची सरासरी टक्केवारी२०.४२ इतकी आहे. तर सर्वात कमी ११.४१ इतके कमी सिंचनक्षेत्र नांदेड जिल्हयात आढळते.

### निष्कर्षः

१. गोदावरी नदीनदीखोऱ्यातील एकुण लागवडीखालील क्षेत्राचा विचार केला आसता सिंचनक्षेत्राची दहा वर्षाची सरासरी टक्केवारी जिल्हानिहाय व वर्षनिहाय काढली असुन अभ्यासक्षेत्रात जशी सिंचनसाठयात वाढ होत गेली त्या प्रमाणात सिंचनक्षेत्राच्या टक्केवारीत घट जाणवते.

२. नांदेड जिल्हयाच्या सिंचनक्षेत्रापेक्षा जालना जिल्हयाचे सिंचनक्षेत्र सरासरी १० टक्के जास्त आढळते.

### संदर्भः

१. द. मा. मोरे, ;.२०१५&रू सिंचन चिंतन. महाराष्ट्र सिंचन सहयोग प्रकाशन, औरंगाबाद.
२. महाराष्ट्र जलसंपत्ती नियमन प्राधिकरण, मुंबई, वार्षिक अहवाल- २००५ -२०१४.
३. ढमढेरे एस. व्ही (२००६), महाराष्ट्रातील जलसंपदा, डायमंड प्रकाशन, पुणे
४. जलसिंचन विभाग, महाराष्ट्र शासन
५. गोदावरी खोरे खंड ५ दृ राज्य जलसंपत्ती आराखडा, जलसंपदा विभाग, महाराष्ट्र शासन.
६. गोदावरी खोरे खंड ६ दृ राज्य जलसंपत्ती आराखडा, जलसंपदा विभाग, महाराष्ट्र शासन.
7. घारे मुकुंद (२०००), सहभागीय पाणलोट क्षेत्र विकास, अफार्म प्रकाशन

# हवामान बदलाचा सोलापूर जिल्ह्यातील शेतीवर झालेल्या परिणामांचा भौगोलिक अभ्यास

**डॉ. प्रा. गायकवाड सुभाष माणिकराव**

सहाय्यक प्राध्यापक,

मा. ह. महाडिक कला व वाणिज्य महाविद्यालय,

मोडनिंब, ता. माढा, जि. सोलापूर.

**प्रस्तावना :**

शेती हा भारतीय लोकांचा मुख्य व्यवसाय आहे. जागतीकीकरणाचे वारे संपूर्ण विश्वभर १९९१ मध्ये वाहू लागले होते. भारताने ही या धोरणाचा स्विकार केला. भारत सरकारने त्या प्रमाणे अर्थव्यवस्थेत बदल केला. बहुराष्ट्रीय कंपन्या विदेशी भांडवलासह भारतात येऊ लागल्या. नवीन तंत्रज्ञानाची देवाण-घेवाण झाली. उच्च दर्जाची बी-बीयाणे, रासायनिक खते, किटकनाशके, यंत्र सामुग्री, वेगवेगळ्या पिकांसांबंधी माहिती शेतकऱ्यांना मिळू लागली. परिणामी शेतीउत्पादनात वाढ झाली, शेतकऱ्यांचा दृष्टीकोन बदलला, पडीक जमीन लागवडीखाली आणण्याचे प्रमाण वाढले. पण विदेशातून स्वस्त व दर्जेदार शेतमाल भारतात आल्याने स्थानिक शेतकऱ्यांच्या शेतीमालाची मागणी कमी झाली. परिणामी पारंपारिक बी-बीयाणांचा वापर कमी झाला. सोलापूर जिल्ह्यातील शेतकरी जास्तीत जास्त उत्पन्नासाठी बागायती पीकाकडे वळले व अन्नधान्य पिकाचे उत्पादन कमी झाले. म्हणून या संदर्भात "हवामान बदलाचा सोलापूर जिल्ह्यातील शेतीवर झालेल्या परिणामांचा भौगोलिक अभ्यास" हा शोध निबंधासाठी विषय निवडला आहे.

**बिज संज्ञा :**

हवामान बदल, शेतीची उत्पादकता, उत्पादनावरील परिणाम.

**अभ्यासक्षेत्र :**

सोलापूर जिल्हा महाराष्ट्रातील एक प्रमुख जिल्हा आहे. महाराष्ट्राच्या आग्नेय कोपऱ्यात वसलेल्या सोलापूर जिल्ह्याचे भौगोलीक स्थान १७॰.१०' उ. अक्षवृत्त ते १८॰.३२' उत्तर अक्षवृत्त आणि ७४॰.४२' पूर्व रेखावृत्त ते ७६॰.१५' पूर्व रेखावृत्त असे आहे. जिल्ह्याच्या उत्तरेस अहमदनगर व उस्मानाबाद हे जिल्हे, पूर्वेस उस्मनाबाद जिल्हा, दक्षिणेस सांगली व कर्नाटक राज्य आणि पश्चिमेस सातारा व पूणे हे जिल्हे आहेत. सोलापूर जिल्ह्याचे एकूण भौगोलिक क्षेत्रफळ १४८९५ चौ.कि.मी. असून ते महाराष्ट्राच्या एकूण क्षेत्रफळापैकी ४.८४% आहे. जिल्ह्याचे नागरी क्षेत्र २.५२% (३७४.४९ चौ.कि.मी.) व ग्रामीण क्षेत्र ९७.४८% (१४५२०.९१ चौ.कि.मी.) आहे.



**सोलापूर जिल्हा नकाशा**

सोलापूर हे जिल्ह्याचे ठिकाण समुद्र सपाटीपासून ५५० मी. उंचावर आहे. जिल्ह्यात बालाघाट पर्वत रांगेचे अनेक फाटे बार्शी, करमाळा तालुक्यात पसरले आहेत. माढा व माळशीरस तालुक्यात विखुरलेले डोंगर आहेत. माढा तालुक्यात चिंचगाव डोंगराची उंची ३०० फुट असून तो ६ चौ. कि.मी. पसरलेला आहे. जिल्ह्यातून भीमा ही प्रमुख नदी वाहत असून तिच्या उजवीकडून निरा व मान आणि डाबीकडून सिना, भोगावती या उपनद्या वाहतात, जिल्ह्यातील वार्षिक सरासरी पर्जन्यमान ५३३.०७ मि.मि. आहे. जिल्ह्याचे तापना १६॰ ते ४२॰ से. च्या दरम्यान आहे. २०११ च्या जनगणनेनुसार जिल्ह्याची एकूण लोकसंख्या ४३१८००० आहे. त्यापैकी ग्रामणी लोकसंख्या २९१९००० व नागरी लोकसंख्या १३९९००० आहे. साक्षरतेचे प्रमाण ७७.०२% आहे. २००१ ते २०११ च्या दशकात लोकसंख्या वाढीचा वेग १२.१६% आहे. सोलापूर जिल्ह्यात एकूण खेड्यांची संख्या ११५५ आहे.

**शोधनिबंधाची उद्दिष्ट्चे :**

१) सोलापूर जिल्ह्यातील शेतीवर झालेल्या परिणामाचा अभ्यास करणे.

२) सोलापूर जिल्ह्यातील पिकाची बदलशीलता अभ्यासणे.

३) सोलापूर जिल्ह्यातील प्रमुख पिकांची उत्पादकता व उत्पादनामधील परिणामाचा अभ्यास करणे.

**संशोधन पध्दती व माहिती स्रोत :**

सदरील संशोधनासाठी संशोधकाने विविध प्रकाशित, साहित्य, संदर्भ ग्रंथ, अहवाल, मासिके इत्यादी दुय्यम साधनांचा आधार घेतला आहे. प्राप्त सामग्रीचे विश्लेषण करण्यासाठी गरजेनुसार सरासरी, टक्केवारी आणि त्यातील बदल इत्यादी सांख्यिकीय साधनांचा वापर करून विश्लेषण करण्यात आले आहे. या शोधनिबंधासाठी सन १९९०-९३ ते २०१३-१४ हा कालावधी अभ्यासण्यात आला आहे.

**विषय विवेचन :**

"पिक प्रारूप म्हणजे एका विशिष्ट वेळी एकूण लागवडीखाली असलेल्या जमिनीत बेगवेगळ्या पिका खालील शेतजमिनीची टक्केवारी किंवा प्रमाण होय." तसेच "पिक प्रारूपातील बदल म्हणजे वेगवेगळ्या पिकाखालील शेतजमिनीच्या टक्केवारीत किंवा प्रमाणात इ ाालेला बदल होय." खाली दिलेल्या टेबलमध्ये सोलापूर जिल्ह्यातील पिकाची आकडेवारी दिली आहे.

### टेबल क्र.१ : सोलापूर जिल्ह्यातील पिकाखालील क्षेत्र (तीन वर्षांची सरासरी) ( क्षेत्र ०० हेक्टर मध्ये)

| क्र. | पिके | १९९०-९३ | लागवडी क्षेत्राची टक्केवारी | २०००-२००३ | लागवडी क्षेत्राची टक्केवारी | २०११-२०१४ | लागवडी क्षेत्राची टक्केवारी | बदल % | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | १९९०-९३ | २०००-०३ | २०११-१४ |
| १ | तृणधान्य पिके | ८२७६.९२ | ७४.५५ | ७३५८.८७ | ६९.३२ | ६१२७.३८ | ६४.७३ | -११.०९ | -१६.७३ | -२५.९७ |
| २ | कडधान्य पिके | १०२५.०४ | ९.२३ | ८७२.९५ | ८.२२ | १११७.८० | ११.८१ | -१४.८३ | २८.०४ | ९.०४ |
| ३ | अन्नधान्य पिके | ९३०१.९६ | ८३.७८ | ८२३१.८२ | ७७.५४ | ७२४५.१८ | ७६.५४ | -११.५० | -११.९८ | -२२.११ |
| ४ | ऊस | ४६२.२१ | ४.१६ | ६४६.२४ | ६.०८ | ११०८.४३ | ११.७० | ३९.८१ | ७१.५१ | १३९.८१ |
| ५ | मसाल्याचे पदार्थ | ५०.८१ | ०.४५ | ५२.०४ | ०.४९ | २६.९५ | ०.२७ | २.४२ | -५०.१३ | -४८.९२ |
| ६ | फळे व भाजीपाला | १५४.८९ | १.३८ | ३०३.२२ | २.८५ | ५३५.८७ | ५.६६ | ९६.६५ | ७६.६२ | २४७.५३ |
| ७ | तंतू पिके | ४०.०० | ०.३६ | ५८.३३ | ०.५४ | २५.१३ | ०.२६ | ४५.८२ | -५६.९८ | -३७.१४ |
| ८ | गळीत धान्य पीके | ९७५.२ | ८.८७ | ११९७.१५ | ११.२७ | २९४.५१ | ३.११ | २२.७५ | -७५.३९ | -६९.८० |
| ९ | औषधी व मादक पदार्थ | २.०९ | ०.०१ | १.४१ | ०.०१ | १.२६ | ०.०१ | -३२.५३ | -१०.६३ | -३९.७१ |
| १० | चारा पिके | १०७.०३ | ०.९६ | ८१.०१ | ०.७६ | २२९.३८ | २.४२ | -२४.३१ | १८३.१५ | ११४.३१ |
| ११ | अखाद्य पिके | ११३३.७७ | १०.२१ | १३३९.६ | १२.६१ | ५५०.९८ | ५.८२ | १८.१५ | -४८.१४ | -३८.७२ |
| १२ | खाद्य पिके | ९९६८.२१ | ८९.७९ | ९२७५.८६ | ८७.३८ | ८९१४.७३ | ९२.९० | -६.९४ | -३.८९ | -१०.७६ |
| १३ | लागवडी खालील एकूण क्षेत्र | ११९०१.९८ | १००.०० | १०६१५.४६ | १००.०० | ९४६५.७१ | १००.०० | -४.३८ | -१०.८३ | -१४.७३ |

वरील टेबल क्र. १ मध्ये सन १९९०-९३, २०००-०३ आणि २०११-१४ अशा सरारसरी तीन वर्षांचा सोलापूर जिल्ह्यातील पिकाखालील क्षेत्रातील बदल दाखविला आहे. अभ्यास वर्ष २०११-१४ मध्ये जिल्ह्यात एकूण लागवडी क्षेत्राच्या तृणधान्य पिकाखालील क्षेत्र ६४.७३% आहे. कडधान्य, गळीतधान्य, ऊस, मसाल्याचे पदार्थ, फळे व भाजीपाला पिकाचे क्षेत्र आणि औषधे व मादक पदार्थाच्या पिकाखालील क्षेत्राच्या तुलनेत अधिक आहे. एकूण लागवडी खालील क्षेत्राच्या ११.८१% क्षेत्र कडधान्य पिकाखाली आहे. जिल्ह्यातील सर्वाधिक ७६.५४% क्षेत्र अन्नधान्य पिकाखाली आहे. या प्रकारे जिल्ह्यातील पिकाखालील क्षेत्राच्या बदलशीलतेचा अभ्यास केल्यानंतर असे स्पष्ट होते की, जिल्ह्यातील तृणधान्य पिके, अन्नधान्य पिके, मसाल्याची पिके, तंतू, गळीत धान्य पिके, औषधी व मादक पदार्थ इत्यादी पिकांचे क्षेत्र कमी इ आले आहे.

जिल्ह्यात लागवडी क्षेत्रापैकी ५.६६% क्षेत्र फळे व भाजीपाला पिकाखाली आहे. जिल्ह्यातील १,११७८० हेक्टर क्षेत्रावर ऊस या नगदी पिकाची लागवड केली आहे. ऊस लागवडीचे प्रमाण ११.७५% आहे. सन १९९०-९३ पासून२०११-१४ या कालावधीत सोलापूर जिल्ह्यातील शेतकरी नगदी पिके (ऊस, फळे, भाजीपाला) घेण्याकडे वळले आहेत असे सांगता येते. तसेच ऊसाचे क्षेत्र १३९.८१% वाढले आहे. फळे व भाजीपाला पिकांचे क्षेत्र २४७.५३% वाढले. चारा पिकाचे क्षेत्र ११४.३१% झाले कारण सोलापूर जिल्ह्यातील शेतकरी व्यापारी तत्त्वावरील पशुपालनाकडे वळल्याचे आढळते. अर्थात जिल्ह्यातील शेतकरी पारंपारिक पिकाखालील (अन्नधान्य) क्षेत्राऐवजी व्यापारी व नगदी पिके लागवडी खालील क्षेत्रात वाढ करीत असल्याचे आढळते.

### जिल्ह्यातील प्रमुख पिकांचे उत्पादन :

पिक उत्पादनावर हवामानाचा परिणाम होतो. सोलापूर जिल्ह्यातील शेतकरी अलीकडच्या काळात हवामानात झालेल्या बदला नुसार विविध पिकांचे उत्पादन घेत आहे.

### टेबल क्र.२ : सोलापूर : प्रमुख पिकांचे उत्पादन (सन १९९०-९३ ते २०११-१४) ('००' मेट्रिक टनामध्ये)

| क्र. | पिके | १९९०-९३ | २०००-०३ | २०११-१४ | बदल % | | |
|---|---|---|---|---|---|---|---|
| | | | | | १९९०-९३ | २०००-०३ | २०११-१४ |
| १ | तृणधान्य पिके | ३६२३.०१ | ३९४४.३३ | २७६२.६२ | ८.३६ | -२९.९५ | -२३.७४ |
| २ | कडधान्य पिके | ३१९.६७ | २८६.३४ | २३८.३८ | -१०.४२ | -१६.७४ | -२५.४२ |
| ३ | अन्नधान्य पिके | ३९४२.६८ | ४२३०.६७ | ३००१ | ७.३० | -२९.०६ | -२३.८८ |
| ४ | तेलबिया | ४०६.०१ | १०६.६६ | ११५.०४ | -७३.७२ | ७.८५ | -७१.६६ |
| ५ | ऊस (केन) | २६५४७ | ४८४५० | १०९८७२.१४ | ८२.५४ | १२६.७२ | ३१३.८७ |
| ६ | तंतू पिके (गाठी) | ४१.६७ | ७५ | ४.३३ | ७९.९८ | -९४.२२ | -८९.६० |
| ७ | औषधी व मादक पदार्थ | १ | २ | उ. नाही | १०० | - | - |
| ८ | मसाल्याचे पदार्थ | ६०८ | ४६९.६७ | उ. नाही | -२२.७५ | - | - |

१) १ गाठ = १७० कि. ग्रॅ.      २) ऊसाचे उत्पादन ड्रेसड केनमध्ये आहे.

वरील आकडेवारी वरून असे स्पष्ट होते की, सोलापूर जिल्ह्यातील अन्नधान्य पिकाच्या उत्पादनात तृणधान्य पिकाचे उत्पादन जास्त आहे. परंतू एक विशेष बाब म्हणजे ११९०-९३ च्या तुलनेत २०११-१४ मध्ये तृणधान्ये, कडधान्य, अन्नधान्य पिकांचे उत्पादन घटले आहे. सन २०११-१४ मध्ये तेलबियाचे उत्पादन ११५०४ मेट्रिक टन झाले. ऊसाचे उत्पादन १०९८७२१४ केन व तंतू पिकांचे उत्पादन ४३३ गाठी झाले आहे.

अभ्यास वर्षातील कालावधीत सोलापूर जिल्ह्यातील पिक उत्पादनातील बदलाचा आढावा घेतल्यानंतर असे स्पष्ट होते की, ऊस उत्पादन ३१३.८७% वाढले. तेलबियाचे उत्पादन ७१.६६% तंतू पिकांचे उत्पादन ८९.६०% तृणधान्य उत्पादन २३.७४% कडधान्य पिकाचे उत्पादन २५.४२% आणि अन्नधान्य पिकाचे उत्पादन २३.८८% घटले आहे.

थोडक्यात जिल्ह्यातील ऊस, गहू, मका इत्यादी पिकांच्या उत्पादनात वाढ झाली तरी ज्वारी, बाजरी, भात या अन्नधान्य पिकांच्या व तेलबियांच्या उत्पादनात कमालीची घट झाली आहे हा प्रश्न विशेष आहे.

**टेबल क्र.३ : पिकांची उत्पादकता : (तीन वर्षांची सरासरी)          (प्रतिहेक्टर किलोमध्ये)**

| क्र. | पिके | १९९०-९३ | २०००-०३ | २०११-१४ | बदल % | | |
|---|---|---|---|---|---|---|---|
| | | | | | १९९०-९३ | २०००-०३ | २०११-१४ |
| १ | तृणधान्ये | ४७६.३३ | ४८८.६७ | ५५९* | २.३५९ | १४.३९ | १७.३५ |
| २ | कडधान्ये | २८३.३३ | ४१५.३३ | १४१५.५०* | ४६.५९ | २४०.८१ | ३९९.५९ |
| ३ | अन्नधान्ये | ४२३.८५ | ५१३.९४ | ४२३.४० | २१.२५ | -१७.६२ | -०.११ |
| ४ | तेल बिया | १६३१.६७ | १४७४.५ | १४२०.५० | -९.८२ | -३.६६ | -१२.९४ |
| ५ | ऊस ( टनामध्ये) | ७४.४० | ८०.०० | ८६.६६ | ७.५३ | ८.३२ | १६.४७ |
| ६ | तंतू पिके | ४४३ | ५२९ | १०२ | १९.४१ | -८०.७१ | -७६.९७ |
| ७ | ओषधी व मादक पदार्थ | ८३३.३३ | ११८९.६७ | उ. ना | ४२.७६ | - | - |
| ८ | मसाल्याचे पदार्थ | २१२३.३३ | २९९१.३३ | उ. ना | ४०.८८ | - | - |

*दोन वर्षांची सरासरी                    स्त्रोत : सोलापूर जिल्हा आर्थिक व सामाजिक समालोचन.

वरील टेबलवरून असे स्पष्ट होते की, सन २०११-१४ मध्ये सोलापूर जिल्ह्यात ऊस, मका (कडधान्य) या पिकांची उत्पादकता जास्त आहे. जिल्ह्यात पिकांच्या उत्पादकतेत ऊसाचा प्रथम क्रमांक आहे. ऊसाची उत्पादकता प्रतिहेक्टर ८६.६६ टन आहे. शिवाय कडधान्य व तृणधान्य पिकांची उत्पादका जास्त आहे.

अभ्यास वर्ष १९९०-९३ ते २०११-१४ या काळातील जिल्ह्यातील पिकांच्या उत्पादकतेच्या बदलाचा अभ्यास केल्यानंतर असे स्पष्ट होते की, अन्नधान्य पिकांची उत्पादकता कमी झाली आहे.

अभ्यास कालावधीमध्ये भारताने जागतीकीकरणामुळे मुक्त अर्थव्यवस्थेचे धोरण स्वीकाराले परिणामी जगातील आधुनिक नवनवीन तंत्रज्ञानाची आदान-प्रदान झाली त्याचा फायदा शेतकऱ्यांना झाला. त्यामुळे सोलापूर जिल्ह्यातील शेतकऱ्यांनी शेती क्षेत्रातील आधुनिक तंत्रज्ञानाच्या जोरावर, जलसिंचनाच्या आधुनिक स्त्रोतांचा वापर करून संकरीत बी- बीयाणे व रासायनीक व सेंद्रीय खतांचा वापर केल्यामुळे सोलापूर जिल्ह्यातील पारंपारिक शेतीची जागा आधुनिक शेतीने घेतल्यामुळे सोलापूर जिल्ह्यातील पीक-प्रारूपता आणि पिक उत्पादकतेमध्ये आमुलाग्र बदल झाल्याचे प्रस्तुत अभ्यासावरून स्पष्ट होते.

**निष्कर्ष :**

१) जिल्ह्यातील पिकाखालील क्षेत्राचा अभ्यास केल्यानंतर असे स्पष्ट होते की, अन्नधान्य पिकाखालील क्षेत्रात आणि गळीत पिकाच्या क्षेत्रात घट झाली आहे.

२) नगदी पिक उदा. ऊस, फळे व भजीपाला आणि चारा पिका खालील क्षेत्रात वाढ झाली आहे.

३) सोलापूर जिल्ह्यातील शेतकरी पारंपारीक पिका ऐवजी व्यापारी किंवा नगदी पिकांच्या क्षेत्रात वाढ करीत आहेत.

४) जिल्ह्यातील विविध पिकांच्या उत्पादनातील बदलात ऊस पिकाची उत्पादकता वाढली आहे.

५) अन्नधान्य पिकाची तेलबीया पिकाची उत्पादकता कमी झाली आहे.

६) सोलापूर जिल्ह्यातील शेतकरी पाण्याच्या उपलब्धतेमुळे व्यापारी तत्त्वावर शेती करत आहे.

**संदर्भ सूची :**

१) *महाराष्ट्राचा भूगोल - ए.बी. सवदी - निराली प्रकाशन, पुणे.*

२) *SANDARBH MAHARASHTRA STATE VAL-१[ST] संपादक - Dr. के. के. शर्मा.*

३) *सोलापूर जिल्हा सामाजिक व आर्थिक समालोचन सन १९९१ ते २०१४.*

४) *W.W.W. Mahaagri.gav. in*

५) *कृषी भूगोल - के. के. खतीब.*

६) *कृषी भूगोल - जयकुमार मगर.*

७) *अर्थसंवाद - जुलै, ऑगस्ट २०१३.*

८) *सोलापूर जिल्ह्यातील पीक प्रारूपातील बदलाचा भौगोलिक अभ्यास - प्रा. गायकवाड एस. एस.*

# जलसंवर्धन काळाची गरज

**प्रा. डॉ. रमेश धनेश्वर**

भूगोल विभाग प्रमुख

भाई किशनराव देशमुख महाविद्यालय,

चाकुर जि.लातूर

## प्रस्तावना :

मानवाच्या मुलभूत गरजांपैकी पाणी ही एक महत्वाची गरज आहे. पाणी हे नैसर्गिक संसाधन आहे. वाढती लोकसंख्या, औद्योगिकरण, नागरीकरण, शेती यामुळे पाण्याचा पुरवठा अपुरा पडू लागला व उपलब्ध पाण्याचा दर्जासुध्दा खालवला. पाण्याची मनुष्याला सर्वाधिक आवश्यकता असते. ती गरज भागविण्यासाठीच मनुष्य नेहमी नदीच्या किनाऱ्यावर वास करत आला आहे. लोकसंख्या वाढीबरोबरच पाण्याची गरज पिण्यापुरतीच मर्यादीत न राहता अन्य कारणांसाठी वापरली जावू लागली. आता पाण्याचा उपयोग पिण्यासाठी, घरगुती कामासाठी, सिंचनासाठी, उद्योग, मनोरंजन, शेती इत्यादीसाठी केला जातो.

पाणी ही आपली राष्ट्रीय संपत्ती आहे. वाढत्या लोकसंख्येबरोबर या राष्ट्रीय संपत्तीचा वापर वाढला असून, त्यामुळे पाण्याची दरडोई उपलब्ध कमी होऊ लागली आहे. शहरीकरण आणि औद्योगीकरणामुळेही पाण्याची मागणी सातत्याने वाढत आहे. साहजीकच उपलब्ध पाणीसाठा अपुरा पडू लागला आहे. भविष्यात ही समस्या गंभीर स्वरुप धारण करु शकते याची जाणीव आपण सर्वांनी ठेवायला हवी. सर्व सजीवांना जगण्यासाठी पाणी आवश्यक असते. जलसाक्षरतेच्या विषयाकडे आज सर्वांनीच जागरुकपणे पाहण्याची गरज आहे.

## उद्दिष्टे :

१) जलसंवर्धन व्यवस्थापनाचा आढावा घेणे.

२) जलसंवर्धनाबाबत महत्व जाणून घेणे.

३) जलसंवर्धनाबाबत उपाययोजना शोधुन काढणे.

## विषय विवेचन :

जलसंवर्धन ही काळाची गरज आहे. त्यासाठी समाजामध्ये तशी जाणी निर्माण करणे आवश्यक आहे. भारत हा कृषीप्रधान देश आहे. शेतीसारख्या व्यवसायात जलसंवर्धनाबाबत शेतकऱ्यांमध्ये जनजागृती व्हावी म्हणुन कृषी संमेलन, अधिवेशन इत्यादी मार्फत जलसंवर्धनाचे महत्व पटवून देता येते. मानवाने आपल्या जीवनात नियोजनबध्द केलेल्या पाण्याचा वापर म्हणजे जलसंवर्धन होय. पाणी ही विपूल प्रमाणात आढळणारी संपत्ती आहे. तथापि संवर्धन आणि नियोजनाचा प्रभाव मात्र प्रकर्षाने जाणवतो. एकूण पावसाच्या पाण्यापैकी फक्त १० % पाणीच वापरले जाते. भारतातल्या शेतीला मोसमी पावसावर अवलंबून आहे. पावसाचे वितरण, कालखंड व प्रमाण फारच विषम आहे. याशिवाय वनस्पतीची अनिर्बंध तोड, मृदेची अतोनात धुप यामुळे मोसमी पावसाचा बराच भाग वाहुन जातो. जलसाठयाची वापरात अजिबात नियोन नाही तळी व सरोवरे नष्ट होण्याच्या मार्गावर आहेत.

## जलसंवर्धनाबाबत समाज जाणीव :

जलसंवर्धनाबाबत समाजामध्ये तशी जाणीव व जागृती निर्माण करणे आवश्यक आहे. मनोरंजनातुन ज्ञानप्राप्ती या तत्त्वानुसार प्रसारमाध्यमाच्या जलसंवर्धनामध्ये पाण्याचा अतिरेकी वापर टाळून आवश्यक तेवढेच जल वापरावे यासाठी पाण्याच्या महत्वाबाबत लहान-थोर, वृध्द, स्त्री-पुरुष एकुणच समाजामध्ये जागृती करणे आवश्यक आहे.

## पाणी व्यवस्थापनामध्ये अशासकीय संस्थांचा सहभाग :

प्रत्येक शहर व गावातील अशासकीय संस्थांनी लोकांना व्यवस्थीत पाणी मिळावे म्हणुन प्रयत्न करायला हवा. बऱ्याच खेडयामध्ये अशासकीय संस्थांनी जाऊन पाणी व्यवस्थापनाचे काम लोकांना शिकवले आहे. अनेक ठिकाणी तलाव बनवले आहेत. रेनवॉटर हार्वेस्टिंग शिकवले, डोंगरातले वाहुन जाणारे पाणी अडवायला शिकवले आहे त्यामुळे लोकांना पाण्याचा प्रश्न कायमचा सुटला आहे.

## जलसंवर्धनाचे उपाय :

१) पाण्याबाबत जाणीव निर्माण करण्यासाठी वृत्तपत्रे, टी.व्ही., रेडियो इत्यादी माध्यमाद्वारे जलसंवर्धनाबाबत माहिती प्रसारीत करण्यात यावी.

२) किर्तन, भारुड, गाणी, लोकनाटय इत्यादीद्वारा पाण्याबाबत जनतेत जागृती निर्माण करावी.

३) जलवाहीण्या, नळ, बंधारे व कालवे यांची नियमीत डागडूजी करावी.

४) जंगलतोड थांबवुन वृक्ष लागवड करावी.

५) पाणी वापरासंदर्भात शेतकऱ्यांना माहिती द्यावी.

६) पाणी समस्येला कारणीभूत असलेल्या अफाट लोकसंख्यावाढ नियंत्रण करण्यासाठी कठोर उपाय योजावेत.

७) शेतीसाठी जलसिंचनासंदर्भात नवीन तंत्रज्ञानाचा वापर करावा.

८) बचत गटातील महिलांमध्ये जनजागृती करावी.

९) जलसाक्षरतेबाबत जागरुकता झाली पाहीजे.

१०) प्रत्येक नागरीकाने आपले कर्तव्य समजुन पाणी व्यवस्थापन करावे.

११) प्राथमिक, माध्यमिक व महाविद्यालयीन स्तरावरील अभ्यासक्रमात जलसंवर्धनाबाबतीतला अभ्यास समाविष्ट असावा.

**सारांश :**

      जलसंवर्धन करणे ही काळाची गरज असल्यामुळे समाजामध्ये तशी जाणीव जागृती निर्माण करावी. पाणी ही राष्ट्रीय संपत्ती आहे. वाढत्या लोकसंख्यमध्ये या राष्ट्रीय संपत्तीचा वापर वाढला असुन त्याची पाण्याची दरडोई उपलब्ध कमी होऊ लागली आहे. प्रत्येक अशासकीय संस्थानाची पाण्याच्या व्यवस्थापनाबाबत समाजामध्ये जाणीव जागृती निर्माण करावी. मनुष्याच्या मुलभूत गरजांपैकी पाणी ही एक असल्यामुळे तिचे संवर्धन करणे ही आपली सामुहीक जबाबदारी आहे.

**संदर्भ ग्रंथ :**

    १)   *पर्यावरणशास्त्र — डॉ.विठ्ठल घारपुरे*

    २)   *कृषी भूगोल — अरुण कुंभारे*

    ३)   *पर्यावरणशास्त्र — शैलजा  सांगळे*

    ४)   *पर्यावरण भूगोल — डॉ्घ पांडूरंग केचे*

    ५)   *महाराष्ट्राचा भूगोल — प्रा. ए.बी. सवदी*

# परभणी जिल्हयातील तूर पिकाची उत्पादकता एक भौगोलिक अभ्यास

प्रा. डॉ. एच. डी. वागलगावे

भूगोल विभाग

शिवनेरी महाविद्यालय शिरुर अनंतपाळ

**प्रस्तावना :**

    कृषी उत्पादकता आणि कृषि कार्यक्षमता या दोन्ही शब्दाचे अर्थ वेगवेगळे आहेत. कृषी उत्पादकता मूर्त असते. तर जगातील बहुतांशी देश हे कृषीप्रधान असल्यामुळे अभ्यास करणे अधिक महत्वाचे असते. आपल्या आपल्या देशाच्या संदर्भाने शेती हा अत्यंत महत्वाचा व्यवसाय आहे. कारण शेती हा भारतीय अर्थव्यवस्थेचा कणा आहे. कृषी उत्पादकता वाढविणे गरजेचे आहे. आपला देश कृषीप्रधान असल्यामुळे ७० टक्के लोक शेती या व्यवसायात गुंतलेले आहेत. कृषी उत्पादकता अनेक घटकांवर अवलंबून आहे. प्राकृतिक, सामाजिक, आर्थिक, राजकीय अशा वेगवेगळया घटकाचा प्रभाव पडतो. जर हे शेतीस अनुकुल असतील तर कृषीउत्पादकता वाढतो. या उलट जर त्या प्रतीकुल असतील तर कृषी उत्पादकता वाढत नाही.

**स्थान व विस्तार :**

    महाराष्ट्र राज्यातील मराठवाडा विभागातील परभणी हे एक प्रमुख जिल्हा आहे. महाराष्ट्र राज्याच्या पूर्वेस वसलेला असून या जिल्ह्याचे भौगोलिक स्थान १८°४५' ते २०°०१' उत्तर अक्षांसावर आणि ७६°१३' ते ७७°२९' पूर्व रेखांशाच्या पट्टयात वसलेला आहे. जिल्हयाच्या पूर्वेस नांदेड, पश्चिमेस जालना, दक्षिणेस बीड व लातूर उत्तरेस बुलढाणा व हिंगोली हे जिल्हे आहेत. जिल्हयाचे भौगोलिक क्षेत्रफळ ६५११ चौ.की.मी. असून सन २००१ च्या जनगणनेनुसार जिल्हयाची लोकसंख्या १५२७७१५ आहे.

    प्रस्तुत अभ्यासासाठी इ.स. २००० ते २०१० या दहा वर्षातील सरासरी ऊस पीक उत्पादकता निर्देशांकाचा अभ्यास करण्यात आलेला आहे.

**आकडेवारी व माहिती संकलनाचे स्रोत :**

    परभणी जिल्हयातील हरभरा पीक उत्पादकता सन २००० ते २०१० या कालावधीत अभ्यास करण्यासाठी आकडेवारी व माहिती संकलनासाठी संशोधकाने पुढील साहित्य सामुग्रीचा वापर केला आहे. शासकीय व निमशासकीय कार्यालयातील माहिती पुस्तीका, गॅझेटर्स, मासिके, इंटरनेट इ. साधनाचा अवलंब करुन माहिती संकलित केली आहे.

**अभ्यास पध्दती :**

    प्रस्तूत अभ्यासासाठी आवश्यक असणारी माहिती व्दितीय स्वरुपाची असून परभणी जिल्हा सामाजिक व आर्थिक समालोचनाचा वापर केला आहे. कृषी उत्पादकता काढण्यासाठी खालील सुत्राच्या साह्याने काढण्यात आले आहे.

$$PN = \frac{y}{yn}\% \frac{T}{TN} \times 100$$

**विषय विवेचन :**

    परभणी जिल्ह्यातील तूर या पिकाचा अभ्यास करीत असताना १० वर्षाच्या कालावधीचा अभ्यास केला आहे. हे पीक रब्बी हंगामातील प्रमुख पीक आहे. या जिल्ह्यातील सर्व तालुक्यातुन हे पीक घेतले जाते. जमीन, पाणी, उत्पादकता, हवामान या सर्व गोष्टींचा तूर पिकावर व उत्पन्नावर परिणाम होत असल्याचे दिसून येते.

    तूर उत्पादकता निर्देशांक :- सन २०००-२००५ या कालावधीत तूर पिकाच्या जवळ (X + 25.D.) निर्देशांक गटात पालम आणि जिंतूर या दोन तालुक्याचा समावेश होतो. या तालुक्यातील तूर पिकाखालील सरासरी क्षेत्र १३.५२ टक्के एवढे असून उत्पादन १९.२१ टक्के एवढे असून या गटातील उत्पादकता निर्देशांक १६३.२५ च्या दरम्यान आहे.

**तूर पीक उत्पादकता निर्देशांक :**                     (क्षेत्र व उत्पादन टक्केवारी)

| अ.क्र. | तपशील | २०००-२००५ | | २००५-२०१० | | निर्देशांक | | बदल |
|---|---|---|---|---|---|---|---|---|
| | | क्षेत्र | उत्पादन | क्षेत्र | उत्पादन | २०००-२००५ | २००५-२०१० | |
| १ | सेलू | १९.४६ | ११.९४ | १२.७६ | १२.५० | ९५.८२ | ९७.९६ | २.१४ |
| २ | जिंतूर | ७.९८ | १३.०३ | १८.१३ | १३.४८ | १६३.२८ | ७४.३५ | -८८.९३ |
| ३ | परभणी | १८.८९ | १६.५० | २७.६७ | १७.५४ | ८७.८७ | ६३.३९ | -२४.४८ |
| ४ | मानवत | ०.०० | ६.६८ | ३.२६ | ५.३९ | ६.०० | १६५.३३ | १६५.३३ |
| ५ | पाथरी | २१.२८ | १२.२९ | १३.२६ | १२.६८ | ५७.७५ | ९०.८३ | ३३.०८ |
| ६ | सोनपेठ | ०.०० | १५.८८ | २.९८ | १६.१८ | ०.०० | ५४२.९५ | ५४२.९५ |
| ७ | गंगाखेड | १८.२२ | ५.४६ | ११.३८ | ४.०६ | २९.९६ | ३५.६७ | ५.७५ |
| ८ | पालम | ५.३४ | ६.१८ | ०६.१० | ५.२२ | ११५.२३ | ५५.५७ | -३०.१६ |
| ९ | पूर्णा | १५.८३ | ११.९४ | ३.७६ | १२.९५ | ७५.४२ | ३४४.४१ | २८८.९९ |
| | एकूण | १०० | १०० | १०० | १०० | १०० | | |

*स्रोत :- संशोधकाव्दारा संकलित केलेल्या माहितीवर आधारित.*

मध्यम उत्पादकता निर्देशांक (X + 25.D.) गटात सेलू, पूर्णा आणि परभणी या तीन तालुक्याचा समावेश होतो. या तालुक्यातील तूर पिकाखालील खेत्र ४१.१८ टक्के एवढे असून उत्पादन ४०.४८ टक्के एवढे आहे. या गटातील उत्पादकता निर्देशांक ५७.७५ पर्यंत आढळतो.

**निष्कर्ष :**

सन २०००-०५ ते २००५-१० या दहा वर्षाच्या कालावधीत तूर पीक उत्पादकता निर्देशांकात सर्वांत जास्त घनात्मक बदल सोपनेठ या तालुक्यात ५४२.९५ एवढी दिसून येते. तर सर्वांत जास्त ऋणात्मक बदल जिंतूर तालुक्यात ८८.९३ एवढा दिसून येतो. उर्वरित सेलू, मानवत, पाथरी, गंगाखेड, पुर्णाया तालुक्यात घनात्मक बदल दिसून येतो. तर परभणी व पालम तालुक्यात ऋणात्मक बदल दिसून येतो.

**संदर्भ :**

१. आर.सी. तिवारी आणि बी.एन. सिंह कृषी भूगोल
२. डॉ. विठ्ठल धारपुरे (२०००) कृषी भूगोल.
३. भोसले व कारे भारताचा कृषी भूगोल
४. परभणी जिल्हा अर्थिक व सामाजिक समालोचन सन २०००-२०१०.

## तिरुजलसिंचन प्रकल्प प्रभाव क्षेत्रातील लोकसंख्या घनतेचा भौगोलिक अभ्यास

**प्रा. डॉ. आप्पाराव आण्णाराव काळगापुरे**

संशोधक मार्गदर्शक व भुगोल विभाग प्रमुख

श्री हावगीस्वामी महाविद्यालय, उदगीर   .

**प्रा. महेश सुरेशराव मोरे**

राजर्षी शाहु महाविद्यालय,

लातुर.

**प्रस्तावना :-**

मानवी भुगोलाच्या अभ्यासात लोकसंख्येस अधिक महत्त्व आहे, मानवाने पृथ्वीतलावर प्रचंड बदल घडवुन आणले आहेत. शास्त्रीय आणि तंत्रज्ञान विषयक प्रगतीतुन माणसाची शक्ती इतकी वाढली आहे की, त्याच्या कुवतीपलीकडे असे काही राहिलेले नाही. प्रदेशाची आर्थिक प्रगती ही त्या प्रदेशातील एकुण लोकसंख्येशी निगडीत असते, देशाची आर्थिक प्रगती ही उत्पादनासाठी लागणाऱ्या नैसर्गिक घटकावर अवलंबुन असते व नंतर ते उत्पादक पदार्थ वापरले जाण्यासाठी लोकसंख्या हा घटक महत्त्वाचा असतो. पुरेशी लोकसंख्या नसेल तर उत्पादित पदार्थांना तेवढ्या प्रमाणात मागणी नसते. म्हणुन लोकसंख्या घटक महत्त्वाचा असतो व लोकसंख्या जास्त झाली तरीही त्याचा विपरीत परिणाम होतो. म्हणुन यात समतोल असला पाहिजे. परंतु जागतिक स्तरावर लोकसंख्येचे वितरण असमान आहे. असेच वितरण तिरु जलसिंचन प्रभावक्षेत्रातपण आहे. एखाद्या प्रदेशात किती लोक राहतात यावरुन लोकसंख्येची घनता समजते.

**बीज संज्ञा :-** तिरु प्रकल्प, लोकसंख्येची घनता.

**अभ्यास क्षेत्र :-**

तिरु जलसिंचन प्रकल्प हा लातुर जिल्ह्याच्या दक्षिण पूर्व भागात असुन, बालाघाट डोंगररांगेच्या प्रभव क्षेत्रात, गोदावरी खोऱ्यात आहे. या प्रकल्पाचा अक्षवृत्तीय विस्तार १८°३'३४'' उत्तर अक्षांश ते ७७°४'७७'' पूर्व रेखांशावर स्थित आहे. हा प्रकल्प मांजरा उपखोऱ्यात असुन हे धरण मातीच्या प्रकल्पात मोडते. धरणाची एकुण लांबी १९९० मी. तर सांडव्याची लांबी ४३१ मी. आहे. या प्रकल्पाने या क्षेत्रात आपला एक वेगळा ठसा उमटवला आहे. म्हणुन याच प्रकल्प प्रभावक्षेत्रातील लोकसंख्येच्या घनतेचा अभ्यास प्रस्तुत शोध निबंधातुन करण्यात आला आहे.

**उद्दिष्टे :-**

तिरुजलसिंचन प्रकल्प प्रभाव क्षेत्रील लोकसंख्या घनतेचा अभ्यास करणे.

**अभ्यासपद्धती :-**

प्रस्तुत शोध निबंध दुय्यम स्वरुपाच्या आकडेवारीवर आधारलेला आहे. आकडेवारी ही जिल्हा जनगणना व महाराष्ट्र जनगणना अहवालावर आधारलेली आहे.

**विषय विवेचन :-**

एखाद्या प्रदेशात किती लोक राहतात यावरुन लोकसंख्येची घनता ठरवली जाते. भुभाग व लोकसंख्या याचे गुणोत्तर असते. घनता ही दर चौ.कि.मी. किंवा दर मैलास काढली जाते. २०११ च्या जनगणनेनुसार भारताची घनता ३८२ आहे तर महाराष्ट्राची ३६५ आहे. लोकसंख्येची घनता काढण्यासाठी खालील सुत्राचा उपयोग केला जातो.



Laiur District Study Area Location Map

Fig No. 1.1

Source: Google Earth & survey of India

$$\text{लोकसंख्येची घनता} = \frac{\text{एकुण लोकसंख्या}}{\text{एकुण क्षेत्रफळ}}$$

लोकसंख्येची घनता ही त्या प्रदेशातील भविष्यातील विकासाचा अनुमान काढण्यासाठी मुख्य आधार असते. कोणत्याही प्रदेशाचा आर्थिक विकास तसेच सामाजिक आणि सांस्कृतिक विकास राबविण्यासाठी त्या प्रदेशातील लोकसंख्येची घनता समजुन घेणे महत्त्वाचे ठरते.

तिरुजलसिंचन प्रकल्प प्रभाव क्षेत्रातील २००१ ते २०१९ या दोन दशकातील लोसंख्येची घनता दर्शवली आहे.तिरु जलसिंचन प्रकल्प प्रभाव क्षेत्रातील घनता.

| अ.क्र. | गावाचे नाव | लोकसंख्या घनता | |
|---|---|---|---|
| | | २००१ | २०११ |
| १. | वाढोण बु. | ४१४ | ४४० |
| २. | वाढोणा खु. | २२५ | २६२ |
| ३. | लाळी बु. | १५५ | १८७ |
| ४. | लाळी खु. | २६० | ३६१ |
| ५. | बेलसांगवी | २४३ | २८७ |
| ६. | शिवणखेड | २१७ | २७२ |
| ७. | येवरी | २६३ | ३२७ |
| ८. | सोनाळा | २६८ | ३५० |
| ९. | मंगरुळ | २७७ | ३१४ |
| १०. | मोर्तळवाडी | २४९ | २६८ |
| ११. | चिमाचीवाडी | १४१ | १६४ |
| | **एकुण** | **२४७** | **२९४** |

संदर्भ जनगणना पुस्तीका लातुर, २००१, २०११



२००१ ते २०११ या कालावधीत लोकसंख्येची घनता प्रत्येक गावात वाढत गेली असुन २००१ ची सरासरी घनता २४७ होती तर २०११ ची सरासरी घनता २९४ आहे. २००१ च्या तुलनेत २०११ मध्ये तिरुप्रकल्प प्रभावक्षेत्रातील लोकसंख्येची घनता ४७ ने वाढलेली दिसुन येते.

२०११ च्या आकडेवारीनुसार सर्वात जास्त लोकसंख्येची घनता वाढोणा (बु.)या गावात तर सर्वात कमी लोकसंख्या घनता चिमाणीवाडी या गावात आहे. वरील सर्व गावाचा विचार केला असता सर्वात जास्त वेगाने लोकसंख्येची घनता लाळी खु. या गावात वाढली आहे. तर सर्वात कमी लोकसंख्येच्या घनतेत वाढ मोर्तुळवाडीमध्ये दिसुन येते.

वरील लोकसंख्येच्या घनतेच्या आकडेवारीवरुन घनतेचे खालील प्रकार करता येतात.

| | |
|---|---|
| अतिदाट घनतेचे प्रदेश (३०० पेक्षा जास्त) | : वाढोणा (बु.), लाळी(खु.), येवरी, सोनाळा, मंगरुळ. |
| दाट घनतेचे प्रदेश (२००-३०० च्या दरम्यान) | : वाढोणा(खु.), बेलसांगवी, शिवणखेड, मोर्तुळवाडी |
| मध्यम घनतेचे प्रदेश (२००-१०० च्या दरम्यान) | : लाळी (बु.), चिमाचीवाडी |
| कमी घनतेचे प्रदेश (१०० पेक्षा कमी) | : असा एकही गाव नाही जेथे १०० पेक्षा कमी लोक वास्तव्य करतात. |

निष्कर्ष :-
१) सर्वात जास्त लोकसंख्येची घनता वाढवणा (बु.) या गावात आहे.
२) सर्वात कमी लोकसंख्येची घनता चिमाचीवाडी या गावात आहे.
३) लोकसंख्येच्या घनतेत दशवार्षीक वाढ सर्वात जास्त लाळी (खु.) या गावात झाली आहे.

संदर्भ :-
१) लोकसंख्या भुगोल - डॉ.आर.सी. चाँदना.
२) लोकसंख्या भुगोल - डॉ. विठ्ठल घारपुरे.
३) लोकसंख्या भुगोल - प्रा. एच.के. डोईफोडे.
४) महाराष्ट्र जनगणना अहवाल.
५) जिल्हा जनगणना अहवाल.

# ग्रामीण वस्त्यांचे प्रकार व प्रारूप एक भौगोलिक अभ्यास (केज तालुका)

मार्गदर्शक - डॉ. प्रा. आर. डी. खाकरे                 संशोधक - श्री. बन्सी रंगनाथ पाटोळे

भूगोल विभाग प्रमुख

जयक्रांती कला वरिष्ठ महाविद्यालय, लातूर

**सारांश :-**

      दोन डोंगर रांगाच्या मध्यभागी वसलेला म्हणून केज तालुक्याची ओळख आहे. त्यामुळे हा तालुका डोंगर विरहीत दिसुन येतो. केज तालुका समतल सपाट मैदानी प्रदेशाचा आहे. या तालुक्यातील मांजरा नदी जिल्ह्याच्या सिमे बरोबर केज तालुक्याची सिमा बनुन वाहते. केज तालुका बीड जिल्ह्याच्या पुर्वेला आहे. या तालुक्याची प्राकृतिक रचना वैविध्य पूर्णपणे आहे. मैदानी भाग व मांजरा नदीचा मांजर थडीची प्रदेश या सर्व वैशिष्टयपूर्ण प्रदेशाचा परिणाम या तालुक्यात वसलेल्या ग्रामीण वसाहतीवर झालेला दिसुन येते. भुगोल हा विषय ग्रामीण वसाहतीशी संबंधीत विषय आहे. त्यामुळेच तालुक्यातील ग्रामीण वस्त्यांचे प्रकार व प्रारूपाचा अभ्यास करणे अत्यंत महत्वाचे ठरते.

**प्रस्तावना -**

      ग्रामीण वस्त्यांचे प्रकार व प्रारूपांचा अभ्यास करण्यासाठी बीड जिल्हा मधील विभाजीत केज तालुक्याची निवड केली आहे. केज तालुक्याला ऐतिहासिक, सामाजिक, सांस्कृतिक, त्याच बरोबर धार्मिक पार्श्वभुमी मोठी आहे. या तालुक्यामध्ये इ. स. पूर्व काळापासुन या प्रदेशात मानवी जीवन असल्याचे आज मितिला सिध्द झाले आहे. तालुक्याची सामाजिक, सांस्कृतिक, व धार्मिक विविधते बरोबरच भौगोलिक, विविधता ही आढळते. तालुक्यातील दक्षिण भाग हा मांजरा नदीमुळे मांजरथडीचा प्रदेश म्हणून ओळखला जातो. मांजरा नदीच्या सुपिक व खोल काळया मृदेचा त्या प्रदेशातील ग्रामीण वसाहती बरोबर प्रकार व प्रारूपावर देखील परिणाम होताना दिसतो. तालुक्याच्या उत्तर दिशेस धारूर तालुक्यातील डोंगर रांगा व दऱ्या खोऱ्याचा प्रदेश आढळतो. त्याच बरोबर पुर्वेस जोगाई डोंगर रांगाचा प्रदेश आहे. आणि पश्चिमेस समतल सपाट मैदानी भूप्रदेश आढळतो. या सर्व भौगोलिक विविधतेचा ग्रामीण वसाहतीच्या प्रकारावर व प्रारूपावर परिणाम झालेला दिसुन येतो.

**शोध निबंधाचा उद्येश -** हा शोध निबंध खालील तीन महत्वपूर्ण उद्येशांना अनुसरून करण्यात आलेला आहे.

१. ग्रामीण वसाहतीचे प्रकार आणि प्रारूप काळानुरूप बदलत असते.

२. ग्रामीण वसाहतीच्या अंतराचा परिणाम प्रकार आणि प्रारूपावर झालेला दिसतो.

३. प्राकृतिक रचनेचा ग्रामीण वसाहतीचे प्रकार व प्रारूपावर झालेला दिसतो.

**संशोधन पध्दती -**

      केज तालुक्यातील ग्रामीण वस्त्यांचे प्रकार व प्रारूपांचा अभ्यास करण्यासाठी संशोधकाने प्राथमिक, दुय्यम स्वरूपाचा आधार सामग्रीचा वापर करण्यात आला आहे. प्राथमिक स्वरूपाची माहिती मिळवण्यासाठी प्रत्यक्ष केज तालुक्यातील कांही गावांचे प्रश्नावलीच्या माध्यमातून सर्वेक्षण करण्यात आले आहे. तर दुय्यम स्वरूपाच्या सांख्यिकिय साठी बीड जिल्ह्याची २०११ ची जनगनना पुस्तिका, त्याच बरोबर ग्रामपंचायत कार्यालयातील नोंदीची आणि तहसिल कार्यालयातील सांख्यिकीय आकडेवारीचा वापर करण्यात आला आहे. ग्रामीण वस्त्याचे प्रकार व प्रारूपांचा अभ्यास करण्यासाठी आर. बी. मंडल १९७९ यांच्या सांख्यिकी पध्दतीचा उपयोग केला आहे.

**अभ्यास क्षेत्राची निवड -**

      केज तालुका हा सपाट मैदानी प्रदेशात वसलेला तालुका आहे. ऊसतोड कामगारांचा पुरवठा करणारा तालुका म्हणून केजला ओळखले जाते. केज तालुका हे एक समस्या प्रधान क्षेत्र म्हणून ओळखले जाते. लोकसंख्या, रोजगार कुशल कामगारांचा अभाव, हलक्या प्रतीच्या जमीन इ. महत्वाच्या समस्या बरोबरच ग्रामीण वसाहतींचा आकार, प्रकार, प्रारूप यांचा अभ्यास करण्यासाठी या अभ्यास क्षेत्राची निवड करण्यात आली.

      केज तालुक्याचा अक्षवृत्तीय विस्तार १८° ३३ ते १८°५४ उत्तर अशवृत्ता दरम्यान तर रेखावृत्तीय विस्तार ७५°४७ पूर्व ते ७६°१८ पूर्व रेखावृत्त दरम्यान आहे. तालुक्याचे एकूण क्षेत्रफळ ११४६.८९ चौ. कि. मी. असुन ते बीड जिल्ह्याचा ६.१४ % एवढे केज तालुक्याने व्यापले आहे. केज तालुक्याची पूर्व पश्चिम लांबी ४४.८० कि. मी. तर दक्षिण उत्तर ३५.४५ कि. मी. असुन ग्रामीण लोकसंख्येची घनता दर चौ. कि. मी. चा १९० एवढी आहे. तालुक्याचा उत्तरेस वडवणी तालुका, इशान्येस धारूर तालुका तर पुर्वेस अंबाजोगाई तालुका, पश्चिमेस बीड तालुका तर दक्षिणेस उस्मानाबाद जिल्हा येतो. तालुक्याची समुद्र सपाटीपासुनची उंची ६०० ते ७०० मी पर्यंत आहे. या तालुक्यात मांजरा नदी मुख्य नदी असुन तीच्या उपनद्या या उंदरी, केजडी, पापनाशी, होळना, पिसाटी, बोभाटी, यानद्या व कांही ओढे नाले हे हंगामी स्वरूपात वाहतात. केज तालुक्यात २०११ च्या जनगनना अहवाला नुसार एकूण १३५ रहिवाशी गावाची संख्या असून त्यांची विभागणी ही प्रशासकीय कामासाठी सात ७ महसुल मंडळामध्ये केलेली आहे. त्यापैकी एकूण केज मंडळामध्ये १९, उत्तरेश्वर पिंप्री मंडळात १६, नांदुरघाट मंडळात २३, विडा मंडळात २६, होळ मंडळात १२, बनसारोळा मंडळात १९, तर यु. वडगांव मंडळामध्ये २०. ग्रामीण वस्त्यांचा समावेश होतो.

**विषय विवेचन**

      प्रस्तुत शोध निबंधामध्ये अभ्यास क्षेत्रातील ग्रामीण वस्त्यांचे प्रकार आणि प्रारूप यांचा अभ्यास करण्यात आला आहे. यामध्ये ग्रामीण वस्त्यांचे प्रकार ग्रामीण वस्त्यांच्या प्रकाराचे प्रादेशीक वितरणाचे विश्लेशन ग्रामीण वस्त्यांची विविध प्रारूपे आणि ग्रामीण वस्त्यांच्या प्रारूपांची प्रारूपच्या प्रादेशीक वितरणाचे विश्लेषण याचा आढावा घेण्यात आला आहे. अभ्यास क्षेत्रातील ग्रामीण वस्त्यांचे प्रकार ओळखण्यासाठी प्रकिर्ण सुची या सांख्यिकीय पध्दतीचा उपयोग केला आहे. ग्रामीण स्वरूपांच्या प्रारूपाचे विश्लेषण करण्यासाठी भारतीय भू

स्थल निर्देशक नकाशा आणि गुगल अर्थ या वेबसाईटचा उपयोग करण्यात आला आहे. ग्रामीण वस्त्यांचे प्रकार व प्रारूप यामध्ये फरक आहे. साधारणपणे वसाहतीचा आकार व बाह्य विस्तार यांचा समावेश प्रारूपात होतो. वस्त्यांच्या प्रकारावर आणि प्रारूपावर भौगोलिक, सांस्कृतिक, धार्मिक, आर्थिक आणि ऐतिहासिक घटकांचा प्रत्यक्ष अप्रत्यक्ष परिणाम होत असतो. कांही भूगोल तज्ञांनी ग्रामीण वस्त्यांच्या वर्गीकरणासाठी प्रकार आणि प्रारूपाला महत्व दिले तर कांहींनी वस्तीच्या स्थानाला महत्व दिले आहे. वसाहत भुगोलामध्ये ग्रामीण वसाहतीचे प्रकार निश्चित करण्यासाठी घरा घरामधील अंतर, गावाच्या प्रशासकीय सिमा मधील घरे त्यांच्या समुहाची व्यवस्था व वितरण यावर अधिक भर दिला जातो. (डॉ. सुरेशचंद्र बंसल २००५) ग्रामीण वस्ती हा मुख्यतः शेती कार्य आणि शेत जमिनीची सुरक्षितता यासाठी शेती क्षेत्राजवळ स्थापित झाली आहे. शेती कार्य, शेती तंत्र, आणि मृदा वापर करण्याची पध्दत यामुळे बहुतांश वस्तीची रचना आणि आकारांची निर्मिती झाली असल्याचे आढळते. (परपिल्लू १९६६) ग्रामीण वस्तीच्या विविध प्रकारांची निर्मिती घरांचे गट आणि त्यांचे अंतर संबंध यातून झाले आहे. ग्रामीण वस्तीच्या रचनेमधून त्या वस्तीचे स्वतंत्र भौगोलिक अस्तित्व प्रकट झालेले दिसुन येते. (रूसो १९२०) घरांचे परस्पर अंतर व व्यवस्था या घटकावर वसाहतीचे प्रकार करणे शक्य नाही. त्रिवार्था १९४६ यांनी ग्रामीण वसाहतीचे दोन प्रकार सांगितले आहेत. अ. एकल किंवा विखुरीत ब. केंद्रीत किंवा नाभिकिय स्वरूपाच्या त्याच बरोबर हडसन जे. सी. १९६९ यांनी त्रिवार्था यांच्या मतानुसार दोन प्रकार सांगितले आहेत. अ. केंद्रीत, ब. प्रकिर्ण स्वरूपाची वसाहत यांच्या मतानुसार केंद्रीत वसाहती उंच सखल स्वरूपाच्या भुप्रदेशात स्थापन होते. तर विखुरीत वसाहत ही मैदानी प्रदेशात विखुरीत होत असते. वसाहतीच्या प्रकारावर प्राकृतिक घटकांचा अतिशय जास्त प्रभाव असतो. उदा. नदी काठच्या वसाहती या केंद्रीत स्वरूपाच्या असतात कारण त्यांना पुराची भिती असते. तर नदीच्या मैदानी प्रदेशात विखुरीत वसाहती आढळतात कारण त्या ठिकाणी कृषि योग्य जमीन भुमीगत पाण्याची पातळीवर त्यामुळे मानव शेती जवळ राहणे पसंद करतो. अभ्यास क्षेत्रातील वसाहतीच्या प्रकाराचे वर्गीकरण आर. बी. मंडल १९७९ यांच्या प्रकिर्ण सुचीच्या साह्याने केले आहे.

### मंडळ निहाय ग्रामीण वस्तीचे अंतर, लोकसंख्येचा आकार आणि प्रकिर्णन सुची २०११

| अ. क्र. | सर्कलचे नाव | वस्त्यामधील सरासरी अंतर कि. मी. | लोकसंख्येचा सरासरी आकार | प्रकिर्णन सुची |
|---|---|---|---|---|
| ०१ | केज | ३.५३ | १५१०.७० | ४२७.९ |
| ०२ | यु. वडगाव | ३.७१ | १५४८.२६ | ४१७.३ |
| ०३ | उत्तरेश्वर पिंप्री | ३.५९ | १८११.५४ | ५०४.६ |
| ०४ | होळ | ३.८५ | २०१७.२५ | ५२३.९ |
| ०५ | विडा | ३.५९ | १३६७.९४ | ३८१.० |
| ०६ | बनसारोळा | ३.६९ | १६९७.८९ | ४६०.१ |
| ०७ | नांदुरघाट | ३.४९ | १२२२.८७ | ३५०.३ |
| | एकूण तालुका | ३.६३ | १५७९.३४ | ४३७.९ |

*स्रोत :- संशोधका व्दारा अधिकृत माहितीवर आधारीत*

प्रकिर्णन सुचीव्दारे आलेल्या मुल्याचे माध्य आणि चतुर्थक विचलनाच्या आधारे चार गटामध्ये विभाजन केले आहे. अभ्यास क्षेत्रातील प्रकिर्णन सुचीचे मुल्य ३५०.३ ते ५२३.९ च्या दरम्यान आले आहे. प्रकिर्णन सुचीचे उच्च मुल्य सधन वसाहतीचे सुचक आहेत. तर निम्न मुल्य विरल वसाहतीचे सुचक आहेत. प्रकिर्णन सुचीच्या मुल्यावरून ग्रामीण वसाहतीचे अभिक्षत्रीय वितरणाचे पुढील चार प्रकारात विभाजन केले आहे.

**१) सधन ग्रामीण वस्ती :-** अहमद १९५२ यांच्या मते या वसाहतीतील घरे जवळ जवळ असतात. रस्ते व गल्या अरूंद असतात. घरांच्या भिंती परस्परांना भिडलेल्या असतात. या वसाहती मध्ये अनेक जातीचे लोक राहतात. सधन प्रकारच्या ग्रामीण वसाहती मुख्यतः मांजरा नदीच्या खोऱ्यात उत्रेश्वर पिंप्री सर्कल मध्ये दिसुन येतात. या प्रदेशात शेतीचा मोठया प्रमाणात विकास कृषी योग्य जमीन असल्यामुळे झाला आहे. बनसारोळा व होळ सर्कलमध्ये पर्जन्याचे प्रमाण कमी असले तरी जलसिंचनाच्या सुविधांचा कांही प्रमाणित विकास झालेला असून भुमीगत पाण्याची पातळी वर असल्यामुळे विहीरी व कुपनलिकांच्या सहाय्याने जलसिंचन मोठया प्रमाणात केले जाते. त्यामुळे होळ, उ. पिंप्री बनसारोळा सर्कलचे मुल्य हे अनुक्रमे ५२३.९ व ५०४.६ ,४६०.१ असल्यामुळे या तिन्ही सर्कल मधील वसाहती या सधन ग्रामीण वसाहती या प्रकारामध्ये यांचा समावेश होतो.

**२) अर्धसधन ग्रामीण वसाहती :-** अर्धसधन ग्रामीण वसाहतीमध्ये सधन आणि अर्ध विखुरीत ग्रामीण वसाहतीचे वैशिष्टये आढळतात. अशा प्रकारच्या ग्रामीण वसाहतीची निर्मिती कृषी योग्य जमीनीचे प्रमाण, वाहतुक मार्गाची सोय, जलसिंचन सुविधा शैक्षणिक सुविधांची उपलब्धता या घटकामुळे झाली आहे. या प्रकारामध्ये केज सर्कल व यु. वडगाव सर्कल या दोन सर्कलचा समावेश होतो. या गटाचे प्रकिर्णन सुचीचे मुल्य हे ४२७.९ व ४१७.३ दरम्यान आहे.

**३) अर्ध विखुरीत ग्रामीण वसाहत :-** अर्ध विखुरीत ग्रामीण वसाहतीमध्ये अर्ध सधन ग्रामीण वसाहत व विखुरीत ग्रामीण वसाहतीची वैशिष्टये आढळतात. या प्रकारच्या वसाहतीची निर्मिती, पर्जन्याचे प्रमाण कमी, डोंगराळ प्रदेश, सांस्कृतिक सामाजिक, आर्थिक घटकामध्ये विषमता असलेल्या प्रदेशात आल्याचे आढळते. या प्रकारच्या वसाहती आकाराने लहान नसतात. अभ्यास क्षेत्रातील विडा या सर्कलचा या प्रकारामध्ये समावेश होतो. या गटाचे प्रकिर्णन सुचीचे मुल्य हे ३८१.० ते ४१७.३ दरम्यान आहे.

**४) विखुरीत ग्रामीण वसाहती :-** विखुरीत ग्रामीण वसाहतीचा सरासरी लोकसंख्या आकार कमी असतो. अभ्यास क्षेत्रात नांदुरघाट या सर्कलचा समावेश होतो. या ग्रामीण वसाहतीचे वैशिष्टये म्हणजे कृषीयोग्य काळी कसदार खोल मृदा असूनही या प्रदेशात विखुरीत ग्रामीण वसाहती आढळतात. याचे कारण म्हणजे दळण - वळण, रस्ते - वाहतुक, आरोग्य, उच्च शिक्षण पिण्याच्या पाण्याची समस्या, इ. सारख्या मुलभूत गरजांची कमतरता असल्यामुळे या प्रदेशात विखुरीत ग्रामीण वसाहती आढळतात. या गटाचे प्रकिर्णन सुचीचे मुल्य हे ३८१.० पेक्षा कमी आहे.

**५) ग्रामीण वसाहतीची प्रारूपे :-** अनेक गट समुह एकत्र येवून वसाहतीची निर्मिती होते. अशा वसाहतीची प्रारूपे वेगवेगळी असतात. या प्रारूपावर कांही घटकांचा प्रत्यक्ष - अप्रत्यक्ष परिणाम होत असतो. या मध्ये मुख्यत्वे करून भौगोलिक, सांस्कृतिक, ऐतिहासिक, व सामाजिक घटकांचा परिणाम वसाहतीच्या प्रारूपावर होत असतो. ग्रामीण वसाहत ही घरांची मांडणी रस्ते अनेक वेगवेगळया सुविधा या पासुन निर्माण होते. (सिन्हा १९७६) वसाहतीचे केंद्र वसाहतीतील सर्वाधिक उंच भू - भाग असतो. त्यामुळे चारही दिशेला पसरलेल्या कृषी भूमीची सहज देखरेख करता येवू शकते. (दुग्गल एस. एल. १९६८) वरील घटकांच्या वक्तव्या वरून वसाहत स्थान निश्चितीच्या वेळी जे भौगोलिक घटक महत्वाचे ठरतात त्याचा परिणाम प्रारूपावर होत असतो. या भौगोलिक घटका मध्ये नद्या, पाणी पुरवठयाच्या सोयी व प्राकृतिक रचना यांचा समावेश होतो. वरील सर्व घटकांचा स्वतंत्र रित्या किंवा एकत्रित परिणाम होवून वसाहतीची प्रारूपे निश्चित होतात. अभ्यास क्षेत्रातील ग्रामीण वसाहतीचे प्रारूपे निश्चित करण्यासाठी १:५०००० व १:२०००० या प्रमाणावरील स्थल निर्देशक प्रकारांचा उपयोग करण्यात आला आहे.

**ब) केज तालुक्यातील ग्रामीण वसाहतीची प्रारूपे :-**

**१. रेषा कृती प्रारूप** - रेषा प्रती वसाहतीवर मुख्यत: प्राकृतिक व सामाजिक घटकांचा परिणाम होत असतो. या प्रकारच्या वसाहती नदी, नाले, ओढे, पर्वताच्या सुळक्यावर अथवा पायऱ्याचा प्राकृतिक विभागात आढळतात. या वसाहतीच्या रस्त्यावरील बाजुवर दुतर्फा दुकाने असतात तर मागच्या बाजुस घरे व घराच्या मागे शेतीसाठी लागणारे औजारे ठेवण्यासाठी गोठा असतो. या प्रकारच्या वसाहतीत अभ्यासक्षेत्रामध्ये केळगाव, आरणगाव, (उत्तरेश्वरपिंप्री सर्कल) चंदनसावरगाव, कुंबेफळ, (केज सर्कल) होळ, (होळ सर्कल)] विडा, शिंदी, (विडा सर्कल) इत्यादी रेषाकृती प्रारूपाच्या ग्रामीण वस्त्या असल्याचे दिसुन येते.

**२. चौकोनाकृती प्रारूप :-** सपाट मैदानी प्रदेशात ज्या दोन रस्ते एकमेकांना भेटतात त्या ठिकाणी चौकानाकृती प्रारूप असलेली वसाहत निर्माण होते. सुरूवातीच्या रस्त्याच्या चारही कोपऱ्यावर घरे निर्माण होतात. नंतर त्याच्यात वाढ होवून चौकानाकृती प्रारूप तयार होतो. या वसाहती मधील घरे परस्परांना समांतर असतात. या वसाहती मुख्यत: सपाट मैदानी प्रदेशात विकसित होतात. या प्रकारच्या वसाहती माळेगाव (केज सर्कल), नारेवाडी, कोरेगाव, (विडा सर्कल) मध्ये दिसुन येतात.

**३. आयाताकृती प्रारूप :-** आयाताकृती प्रारूपाच्या वस्त्या विशेषत: शेती क्षेत्राच्या आयाताकारमुळे निर्माण झालेल्या आढळतात. मुख्यत्वे शेतीचा आकार आयाताकार मशागतीला सोयीस्कर असतो. आयाताकृतीचे ग्रामीण वस्त्याच्या मधील रस्ते पुर्व - पश्चिम किंवा उत्तर - दक्षिण सरळ असतात. कांही वसाहतीच्या मध्यभागी मंदिर असते. अशा मंदिराच्या चोहो बाजुने आयाताकार घरे निर्माण होतात. तर कांही वसाहतीच्या मध्यभागी मोठे झाड असल्यामुळे ती जागा शिल्लक राहते. त्यातूनच या प्रकारच्या वसाहती निर्माण होतात. अशा वसाहती अभ्यास क्षेत्रामध्ये दहिफळवाडी, धावज्याचीवाडी, कोरडयाचीवाडी (विडा सर्कल), केकतसारणी, जानेगाव (होळ सर्कल), मध्ये पाहावयास मिळतात.

**४. अनियमित प्रारूप** - अनियमित प्रारूपाच्या वस्त्यांना विशिष्ट प्रकारचा आकार नसतो. या प्रकारच्या वस्त्यामध्ये लोकांच्या सोयीनुसार घरे बांधली जातात. त्यामुळे घरे कोठेही असू शकतात. रस्त्याचा विचार केलेला नसतो. सधन ग्रामीण वस्त्यात स्थलांतर करून येणारे लोक जागा सापडेल तेथे घरे करतात. घर निर्माण साठी सोय हेच एक कारण असते. वस्तीत नवनवीन घरांची भर विस्कळीतपणे पडते. त्यामुळे अशा वस्त्यांना अनियमित आकार प्राप्त होतो. अशा वस्त्या अभ्यास क्षेत्रामध्ये नांदुरघाट (नांदुरघाट सर्कल), पिसेगाव (केज सर्कल) , वडमाऊली दहिफळ (विडा सर्कल), इ. अनियमित प्रारूपाच्या ग्रामीण वस्त्या पहावयास मिळतात.

**निष्कर्ष :-**

अभ्यास क्षेत्रातील बऱ्याच वसाहतीचे प्रकार व प्रारूप सर्व साधारण पणे सधन वस्ती, अर्धसधन ग्रामीण वस्ती व प्रारूपामध्ये रेषाकृती प्रारूप व चौकोनाकृती प्रारूप दिसून येतात. सर्वच अभ्यास क्षेत्राचा विचार केल्यास असे सांगता येत नाही की, या प्रदेशात याच प्रारूपाच्या ग्रामीण वसाहती आहेत किंवा या प्रदेशात याच प्रारूपाच्या ग्रामीण वसाहती आहेत हे सांगणे कठीण आहे. त्यामुळे केज तालुक्यामध्ये सर्वत्र वेगवेगळया प्रकारच्या व वेगवेगळया प्रारूपाच्या ग्रामीण वस्त्या दिसून येतात.

**संदर्भ –**

१. बंसल एस. सी. - २००८ (ग्रामीण वस्ती भुगोल) मिनाक्षी प्रकाश मेरठ

२. हडसन एफ. एस. ग्रामीण वस्ती भूगोल

३. *R. B. Mandal Inrroduction to Rorul Settlement*

४. भारतीय जनगणना अहवाल १९९१ - २००१ - २०११

५. भारतीय क्षेत्रमापन .... नकाशा प्रमाण १:५००००, १:२५०००

६. सामाजिक व आर्थिक समालोचन अहवाल २०१० - २०११

# करू पर्यावरण संवर्धन, वसुंधरेचे होईल नंदनवन

**प्रा.डॉ.शशिकांत तोळमारे**

श्री योगानंद स्वामी कला महाविद्याल, वसमत

## सारांश

पृथ्वीवरील भौतीक प्रगती, सांस्कृतीक प्रगती, मानवी विकास या सर्वांचे मुळ पर्यावरणात असल्याचे पहायला मिळते. म्हणजेच पर्यावरणीय अनुकुलतेतून मानवाची उत्क्रांती होत गेली व आजचा परिपुर्ण मानव निर्माण झाला. तसे पाहता या उत्क्रांतीच्या टप्यात मानव सर्वात शेवटी पृथ्वीवर आला, पण मानवाच्या येण्याने पृथ्वीवरील नैसर्गिक पर्यावरणात प्रचंड उलथापालथ झाली. विशेषतः औदयोगिक क्रांतीनंतर प्रगतीच्या नावाखाली, विकासाच्या नावाखाली औद्योगिकरण, नागरीकरण, उदारीकरण, खाजगीकरण गतीमान होऊन नैसर्गिक साधनसंपत्तीचे प्रचंड मोठया प्रमाणात शोषण सुरू झाले. मानवी महत्वाकांक्षेसाठी हव्यासापोटी निसर्गाची अतोनात पिळवणूक सुरू झाली. परिणामी मानवाचा पर्यावरणात सर्वच क्षेत्रात हस्तक्षेप वाढला. मानवी कार्यामुळे जल, जमीन, जंगल, जीवसंपदेवर आघात झाला. त्याचे नैसर्गिक प्रमाण बिघडले. त्यात मानवाचा हस्तक्षेप वाढत जाऊन त्याचा दुरूपयोग सुरू झाला. त्यातुनच हवा, पाणी, जमीन व ध्वनीचे प्रदुषण घडुन आले. या व्यापक प्रदुषणामुळे जागतिक तापमानात वाढ होऊन ग्लोबल वार्मिंगचे संकट निर्माण झाले. वाढती लोकसंख्या, औद्योगीकीकरण, नागरीकरण, प्रदुषण, युद्ध, अणुस्फोट, जंगलतोड, अमर्याद वाळु उपसा, अमर्याद खाणकाम, वनक्षेत्रात घट, कृषीक्षेत्रात घट, क्राँकीट जंगलाचा विकास, घटलेले पर्जन्यमान, वाढलेले तापमान, ध्रुवीय बर्फाचे वितळणे, सागर पातळीत वाढ, पर्जन्यमानात असमतोल, जैवविविधतेचा ऱ्हास, जलचक्रात बिघाड, नैसर्गिक आपत्तीत वाढ, आहेरे व नाहीरे देशांचा संघर्ष, असंतूलीत विकास, विकासांचे केंद्रीकरण, नद्यांना आलेले गटाराचे स्वरूप, मृदा प्रदुषण, रासायनीक खते, बि–बियाणांचा वाढता वापर, अयोग्य जलव्यवस्थापन, इ. कारणांमुळे पर्यावरण चक्रात बिघाड निर्माण होऊन जगाचे तापमानचक्र, पर्जन्यचक्र, जलचक्र, जैवचक्रात बिघाड निर्माण झाला. ओझोनावरण कमी होऊन ग्लोबल वार्मिंगचे संकट ओढावने अशा प्रकारे पृथ्वीवरील मानवाच्या भोगवादी वृत्तीने , अतिमहत्वाकांक्षेने शोषण संस्कृतीमुळे पर्यावरण चक्रात बिघाड निर्माण होऊन त्यातुन अनेक समस्या जन्माला आल्या. पर्यावरणीय नाशातच मानवी विनाशाची बिजे परेली गेली. म्हणुन यातुन बाहेर पडण्याची आपणास वेळीच सबंधित कारणांचा शोध घेऊन त्यावर कठोर उपाययोजना करणे गरजेचे आहे. कारण असे म्हणतात मोठयांच्या यशात लहानांचे यश व मोठयांच्या नाशात लहानांचा नाश अटळ असतो. म्हणुन निसर्गाचे जतन व संवर्धन यातच मानवाचे हीन मानवाचे कल्याण आहे याची जाणीव ठेवायला हवी.

## प्रस्तावनाः

मानव उत्क्रांतीच्या स्वरूपात पर्यावरणात सर्वात शेवटी जन्मला आला पण मानवाने पर्यावरणाचे सर्वाधीक नुकसान केले आहे. कारण पर्यावरणीय घटक हे पर्यावरणाच्या अस्तित्वाला धोका पोहचवत नाहीत. बाकी घटक पर्यावरणात आहे त्या अवस्थेत जगतात. मात्र मानव हा बुद्धीमान व विज्ञाननिष्ठ प्राणी असल्यामूळे तो आपले जीवन अधीकाधिक सुखकर करण्याच्या प्रयत्नात पर्यावरणात प्रचंड बदल करत होता, करत आहे व करत राहणर म्हणुन तर मानवी क्रियेमुळे पर्यावरणाच्या मुळ स्वरूपात प्रचंड बदली झाला. मानवाने पर्यावरणात प्रचंड बदल घडवुन आणले. पर्यावरणात सोईचे बदल केले. विज्ञान व तंत्रज्ञानात प्रगती करून हरप्रकारे पर्यावरणाला हानी पोहचवली. मानवाला आपल्या अतिरेकी महत्वाकांक्षेपोटी पर्यावरणीय साधनसंपत्तीचे अतोनात शोषण केले. वाढती लोकसंख्या, वाढते नागरीकरण, औद्योगिकरण, प्रदुषण, वाढते नागरीकरण, अयोग्य जलनियोजन, असंतुलीत विकासामुळे पर्यावरणावर ताण निर्माण झाला. औझोनवरणला छिद्र पडले. सरासरी जागतिक तापमानात वाढ होऊन ग्लोबल वॉर्मिंग घडुन आली. ज्यामुळे निसर्गचक्रात बिघाड झाला. जलचक्रात बिघाड झाला. उन्हाळे तीव्र बनले, पर्जन्याचे प्रमाण घटले. नैसर्गिक आपत्तीचे प्रमाण वाढले. अनेक वनस्पती व प्राण्यांच्या प्रजाती कायमच्या नष्ट झाल्या. ज्यामुळे पर्यावरणचक्र व जीवनचक्र बिघडले. विकासाचे तत्कालीन परिणाम चांगले झाले पण दुरगामी परिणाम वाईट झाले. काही मोजक्या व्यक्ती, संस्था व देशांना याचा लाभ झाला... पण निसर्गचक्रातील बिघडाचे घातक दुष्परिणाम संपुर्ण जगाला भोगावे लागले. नितीमुल्यांची घसरण झाली. विकासात असमतोल निर्माण झाला. सत्ता व संपत्तीचे केंद्रीकरण झाले व  न केलेल्या गुन्ह्यांची शिक्षा अविकसीत व मागास जगाला भोगावी  लागली. पर्जन्यमान घटले, तापमान वाढले, नैसर्गिक आपत्तीत वाढ झाली. ओला व कोरडा दुष्काळ वारंवार पडु लागला. भुकंप-चक्रिवादळे, ज्वालामुखीचा उद्रेक वाढला, बर्फ वितळुन सागरपातळी वाढत आहे. अशा प्रकारे मानवाने पर्यावरणावर अतीक्रमण केल्यामुळे पर्यावरणाचा समतोल बिघडुन त्याचे दुरगामी घातक परिणाम संपुर्ण जगावर होत आहेत. हे असेच चालत राहीले तर काही  काळातच पर्यावरणचक्रात बदल होऊ न पृथ्वीवरील जीवसृष्टीला धोका निर्माण होऊ  शकतो. पर्यावरणाच्या नाशातच मानवी विनाशाची बीजे

आहेत. म्हणुन यातुन वेळीच सावरण्यासाठी पर्यावरणीय नाशाची कारणे शोधुन त्यावर दुरगामी उपाययोजना करायला हव्यात. तरच पृथ्वीवरील पर्यावरण सुरक्षीत राहील. सुंदर राहील अन्यतः शोषणकारी व्यवस्था विकासाच्या नावाखाली स्वतःच्या पयावर स्वतःच कु-हाड मारून घेतल्याशिवाय राहणार नाही. हा विनाश होऊ नये म्हणुन पर्यावरणाला मारक घटकांची योग्य ती शहानिशा करून कठोर पावले उचलुन हा विनाश थांबवायला हवा यातच पर्यावरणाचे पर्यायाने मानवाचे हीत सामावले आहे.

उद्देशः

1) पर्यावराची सद्यस्थिती जाणुन घेणे.
2) पर्यावरण ऱ्हासाची कारणे शोधणे.
3) पर्यावरणासंदर्भात जागृती करणे.
4) पर्यावरण संवर्धनाचे उपाय सुचवणे.

संशोधन पद्धतीः

प्रस्तुत संशोधन पेपर तयार करण्यासाठी द्वितीयक साधनसामग्रीचा उपयोग करण्यात आला. ज्यात विध्वंस पर्यारणाचा, ग्लोबल वार्मिंग, जागतीक हवामान बदल इ. पुस्तकांच्या मदतीला तितीयक साधनसामग्री संकलीत केली. शिवाय वर्तमानपत्र, मासीके इ द्वारे माहिती संकलीत केली.

विषय विवेचनः

'करू पर्यावरणाचे संवर्धन, वसुंधरेचे होईल नंदनवन' या विषयावर चिंतन करतांना असे निरीक्षणास येते कि, आधुनिक काळात जीवनाच्या सर्वच क्षेत्रात प्रगती क्षेत्र आहे. या प्रगतीच्या हव्यासापोटी पर्यावरणाचे अतोनात नुकसान केले जात आहे, मागील काही दशकात पृथ्वीवरील तापमानात वाढ झाली आहे. वाळवंटीकरणात वाढ झाली आहे. आझोनावरण घटले आहे. वृक्षतोडीचे प्रमाण वाढले आहे. सर्वप्रकारच्या प्रदुषणात वाढ झाली आहे. हवा, पाणी, जमीन, ध्वनी, प्रदुषण होऊन त्याचा मानवी जीवनावर व मानवी आरोग्यावर गंभीर परिणाम झाला आहे. विविध रोगांचे प्रमाण वाढले आहे. पर्जन्यमान घटले. पर्यावरण संतुलन बिघडले. अनेक आपत्तीचे थैमान घातले आहे. हिमक्षेत्रे वितळत आहे. आम्ल पर्जन्य होत आहे. अनेक वनस्पती व प्राण्यांच्या प्रजाती कायमच्या नाहीशा होत आहेत. जैवविविधता धोक्यात येत आहे. अतीवृष्टी, अनावृष्टी, महापुर, अवेळी गारपीट वाढत आहे. तापमानात बदल झाला आहे. एकंदर काय तर पर्यावरण संतुलन बिघडुन त्याचा मानवाच्या सर्वांगीण जीवनावर दुरगामी परिणाम होत आहे. या सर्व पर्यावरणीय बदलाच्या किंवा निसर्गचर्क्राच्या असमतोलास पुढील घटक कारणीभुत आहेत.

पर्यावरणात बिघाड घडवणारे घटक किंवा पर्यावरण नाशाची कारणे.

1) औद्योगीकरणः

जगातील बहुतेक देशात उद्योगाचा विकास प्रचंड वेगाने होत आहे. याचा परिणाम म्हणुन उद्योगाच्या माध्मातुन मोठ्या प्रमाणात, कार्बनडायऑक्साईडचे उत्सर्जन वातावरणात होत आहे. ज्यामुळे हवा, प्रदुषीत होत आहे. शिवाय कार्बनचे प्रमाण वाढल्यामुळे वातावरणाचे तापमान वाढणस मदत होत आहे. जगात वेगाने वाढणाऱ्या औद्योगीकरणाने कार्बन उत्सर्जनात वाढ होवुन प्रदुषण वाढत आहे. शिवाय उद्योगातुन रसायन मिश्रीत पाणी नदी नाल्यात सोडल्यामुळे नदी–नाले प्रदुषीत होत आहेत. पर्यायाने औद्योगीकीकरण तापमान वाढीला व प्रदुषणाला जन्म देत आहे.

2) ग्लोबल वार्मिंगः

जागतीक तापमान व्रढीमुळे वातावरणात कार्बनडॉयक्साईडचे प्रमाण वाढते ज्यामुळे वातावरणाची उष्णता शोषुन घेण्याची क्षमता वाढली. म्हणुन पृथ्वीच्या सरासरी तापमानात वाढ होऊन वैश्विक तापमान वाढ अस्तित्वात आली. आझोनथर कमी झाल्यामुळे अतित्रिव किरणे प्रत्यक्ष पृथ्वीवर येऊन पृथ्वीचे तापमानात वाढण्यास मदत झाली. पृथ्वीचे तापसंतुलन बिघडले. उष्णता स्वरूपात पृथ्वीवर येऊन आधीक तापमान वाढले. पण दिर्घस्वरूपात उर्त्सजीत होत असल्यामुळे वातावरणीय तापमान वाढले. त्यातुन ग्लोबल वार्मिंगचे संकट निर्माण झाले. त्यातुन अनेक प्रश्न निर्माण झाले.

3) उष्णता ग्रहण करणाऱ्या वायुंच्या प्रमाणात वाढः

निसर्गतः वातावरण संतुलन ठेवले जाते. पण मानवी क्रियेमुळे वातावरणात अनेक अनावश्यक वायुंचे उत्सर्जन झाले त्यामुळ वातावरणाची उष्णता शोषुन घेणारे उष्णवायुंचे प्रमाण वातावरणात वाढले. यात कार्बनडॉयकसाईड वायु औद्योगिकरणामुळ प्रतीवर्ष जास्तीत जास्त उत्सर्जीत केला जात आहे. ज्यामुळे सरासरी तापमान वाढले. उष्णता शोषुन घेणारा नायट्रस ऑक्साईड

वातावरणात प्रतीवर्ष 0.2 टक्के वाढल्यामुळे सरासरी तापमान वाढत आहे. शिवाय सी.ए.सी.एस. अथश्रस्र क्लोरोफ्युरो कार्बनच्या प्रमाणात वाढ होत आहे. प्रतीवर्षी 1 दशलक्ष हजारापेक्षा जास्त क्लोरोफ्युरो कार्बन वातावरणाची उष्णता वाढवत आहे.

4) **जैव विविधतेचा ऱ्हासः**

पृथ्वीवरील जैव विविधता हा पृथ्वीचा मुलाधार आहे. पण येथील मानवाच्या चुकीमुळे, अहंकारामुळे मानव जैव विविधतेवर अने आक्रमण करत आहे.ज्यामुळे नैसर्गिक जीवचक्रात बिघाड निर्माण होऊन पृथ्वीवरील जैविक संतुलन, वातावरणीय संतुलन, व सर्वांगीण संतुलन धोक्यात येत आहे. 'जियो जिवस्य जिवनम्' यात बाधा निर्माण होऊन निसर्गचक्रात बिघाड निर्माण झाला. त्यातुन अनेक प्रश्न निर्माण झाले.

5) **चुकीची शेती पद्धतीः**

विज्ञान व तंत्रज्ञानाच्या नावाखाली मानवाने शेतीत अनेक नवनवीन प्रयोग केले. आधुनिक खते, बि-बियाधे, औषधे, किटकनाशके इ. च्या अतिरेकी वापर केल्यामुळे जमीनींची पोषकता काही काळासाठी वाढली पण कालांतराने या घातक द्रव्यांचे , खतांचे, औषधांचे दुष्परिणाम समोर येऊ लागले. शेतीचा उत्पादन खर्च वाढला. उत्पन्न घटले. जमीनी नापीक झाल्या. अनेक नवनवीन रोग उद्याला आले. शेतीतील मातीतील जैवत्व संपले. जमीनी खारं झाल्या. प्रदुषीत झाल्या. उपजाऊ क्षमता घटली. अनेक रोगांचा प्रसार झाला. कृषीव्यवसाय धोक्यात आला. शेती व शेतकरी नामशेष होऊन शेतकऱ्यांवर आत्महत्येची पाळी आली.  जमीनीवरील जिवांची संख्या 40 वर्षात 25 टक्के ने घटली, सागरी जीवांची संख्या 28 टक्के ने घटली. या सगळ्यांचा परिणाम म्हणुन निसर्गाचे संतुलन बिघडुन अनेक प्रश्न निर्माण झाले.

6) **लोकसंख्या विस्फोटः**

जगाची लोकसंख्या 600 कोटीपेक्षा अधिक आहे. जगाचे साधन संपत्ती व लोकसंख्यातील प्रमाण पचंड व्यस्त असल्याचे पहायला मिळते. कारण नैसर्गिक साधनसंपत्ती दिवसेंदिवस कमी कमी होत असतांना तिची मागणी मात्र अधिक वाढत आहे. विशेषतः मागास देशात, आशियायी देशात, भारतीय उपखंडात व चीनमध्ये जगातील जवळपास अर्धी लोकसंख्या केंद्रीत झाली आहे. म्हणजेच साधनसंपत्तीचे प्रमाण कमी कमी होतांना लोकसंख्या मात्र झपाट्याने वाढत आहे. म्हणुन या लोकसंख्येच्या गरजांची पुर्तता करण्यासाठी नागरीकरण, औद्योगिकीकरण होत आहे.  परिणामी साधन संपत्तीवर अधिक ताण पडत आहे. अन्न, वस्त्र व निवारा या मानवाच मुलभुत गरजांची पुर्तता करण्यात जास्तीत जास्त संपत्ती खर्च होत असल्यामुळे त्याचा विकासावर प्रतीकुल परिणाम होत आहे. म्हणजेच अतिरिक्त लोकसंख्येतुन अनेक प्रश्न जन्माला येत आहे. अतिरिक्त लोकसंख्या  निसर्गाचे संतुलन बिघडवण्यास प्रत्यक्ष, अप्रत्यक्ष कारणीभुत ठरत आहे.

7) **सर्व प्रकारचे प्रदुषणः**

पर्यावरणाच्या नाशात मानवाची मध्यवर्ती भुमिका आहे, महत्वाची भुमिका आहे. कारण प्रगतीच्या नावाखाली. विकासाच्या नावाखाली मानवाने वन–जमीन–जंगल–जीवांचा नाश केल्यामुळे पर्यावरणाचे संतुलन बिघडले. अतिरेकी जलप्रदुषण, अतिरेकी जमीनीचे प्रदुषण, अतिरेकी हवाप्रदुषण व अतिरेकी ध्वनी प्रदुषणामुळे मानवाने अनेक रोगांना आमंत्रण दिले. जिवचक्राचा ऱ्हास झाला. जलचक्र धोक्यात आले. ऑक्सीजनचक्रात, कार्बनचक्रात, नायट्रोजन चक्रात बिघाड निर्माण होऊन एकंदर पर्यावरणाचेच संतुलन बिघडले.  म्हणुन मानवाने केलेल्या भौतीक प्रदुषणामुळे निसर्ग बिघडला व मानवाने केलेल्या वैचारिक प्रदुषणामुळे, सांस्कृतिक प्रदुषणामुळे भोगवादी, चंगळवादी वृत्तीचा अतिरेक होऊन, समान व्यवस्था, कुटुंब व्यवस्था व संपुर्ण सिस्टीममध्ये बिघाड झाला. त्यामुळे अनेक राक्षसी प्रवृत्ती जन्माला आल्या. ज्यातुन धर्मवाद, जातवाद, प्रांतवाद, भाषावाद, निर्माण होऊन व्यक्ती, समाज, राज्य, राष्ट्र व विश्व अस्थिर बनले. एकाथोने व्यवस्थेचे संतुलन बिघडले. पर्यावरणाचे संतुलन दिसते आमचे आम्ही मान्य करायलाच तयार नाही म्हणुन प्रश्न गंभीर आहेत्र


**पर्यावरण असंतुलनाचे परिणामः**

पर्यावरणात असंतुलन निर्माण झाल्यामुळे त्याचे दुरगामी परिणाम संपुर्ण मानवी जिवनावर होत आहेत. पर्यावरण असंतुलनामुळे निसर्गचक्रात बिघाड निर्माण झाला. पर्यायाने पावसाळ्यात पाऊ स पडेना, हिवाळ्यात थंडी पडेना, उन्हाळ्यात तापमानात प्रचंड चढ-उतार  होत आहेत. पर्जन्यात घट झाल. अनेक रोगांचा प्रादुर्भाव वाढला. जागतीक तापमानात वाढ झाली.

जंगलांना आग लागु लागली. ओझोनथर कमी झाले. पर्जन्यात असमतोल निर्माण झाला. पर्जन्य वितरण विस्कळीत झाले. पर्यावरणीय आपत्तीत वाढ झाली. एकाचवेळी एकाच देशात ओला व कोरडा दुष्काळ पहायला मिळु लागला. अनेक साथीचे रोग पसरले. कॅन्सरचे प्रमाण वाढले. जैवविविधता धोकयात आली. पाण्याचे दुर्भिक्ष निर्माण झाले. गावे ओस पडु लागली. स्थलांतराच्या प्रमाणात वाढ झाली. शेतीक्षेत्र डबघाईला आले. साधनसंपत्तीवर प्रचंड ताण येऊन असंतुलन अधीकच वाढत गेले. एकुणच काय तर पर्यावरण संतुलन बिघडल्याने कृषी, संस्कृती, उद्योग, व्यापार, अर्थकारण, समाजकारण, राजकारण, विकास प्रक्रिया अशा सर्वच गोष्टीवर पडला. त्यातुन अनेक प्रश्न निर्माण झाले. ज्यामुळे मानवाच्या सर्वांगीण जीवनावर प्रभाव पडला. मानवाचे केवळ भौतिक जीवनच नाही तर मानसिक, सांस्कृतिक जीवनही पर्यावरणीय बदलामुळे ढवळुन निघाले. म्हणुन या पर्यावरणीय असंतुलनाकडे डोळेझाक करणे मानवासाठी आत्मघातकी ठरू शकते. मानवाला पर्यावरणाकडे दुर्लक्ष करणे परवडणारे नाही कारण पर्यावरणाच्या नाशातच मानवाचा सर्वनाश कटळ आहे. म्हणुन वेळीच सावध होणे गरजेचे आहे.

## पर्यावरण संवर्धनाचे उपायः

पर्यावरणाच्या असमतोलामुळे अनेक प्रश्न निर्माण होत आहेत. त्यातुन अनेक प्रश्न निर्माण होत आहेत. म्हणुन हे सर्व टाळण्यासाठी वेळीच पर्यावरणाचे जतन व संवर्धन होणे गरजेचे आहे. हे पर्यावरणाचे जतन व संवर्धन म्हणजे ज्या ज्या क्षेत्रात मानवी चुकीमुळे पर्यावरणाची प्रचंड हानी झाली, प्रचंड शोषण झाले, अविचाराने पर्यावरणीय व्यवस्थेला धोका निर्माण झाला. त्या त्या सर्व क्षेत्राचा शोध घेऊ न योग्य ती पावले उचलुन पर्यावरणाचे होणारे नुकसान टाळले तर... कमी केले तर पर्यावरणीय असमतोल दुर करण्यास मदत होईल. म्हणुन अनंक प्रमुख क्षेत्रात जाणीवजागृती करून पर्यावरणाचा ऱ्हास कमी करता येतो. पर्यावरण असंतुलन नियंत्रीत करता येते.

### 1) अपारंपारिक उर्जा साधनांचा विकासः

जगातील बहुतेक देशात उद्योगधंद्यांचा विकास वेगाने होत आहे. हा उद्योगाचा विकास साध्य करण्यासाठी मोठ्याप्रमाणात खनिज संपत्ती व अन्य शक्तीसाधने उपयोगात आणली जातात. ज्यामुळे भुगर्भीय खनिज संपत्तीचे अतोनात शोषण केले जात आहे. शक्ती साधनांचा अमर्यादीत वापर सुरू आहे. म्हणुन अशावेळी उपयोगी खनिजे व शकतीसाधने अमर्यादीत प्रमाणात उपयोगात आणली जातात. त्यामुळे पर्यावरणाची मोठ्या प्रमाणात हानी होत आहे. म्हणुन या परंपरागत उर्जा साधन्या ऐवजी अपारंपारिक उर्जा साधनांचा विकास केला तर खनिजांचे व शक्तीसाधनांचे अमर्यादीत शोषण थांबेल. ज्यामुळे पर्यावरणाचे होणारे नुकसान कमी होऊ न पर्यावरण संतुलन राखले जाईल. पर्यावरणाची हानी टळेल. ज्यामुळे विकास प्रक्रियेत सातत्य राहण्यात मदत होईल.

### 2) जलसंवर्धन किंवा जलनियोजनः

पाणी म्हणजे जीवन मानवी जीवनात पाण्याला अतीशय महत्व आहे. एकुण पाण्याचा विचार करता जवळपास 97 टक्के पाणी हे खाऱ्या पाण्याच्या स्वरूपात सागरात आहे. 2 टक्के पाणी हे बर्फाच्या स्वरूपात ध्रुविय प्रदेशात आहेत तर केवळ 1 टक्के शुद्ध पाणी नदी, नाले, विहीरी, कुपननलिका, सरोवर गोड्या पाण्याच्या स्वरूपात आहे. त्या गोड्या पाण्याचे मोठ्या प्रमाणात प्रदुषण होत आहे. कॅनॉलद्वारे शेतीला पाणी दिल्यामुळे 50 टक्के पाण्याचा अपव्यय होतो. चुकीच्या पद्धतीने शेतीयला पाणी दिल्यामुळे जमीनी खाऱ्या होत आहेत. शिवाय उद्योगांना व महानगरांना प्रचंड पाणीपुरवठा केल्यामुळे पाणी टंचाई निर्माण झाली आहे. पाण्यामुळे अनेक प्रादेशीक वाद निर्माण होत आहेत. अनेक आंतरराज्यीय वाद निर्माण होत आहेत. एवढेच नव्हे तर अनेक देशांत पाण्यामुळे संघर्ष पेटण्याची भिती आहे. म्हणुन यातुन मार्ग काढण्यासाठी प्रत्येकाने पावसाच्या पाण्याचे योग्य पद्धतीने जतन, संवर्धन व नियोजन केले तरच शांतता, सुव्यवस्था व शाश्वत विकास टिकेल अन्यतः पाण्यामुळे तिसरे महायुद्ध व्हायला फारसा वेळ लागणार नाही.

### 3) जंगलसंवर्धन किंवा वनव्यवस्थापनः

मानावाच आरंभापासुन ते आजपर्यंत अनधान्यासाठी मानवाला वनस्पती अर्था पिकांवर अवलंबुन राहावे लागणार आहे. प्राचीनकाळी तर अन्न, वस्त्र व निवारा या मुलभुत गरजांची पुर्तता वनामुळे होत होती. आधुनिक काळातही पर्यावरण संतुलन राखण्यासाठी वनक्षेत्र महत्वाचे आहे. मात्र वाढती लोकसंख्या, वाढते नागरीकरण वाढते औद्योगीकरण, रस्तेविकासामुळे मोठ्या प्रमाणात वनक्षेत्राचा ऱ्हास होत आहे. ज्यामुळे वनक्षेत्रातील जैवविविधता नष्ट होऊन पर्यावरण समतोल बिघडत आहे. पर्जन्यात घट निर्माण होत आहे. हे असेच चालत राहील्यास पर्यावरणीय वायुचक्रात असंतुलन निर्माण होईल. वातावरणीय समस्या निर्माण

होतील. अगदी आरंभी संपुर्ण पृथ्वी वनाच्छीद होत. लोकसंख्या व नागरी औद्योगिक विकासाबरोबर वनक्षेत्रात प्रचंड घट निर्माण झाली. देशाच्या 33 टक्के वनक्षेत्र असायला हवे मात्र अनेक देशात हे प्रमाण 10.15 टक्के एवढे कमी आहे. म्हणुन पर्जन्यात असमतोल व पर्यावरणात असमतोल निर्माण होऊन अनेक प्रश्न निर्माण होत आहेत. हे सर्व टाळण्यासाठी वनांचे जतन व संवर्धन, नियोजन व्हायला हवे.

## 4) खनिजांचे संवर्धन किंवा जनतः

मुख्यतः खनिजे नाशवंत साधनसंपत्ती आहे. देशाचा विकास खनिज संपत्तीच्या उपलब्धतेवर अवलंबुन आहे. खनिजा अभावी विकास प्रक्रिया खंडीत होते. म्हणुन आहे. त्या खनिजांचे जतन व संवर्धन गरजेचे आहे मात्र आधुनिक काळात विकासाच्या नावाखाली खनिज संपत्तीचे अमर्याद शोषण कले जात आहे. ज्यामुळे निसर्गाचे अतोनात नुकसान होत आहे. शिवाय खनिजे संपताच विकास प्रक्रिया थांबणार आहे. शिवाय खनिजे संपताच विकास प्रक्रिया थांबणार आहे म्हणुन आहे त्या खनिजांचा विचारपुर्वक व नियोजनपुर्वक वापर व्हायला हवा. हे खनिजांचे अमर्याद शोषण असेच चालु राहीले तर त्याचा पर्यावरणावर विपरीत परिणाम होऊन त्याचा संपुर्ण मानव जातीवर प्रभाव पडेल. नैसर्गिक अनर्थ ओढावेल म्हणुन वेळीच सावध होऊन खनिज व शक्तीसाधनांचे जतन व संवर्धन व्हायला हवे.

## 5) मृदासंवर्धन किंवा मृदा व्यवस्थापनः

मृदा हा घटक शेतीच्या माध्यमातुन वनस्पतीच्या माध्यमातुन शेतीविकासाला प्रभावीत करतो. जेथे सुपीक व काळी मूदा तेथे विकासाला संधी असते. याउलट अत्यंत उष्ण अशा वाळवंटी प्रदेशात व अत्यंत शीत अशा ध्रुवीय प्रदेशात मृदेच्या अभावामुळे कृषी विकास होऊ शकत नाही. परिणामी मानवी जीवनांचा उद्योग व व्यवसाचा विकास पाहिजे तसा होऊ शकत नाही. म्हणुन मृदेचे संवर्धन किंवा व्यवस्थापन हे कृषी व कृषीपुरक उद्योगाच्या विकासासाठी धिक उपयोगी मानली जाते. आधुनिक खते, रसायने, बि-बियाणे व औषधांमुळे होणारा मृदेचा ऱ्हास नाही थांबला तर ही पृथ्वी वाळवंटात स्थलांतरीत होण्यासाठी फारसा वेळ लागणार नाही.

## 6) लोकसंख्येचे सुयोग्य व्यवस्थापनः

पृथ्वी निर्माण झाली तेव्हा पृथ्वी साधन साधन संपत्तीने ओतपोत भरलेली होती. मात्र लोकसंख्या अजीबात नव्हती. जस जसा काळ पुढे पुढे सरकत गेला तसतसा लोकसंख्येचा विकास होऊन अशी अवस्था निर्माण झाली कि आज लोकसंख्येने पृथ्वी ओसंडुन वहात आहे. मात्र साधन संपत्ती संपुर्ण गेली. सांगायचे तात्पर्य असे कि जगातील बहुतेक प्रश्नांचे मुळ हे जगाच्या अतीरिक्त लोकसंख्येत आहे. म्हणुन प्रचंड वेगाने वाढल्या लोकसंख्येने साधन संपत्तीवर अतिरीत भार निर्माण केल्यामुळे साधनसंपत्तीवर ताण येत आहे. परिणामी त्यांचे अधिक शोषण होत आहे. या लोकसंख्या व साधनसंपत्तीतील असमतोलातुन आर्थिक, सामाजिक, सांस्कृतीक, राजकीय व सर्वांगीण समतोल बिघडुन संपुर्ण व्यवस्था धोकयात येत आहे. म्हणुन यातुन मार्ग काढण्यासाठी नैसर्गिक साधन संपत्तीच्या जतन व संवर्धनाबरोबरच लोकसंख्येचे नियोजन, व्यवस्थापन व गुणात्माक वाढ करणे गरजेचे आहे. तरच शाश्वत विकास साध्य होईल. अन्यताः विकासाचा फुगा फुटायला फारसा वेळ सांगणार नाही.

थोडक्यात पर्यावरणाचे जतन व संवर्धन करणे गरजेचे आहे. कारण मानवी जीवच पुर्णतः पर्यावरणावर व पर्यावरणीय साधन संपत्तीवर अवलंबुन असेल तर पर्यावरण व पर्यावरणी साधनसंपतती टिकली तरच मानव टिकेल तरच विकास प्रक्रिया शाश्वत राहील. अन्यतः पर्यावरणाच्या नाशातच मानवाचा सर्वनाश अटळ आहे. म्हणुन पर्यावरणीय साधन संपत्तीचे पर्यायाने पर्यावरणाचे जतन व संवर्धन केल्यास वसुंधरेचे नंदनवन व्हायला वेळ लागणार नाही. पण त्यासाठी सर्वच पातळीवर प्रयत्न ,परिश्रम, प्रामाणीकता हवी. अन्यतः विकासाच्या नावाखाली आपण दिवसेंदिवस विनाशाकडे वाटचाल करत आहोतच हे विरता कामा नये.

## संदर्भ ग्रंथ

1) *विध्वंस पर्यावरणाचा– भालचंद्र देशपांडे, रजत प्रकाशन, औरंगाबाद–1998*

2) *ग्लोबल वॉर्मिंग– संजय आवटे, जगदीश मोरे– तेजस प्रकाशन, कोल्हापुर.*

3) *सृष्टीचे घनचक्र– शिधये श्रीराम– राजहंस प्रकाशन, पुणे.*

४) *पर्यावरण जाणीव जागृती– प्रा. पाटील एस.एम.*

# लातूर व औसा तालुक्यातील ग्रामीण वसाहतीचे प्रकारः एक भौगोलिक विश्लेषण

**डॉ. अभिजित आर. बादाडे**

विभाग प्रमुख,
कै. व्यंकटराव देशमुख महाविद्यालय, बाभळगाव

**बळीराम शिवाजी लहाने**

संशोधक विद्यार्थी

**सारांश :**

लातूर व औसा तालुक्यातील ग्रामीण वसाहतीचा अभ्यास केल्यास असे लक्षात यते की, अभ्यास क्षेत्रातील बहुतेक वसाहती या केंद्रीत स्वरुपाच्या दिसून येतात. या वसाहतीमध्ये कांही ठिकाणी केंद्रीकरण जास्त झालेले दिसून येते तर कांही ठिकाणी केंद्रीतता कमी आढळते. सामान्यतः या क्षेत्रातील मोठ्या केंद्रीत ग्रामीण वसाहतीची निर्मिती वहातुक मार्गाची सुगमता असलेल्या क्षेत्रामध्ये दिसून येते. शेती क्षेत्राचा आकार, मृदा प्रकार, धार्मिक स्थळे, वाहतुक व दळणवळण सुविधा या घटकाचा प्रभाव वसाहतीच्या विकासावर होत असतो. याशिवाय वसाहतीमध्ये रहात असलेल्या लोकांचा स्तर व त्यांचे कार्य आणि जात याचाही परीणाम वसाहतीच्या प्रारुपावर दिसून येतो.

लातूर व औसा तालुक्यातील ग्रामीण वसाहतीच्या प्रकाराचे वर्गीकरण करण्यासाठी आर.बी. मंडल (१९७९) यांच्या सांख्यिकी पध्दतीचा उपयोग केला आहे. ग्रामीण वसाहतीचे अंतर आणि आकार याच्या आधारे प्रकिर्णन सूची काढली आहे.वसाहतीचा फैलाव किंवा पसरणे याला प्रकिर्णन असे म्हणतात.वसाहतीचे प्रकिर्णन काढण्याच्या अनेक पध्दती आहेत. जयराम यादव यांनी गंगा-यमुना दोआबमधील वसाहतीच्या प्रकिर्णनला सरळ रेषीय अंतराच्या आधारे स्पष्ट केले आहे. ग्रामीण वसाहतीचे सैध्दांतिक अंतर हे एखाद्या प्रदेशातील ग्रामीण वसाहतीच्या घनतेवर अधारीत आहे. रॉबीन्सन आणि बारनेस (१९४०) यांनी ग्रामीण वसाहतीच्या क्षेत्रीय प्रारुपाची व्याप्ती आणि स्वरुपाला मोजण्याचा प्रयत्न केला आहे. मुखजी (१९७०) यांनी ग्रामीण वसाहतीच्या अंतराचा अभ्यास केला आहे.

**अभ्यास क्षेत्र :**

उस्मानाबाद जिल्ह्याचे विभाजन करून १६/०८/१९८२ रोजी लातूर या नवीन जिल्ह्याची निर्मिती झाली. औरंगाबाद विभागामध्ये असलेला महाराष्ट्र राज्याच्या दक्षिण पुर्वेस असून अक्षवृत्तीय विस्तार १८॰ ५' उत्तर ते १८॰ ७' उत्तर अक्षवृत्त आणि रेखावृत्तीय विस्तार ७३॰ २५' पुर्व ते १८॰ ७' पुर्व रेखावृत्त इतका विस्तार आहे. या जिल्ह्याचे क्षेत्रफळ ७१५७ चौ.कि.मी. आहे. या जिल्ह्याची सन २०११ च्या जनगणनेनुसार लोकसंख्या २४५४१९६ इतकी आहे. लातूर जिल्ह्यात लातूर, अहमदपूर, उदगीर, निलंगा, औसा, रेणापूर, चाकूर, देवणी, जळकोट व शिरुर अनंतपाळ असे एकूण दहा तालुके आहेत. या जिल्ह्याची साक्षरता ७९.०३%आहे. लातूर जिल्ह्यात भुईकोट किल्ला औसा, खरोसा लेणी, उदगीरचा किल्ला, रेणुकादेवी मंदीर, सिध्देश्वर मंदीर ही ऐतिहासिक ठिकाणे आहेत. जिल्ह्यातील लातूर व औसा हे दोन तालुके अभ्यासक्षेत्रासाठी निवडले आहेत.

लातूर तालुक्याचे क्षेत्रफळ १००४ चौ.कि.मी.असून ग्रामीण वसाहतीचे क्षेत्रफळ ३८३ चौ.कि.मी.आहे. सध्या या तालुक्यात रहिवासी वसाहतीची संख्या १२० (२०११) असून अभ्यास क्षेत्राची २०११ च्या जनगणनेनुसार एकूण लोकसंख्या ६८३६६६ इतकी आहे. तर या तालुक्यातील ग्रामीण लोकसंख्या २८६७११ एवढी आहे. लातूर तालुक्यात एकूण ०५ मंडळे आहेत.मुरूड, तांदुळजा, गातेगाव, लातूर, कासारखेडा आहेत. औसा तालुक्याचे क्षेत्रफळ १२४८.६१ चौ.कि.मी. आहे. सध्या या तालुक्यात १२६ (२०११) रहिवासी वसाहती असून एकूण लोकसंख्या २०११ नुसार ३०९५७१ एवढी आहे. या तालुक्यात ग्रामीण लोकसंख्या २७३४५३ इतकी आहे.प्रस्तुत संशोधनात फक्त ग्रामीण वसाहतीचीच लोकसंख्या व क्षेत्रफळ घेण्यात आले आहे.लातूर शहर व औसा शहर याचा विचार करण्यात आलेला नाही.

**उद्दिष्ट्चे :**

१. ग्रामीण वसाहतीच्या प्रकाराचा अभ्यास करणे.
२. ग्रामीण वसाहतीमधील अंतर, लोकसंख्येचा आकार आणि प्रकिर्णन सूचीद्वारे सूची च्या आधारे अभ्यास करणे.

**संशोधन पध्दती :**

वॉल्टर ख्रिस्टालर (१९३३) यांनी वसाहतीच्या षटकोनीय क्रमानुसार अभ्यास केला आहे. जेव्हा वसाहतीचे अंतर जवळ असते तेव्हा वसाहती सकेंद्रीत असतात. अंतर समान असल्यास वितरणर प्रारूप समरूपी किंवा नियमित असते. आणि नियमित अंतरण असल्यास वितरण प्रारूप यादृच्छिक असल्याचे दिसून येते. आर.बी.मंडल (१९७९) यांच्या सुत्राच्या साह्याने वसातीचा आकार आणि अंतरावरून ग्रामीण वसाहतीची प्रकिर्णन सुची खालील सुत्राच्या आधारे काढली जाते.

१) $\text{प्रकिर्णन सुची} = \dfrac{\text{ग्रामीण वसाहतीच्या सरासरी लोकसंख्येचा आकार}}{\text{ग्रामीण वसाहतीतील सरासरी अंतर}}$

अ) $\text{वसाहतीच्या सरासरी लोकसंख्येचा आकार} = \sqrt{\dfrac{\text{एकूण ग्रामीण लोकसंख्येच्या}}{\text{एकूण ग्रामीण वसाहती}}}$

ब)        प्रकिर्णन सुची        =        $\dfrac{\text{एकूण क्षेत्रफळ (चौरस) कि.मी.}}{\text{एकूण ग्रामीण वसाहती}}$

प्रकिर्णन सूची मुल्यावरून ग्रामीण वसाहतींच्या वितरणाचे पुढील चार प्रकारात विभाजन कले आहे. १) सधन ग्रामीण वसाहती २) अर्ध सधन ग्रामीण वसाहती ३) अर्ध विखुरलेल्या ग्रामीण वसाहती ४) विखुरलेल्या ग्रामीण वसाहती या प्रकारात केले आहे.

**अभ्यास विषय :**

लातूर तालुक्यातील ग्रामीण वसाहतींचा अभ्यास करताना असे दिसून येते की, मांजरा नदीखोऱ्याच्या भागातील वसाहती या अंतराने जवळ-जवळ व केंद्रीत आणि अर्धकेंद्रीत अशा स्वरूपाच्या आढळतात. तर वसाहती या अर्ध विखुरलेल्या वसाहती या आढळतात.

औसा तालुक्यातील ग्रामीण वसाहतींचा अभ्यास करताना असे लक्षात येते की, तावरजा नदीच्या खोऱ्यात व तेरणा नदीच्या खोऱ्यात सधन वसाहती आढळतात. तर तेरणा नदीचा उत्तर भागात अर्ध विखुरलेल्या वसाहती आढळतात.

सारणी क्र. १.१ - अ आणि सारणी क्र. १.१ - ब मध्ये प्रकिर्णन सुची जास्त असलेल्या गटात केंद्रीत वसाहतीचा समावेश होतो. तर औसा तालुक्यात ६१४.३ ते ७९०.२ या दरम्यान आहे. प्रकिर्णन सूचीचे उच्च मूल्य सधन वसाहतीचे सूचक आहेत. तर निम्न मूल्य विखुरलेल्या वसाहतीचे सूचक आहे.

**सारणी क्र. १.१ - अः लातूर तालुका (२०११)**
**लोकसंख्येनिहाय ग्रामीण वसाहतींचे अंतर, लोकसंख्येचा आकार आणि प्रकिर्णन सूची**

| अ.क्र. | मंडळ | वसाहतीमधील सरासरी अंतर | लोकसंख्येचा सरासरी आकार | प्रकिर्णन सूची |
|---|---|---|---|---|
| १ | मुरूड | ३.३३ | ३१५३.४ | ९४६.९ |
| २ | तांदुळजा | २.७० | १८४१.० | ६८१.८ |
| ३ | गातेगाव | २.८३ | १९६५.५ | ६९४.८ |
| ४ | लातूर | २.९९ | ३२७५.९ | १०९५.३ |
| ५ | कासारखेडा | २.४४ | १७६६.१ | ७२३.७ |
| | एकूण | २.८६ | २३६९.२ | ८३५.३ |

*स्रोत :लातूर जिल्हा प्राथमिक जनगणना अहवाल २०११*

**सारणी क्र. १.१ - बः लातूर तालुका (२०११)**
**मंडळनिहास ग्रामीण वसाहतींचे अंतर, लोकसंख्येचा आकार आणि प्रकिर्णन सूची**

| अ.क्र. | मंडळ | वसाहतीमधील सरासरी अंतर | लोकसंख्येचा सरासरी आकार | प्रकिर्णन सूची |
|---|---|---|---|---|
| १ | भादा | ३.१४ | १९२९.२ | ६१४.३ |
| २ | औसा | ३.१२ | १९२३.८ | ६१६.६ |
| ३ | लामजना | ३.११ | २१८०.७ | ७०१.१ |
| ४ | मातोळा | ३.३० | २५२३.० | ७६४.५ |
| ५ | किल्लारी | ३.०३ | २३९४.५ | ७९०.२ |
| | एकूण | ३.१४ | २१७०.२ | ६३१.१ |

*स्रोत :लातूर जिल्हा प्राथमिक जनगणना अहवाल २०११*

**सधन ग्रामीण वसाहती :**

अहमद (१९६५) यांच्या मते, ''सधन ग्रामीण वसाहतीची प्रमुख विशेषतः म्हणजे एखाद्या केंद्रस्थानी सर्व वसाहती केंद्रीत होतात. या वसाहतीमधील घरे जवळजवळ असतात.रस्ते व गल्ल्या अरूंद असतात. घरांच्या भिंती परस्परांना भिडलेल्या असतात. घरांच्या बांधकामासाठी स्थानिक बांधकाम सामुग्रीचा वापर केलेला आढळतो. या वसाहतीमध्ये अनेक लोक वास्तव्य करतात.या वसाहतीमध्ये सामाजिक, धार्मिक आणि आर्थिक हेतूने एकत्रीत आलेले लोक निवास करतात.अनेक भूगोल तज्ञांनी या प्रकारच्या वसाहतींना वेगवेगळ्या नावाने संबोधले जाते.फ्रिंच आणि त्रिवार्था (१९४६) यांनी या प्रकारच्या वसाहतींना केंद्रीत वसाहती किंवा सधन वसाहती तर जीन ब्रुन्स (१९५२) यांनी सकेंद्रीत वसाहत असे संबोधले आहे.ब्लाश (१९११) यांनी पुंजीत वसाहत आणि काही भूगोल तज्ञांनी या वसाहतीस संकलित वसात असे संबोधले आहे. सधन ग्रामीण वसाहती असलेल्या गटामध्ये सरासरी ग्रामीण वसाहतीचा आकार मोठा असल्याचे आढळते. या ग्रामीण वसाहतीची लोकसंख्येची घनता जास्त आणि घरातील अंतर जवळ-जवळ असल्याचे दिसून येते.दुगल (१९६१) यांच्या मते ''सधन ग्रामीण वसाहतीचा विकास अशा सुगम स्थानावर होतो.ज्या ठिकाणावरून विकास अशा सुगम स्थानावर होतो.ज्या ठिकाणावरून सभोवतालच्या शेतजमिनीचे निरीक्षण करता येते.

लातूर तालुक्यात मांजराव तावरजा नदीखोऱ्यातील प्रदेशात जास्तीत जास्त सधन प्रकारच्या वसाहती आढळून येतात. या प्रदेशात पर्जन्य व जलसिंचनाच्या सोई हे घटक वसाहतीच्या प्रकारावर परीणाम करणारे महत्त्वाचे घटक आहेत. या प्रदेशातील सुपिक मृदेचाही वसाहतीच्या केंद्रीकरणावर परीणाम होतो. या प्रदेशामध्ये शेती व्यावसायाचा विकास झालेला दिसून येतो.या वसाहतीमध्ये लोकसंख्येची घनता व वसाहतीचा आकार जास्त आढळून येतो.

या वसाहत प्रकारची प्रकिर्णन सूची सर्वाधिक लातूर मंडळात १०९५.३ इतकी दिसून येते. या प्रकारची उदाहरणे असून त्यामध्ये लातूर मंडळातील साई, महापूर, नांदगाव, बोरवटी, गंगापूर, खंडापूर, पेठ इत्यादी ग्रामीण वसाहतींचा समावेश होतो.

औसा तालुक्यातील तावरजा व तेरणा नदीच्या खोऱ्यात जास्तीत जास्त सधन प्रकारच्या ग्रामीण वसाहती आढळतात. या प्रदेशात पर्जन्य व जलसिंचन हे घटक वसाहतीच्या वितरणावर परिणाम करतात. या प्रदेशात शेती व्यावसायाचा विकास झालेला दिसून येतो. या वसाहतीत लोकसंख्येची घनता वसाहतीचा सरासरी आकार जास्त आढळून येतो.

या वसाहत प्रकारची प्रकिर्णन सूची ७९०.२ इतकी असलेली दिसून येते या प्रकारची उदाहरणे किल्लारी मंडळात माळकोंडजी, हारेगाव, मोगरगा, कारला, नांदुर्गा, हसलगण, तळणी, किल्लारी या ग्रामीण वसाहतीचा समावेश होतो.

**अर्ध सधन ग्रामीण वसाहती :**

लातूर तालुक्याती हा वसाहत प्रकार सधन वसाहत प्रकार व विखुरलेला वसाहत प्रकार यांच्या दरम्यानचा असून अशा प्रकारच्या ग्रामीण वसाहतीची निर्मिती कृषी योग्य जमिनीचे प्रमाण, वाहतूक मार्गांची उपलब्धता, प्रवाहप्रणाली, योग्य स्तरावर भूजल उपलब्धता या घटकामुळे झालेली दिसून येते. या प्रदेशात पर्जन्य व जलसिंचन या घटकाचा वसाहतीच्या प्रकारावर परिणाम झालेला दिसून येतो. शेती व्यावसायाचा विकास झालेला आहे. या वसाहतीत लोकसंख्येची घनता व वसाहतीचा सरासरी आकार मध्यम स्वरूपाचा आढळतो.

या वसाहत प्रकाराची प्रकिर्णन सूची ९४६.९ इतकी मुरूड मंडळात दिसून येते. या प्रकारची उदाहरणे पुढील प्रकारची असून त्यामध्ये औसा, वाघोली, शिराळा, माटेफळ, मुरूड, बोरगाव, निवळी, एकुर्गा इत्यादी वसाहतीचा समावेश होतो.

औसा तालुक्यात तेरणा व मांजरा नदीच्या खोऱ्यात अर्ध सधन प्रकारच्या ग्रामीण वसाहती दिसून येतात. या प्रदेशात पर्जन्य व जलसिंचन हे घटक वसाहतीच्या प्रकारावर परिणाम करणारे महत्त्वपूर्ण घटक आहेत. या प्रदेशात शेती व्यवसायाचा विकास झालेला आढळतो. या वसाहतीत लोकसंख्येची घनता व वसाहतीचा सरासरी आकार जास्त आढळतो.

या वसाहत प्रकारची प्रकिर्णन सूची ७६४.५ इतकी दिसून येते. या प्रकारची अनेक उदाहरणे मातोळा मंडळात बेलकुंड, तुंगी (बु), नागरसोगा, हिप्परगा, चिंचोली काजळे, मातोळा, लोहारा या ग्रामीण वसाहतीचा समावेश होतो.

**अर्ध विखुरलेल्या ग्रामीण वसाहती :**

लातूर तालुक्यात अर्ध विखुरलेल्या आणि अर्धसधन वसाहती यांची वैशिष्ट्ये समान आढळतात. अशा प्रकारच्या वसाहतीची निर्मिती ज्या ठिकाणी पाण्याचे प्रमाण कमी, मृदेचा निम्नस्तर यामुळे या वसाहती बहुतांश आकाराने लहान असतात.

या वसाहत प्रकारची प्रकिर्णन सूची ७२३.७ इतकी दिसून येते. या प्रकारची पुढील प्रमाणे अनेक उदाहरणे असून त्यामध्ये कासारखेडा मंडळातील मळवटी, भडी, कोळपा, ममदापूर, रमजानपूर, उमरगा, सलगरा खु., दगडवाडी या प्रकारच्या वसाहती आकाराने लहान आहेत.

औसा तालुक्यात अर्ध विखुरलेल्या ग्रामीण वसाहतीची निर्मिती ज्या ठिकाणी मृदेचा निम्नस्तर, पाण्याची अनुपलब्धता यामुळे या ग्रामीण वसाहती आकाराने लहान दिसून येतात.

या वसाहत प्रकारची प्रकिर्णन सूची ७०१.१ इतकी दिसून येते. या प्रकारची पुढील प्रमाणे अनेक उदाहरणे असून त्यामध्ये लामजना मंडळातील कन्हेरी, भंगेवाडी, चलबुर्गा, तांबरवाडी, दाऊतपूर, येळी इत्यादी ग्रामीण वसाहतीचा अर्ध विखुरलेल्या वसाहत प्रकारात होतो.

**विखुरलेल्या ग्रामीण वसाहती :**

लातूर तालुक्यात या वसाहत प्रकारच्या प्रदेशामध्ये प्राकृतिक रचना, समान उंची आढळून येते. मृदेचा निम्न दर्जा यामुळे त्या ठिकाणी वसाहती या विखुरलेल्या स्वरूपाच्या दिसून येतात. या प्रदेशात ग्रामीण वसाहतीच्या विकासासाठी जलसिंचन सुविधेची उपलब्धता यामध्ये तलाव, विहिरी, बोरवेल इत्यादीची उभारणी करून शेतीचा विकास करणे आवश्यक आहे. यामुळे ग्रामीण वसाहतीत प्रादेशिक समतोल निर्माण करता येईल.

अभ्यास क्षेत्रातील प्रकिर्णन सूची गातेगाव मंडळात ६९४.३ आणि तांदुळजा मंडळात ६८१.८ इतकी दिसून येते. या प्रकारचे प्रकारची उदाहरणे गातेगाव मंडळात नागझरी, तांदूळवाडी, सामनगाव, आकरवाई साकरा, धानोरी, उटी खु. इत्यादी पहावयास मिळतात. तर तांदुळजा मंडळात सेवादास नगर, वांजरखेडा तांडा, वाकडी, गांजुर, ताडकी, रूई, दिंडेगाव इत्यादी ग्रामीण वसाहतीचा समावेश होतो.

औसा तालुक्यात विखुरलेल्या ग्रामीण वसाहतीचा सरासरी लोकसंख्येचा आकार कमी असतो. शेतीखालील जमिनीचे प्रमाण कमी असतो.शेतीखालील जमिनीचे प्रमाण कमी असते. मृदेच्या निम्न दर्जा व शेतीसाठी कमी पाणीपुरवठा याचा वसाहतीच्या कृषी पध्दतीवर परिणाम झालेला दिसून येतो. अशा प्रदेशात तलाव, विहिरी, बोरवेल याची उभारणी करून शेतीचा विकास करणे आवश्यक आहे.

या वसाहत प्रकारची प्रकिर्णन सूची औसा मंडळात ६१६.६ आणि भादा मंडळात ६१४.३ इतकी पहावयास मिळते. या प्रकारची पुढील उदाहरणे असून त्यामध्ये औसा मंडळात कवठा, हासेगाव, खानापूर, औसा ग्रामीण, फत्तेपूर, होळी, तोंडोळी इत्यादी पहावयास मिळतात. तर भादा मंडळात नाहुली, कवठा केज, नळदुर्ग, बऱ्हानपूर, वडजी, येलोरीवाडी, येलोरी, रिंगणी या ग्रामीण वसाहतीचा समावेश होतो.

**संदर्भ ग्रंथ :**

१. *अहिरराव वा.र. (१९९७) अधिवास भूविज्ञान, निराली प्रकाशन, पुणे*
२. *भारतीय भू-स्थलदर्शक नकाशा*
३. *Mandal R.B. Introduction to Rural Settlement.*
४. *WWW.Laturnic.in*
५. *WWW.Googleeirth.com*

# नांदेड जिल्ह्यातील दळणवळण सेवा : एक भौगोलिक अभ्यास

**श्रीहरी रामराव गायकवाड**

संशोधक

श्री हावगीस्वामी महाविद्यालय,

उदगीर जि.लातूर.

**डॉ. सदानंद गोने**

मार्गदर्शक

प्राचार्य, उज्वल ग्रामीण महाविद्यालय,

घोणसी ता.जळकोट जि.लातूर.

**प्रस्तावना:**

२१ व्या शतकामध्ये दळणवळणाच्या साधनांमध्ये फार मोठ्या प्रमाणात सुधारणा झाल्यामुळे शहरी किंवा नागरी सेवा-सुविधांची उपलब्धता ग्रामीण भागापर्यंतच नाही तर राज्य व राष्ट्रामध्ये देवाणघेवाण वाढून मोठ्या प्रमाणात देशाचा सर्वांगिण विकास साधला जातो. शहरी केंद्र ग्रामीण भागामध्ये मोठ्या प्रमाणात आणि जलद गतीने सुविधा पुरवित आहेत. शहराचा आकार व तेथील दळणवळण सुविधा व रस्ते बांधणी यावरून राष्ट्राची ओळख, देशाची व शहराची ओळख होण्यासाठी महत्त्वाची भूमिका बजावतात म्हणून नागरी व्यवस्थेत दळणवळण हा घटक महत्त्वाचा मानला जातो. भारतातच नव्हे तर इतर देशातसुद्धा दळणवळणामुळे अनेक देशाची प्रगती झालेली दिसून येते. युरोप, चीन, अमेरिका या देशामध्ये दळणवळणाची साधने अत्याधुनिक व जलद गतीचे असल्याकारणाने त्या देशाचा जगाच्या तुलनेत विकास झालेला दिसून येतो. सध्याचे युग हे तंत्रज्ञानाचे युग म्हणून ओळखले जाते. या युगामध्ये मानवाने अनेक प्रकारचे शोध लावले आहेत व त्यामुळे मानवाची व कार्याची गती वाढली आहे.त्या अनुषंगाने दळणवळणाची साधने व रस्ते योग्य प्रकारचे असतील तर त्या देशाचा, राज्याचा व शहराचा मोठ्या प्रमाणावर विकास होतो.

प्राचीन काळापासून वाहतूक व दळणवळणाची साधने अस्तित्वात असलेली आढळून येतात. त्यामुळे अनेक शहराचा विकास झालेला आज आधुनिक युगात पहावयास मिळतो. दळणवळणाचा अभ्यास हे त्या प्रदेशातील वाहतूक व रस्ते यांचा एक योग्य प्रकारे केलेला विश्लेषणात्मक अभ्यास होय. नांदेड या जिल्ह्यातील १६ तालुक्यांमध्ये १५४१ ग्रामीण गावे, वाड्या, तांडे आहेत आणि या सर्वांना दळणवळणासाठी सुविधांची गरज आहे. त्यामुळे या १६ तालुक्यातील दळणवळणाचा अभ्यास करण्यात आला आहे.

**अभ्यासाची उद्दिष्ट:**

नांदेड जिल्ह्यातील दळणवळण सेवांचा अभ्यास करणे हे प्रमुख उद्दिष्ट समोर ठेवून सदरील शोधनिबंध तयार करण्यात आला आहे.

**माहिती संकलन व संशोधन पद्धती:**

सदरील शोधनिबंध पूर्ण करण्यासाठी द्वितीयक सामुग्रीचा वापर केला आहे. द्वितीय सामग्रीमध्ये जिल्हा सामाजिक व आर्थिक समालोचन नांदेड जिल्हा, विविध मासिके व जिल्हाविषयक अनेक ग्रंथ यांचा आधार घेतला आहे.मिळालेल्या आकडेवारीच्या आधारे सांख्यिकीय पद्धतीने विश्लेषण केलेले आहे.

**नांदेड जिल्हयाचेस्थानविस्तार:**

मराठवाड्याच्यापूर्वेकडीलनांदेडयाजिल्हयाचा क्षवृत्तीयविस्तार ॰ ' त्तरते ॰ , त्तर क्षवृत्तवरेखावृत्तीयविस्तार ॰ 'पूर्वते ॰ 'पूर्वरेखावृत्तदरम्यान हे.नांदेडजिल्हयाच्या त्तरेसयवतमा व हिंगोलीजिल्हे हेत.पश्चिमेसपरभणीजिल्ह हे.पश्चिमवनैऋत्येसलातूरजिल्ह हे.तरदक्षिणेसकर्नाटकराज्यातील लबिदरजिल्ह हे.जिल्हाचेएकूनक्षेत्रफ , चौ.किमी हे. च्याजनगणनेनुसारजिल्ह्यातीललोकसंख्या , , एवढी हे.महारा ्राज्याच्याएकूणलोकसं ख्येपैकी क्केलोकसंख्यानांदेडजिल्ह्याची हे.तरजिल्ह्याचेक्षेत्रफ महारा ्राच्याएकूणक्षेत्रफ च्या क्के एवढे हे.

**विश्लेषण:**

नांदेड जिल्ह्यात १६ तालुके असून हा जिल्हा महाराष्ट्र-आंध्रप्रदेशाच्या सीमेलगत असून ही एक महत्त्वाची बाजारपेठ आहे. या ठिकाणाहून अनेक महत्त्वाच्या शहरास वाहतूक जोडलेली आहे. नांदेड जिल्ह्यातील १६ तहसीलमध्ये १५४१ गावे आहेत व त्या प्रत्येक तहसीलमध्ये अनेक दळणवळणाची साधने उपलब्ध आहेत. त्यात जीप, बस, ऑटो रिक्षा, मोटारसायकल, टेम्पो, ट्रक, हातगाडी, घोडागाडी, बैलगाडी अशा अनेक प्रकारच्या साधनांचा वापर या जिल्ह्यातील लोक दळणवळणाचे साधन म्हणून करतात.

वरील साधनांच्या वापरामुळे मानवाला अनेक प्रदेशात जावून व्यापार करतो येतो व विकास साधता येतो. दळणवळणाच्या साधनांमुळे अनेक शहरांमध्ये व राज्यांमध्ये जाता येते आणि आयात-निर्यात करून विकास साधता येतो. त्यामुळे नांदेड जिल्ह्यातील १६ तालुक्यातील अनेक गावातील व्यापारी ह्या सेवांचा फायदा घेतात व जिल्ह्याचा व स्वतःच्या विकासाला हातभार लागतो. म्हणून वाहतूक व दळणवळण व्यवस्था हे शहराच्या विकासासाठी अतिशय महत्त्वाचा घटक म्हणून ओळखला जातो.
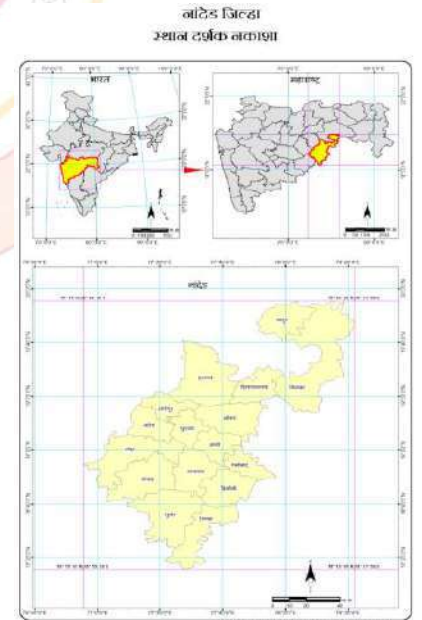
**सारणी क्र. १.१: नांदेड जिल्ह्यातील तहसीलनिहाय पक्क्या रस्त्याने जोडलेली गावे व टक्केवारी (कि.मी. मध्ये)**

| अ.क्र. | तहसील | टक्केवारी | गावांची संख्या | किलोमीटर |
|--------|-------|-----------|----------------|----------|
| १ | माहूर | ७१.५९ | ६३ | ३६२ |
| २ | किनवट | ७९.२१ | १४१ | ८९६ |
| ३ | हिमायतनगर | ७०.०० | ४९ | ४२६ |
| ४ | हदगाव | ५१.३५ | ७६ | ८२७ |
| ५ | अर्धापूर | ७१.१५ | ३७ | ३१५ |
| ६ | नांदेड | ८३.१३ | ६९ | ५३३ |
| ७ | मुदखेड | १९.१६ | ४७ | ३४९ |
| ८ | भोकर | ६६.२५ | ५३ | ५४७ |
| ९ | उमरी | ६९.२३ | ४५ | १५१.२२ |
| १० | धर्माबाद | ९६.०८ | ४९ | ३५२ |
| ११ | बिलोली | ७९.५२ | ६६ | ५०६ |
| १२ | नायगाव | ७०.११ | ६१ | ४७९ |
| १३ | लोहा | ७२.३६ | ८९ | ७८० |
| १४ | कंधार | ६८.०० | ८५ | ८३३.७८ |
| १५ | मुखेड | ७२.१९ | १०९ | ९८३ |
| १६ | देगलूर | ६१.३२ | ६५ | ७५८.३३ |
| | **एकूण** | **७१.६४** | **११०४** | **९५९८.३३** |

*स्रोत : नांदेड जिल्हा सामाजिक व आर्थिक समालोचन, २०११*

सारणी क्र. १.१ मध्ये दाखवल्याप्रमाणे सर्वांत जास्त वाहतूकीसाठी रस्ते बनवलेले गावे व तालुके यामध्ये किनवट तालुक्याचा प्रथम क्रमांक लागतो. या तालुक्यातील १४१ गावे पक्क्या रस्त्याने जोडलेली आहेत. तर सर्वांत कमी रस्ते असलेले तहसील व गावे अर्धापूर या तालुक्यात ३७ जोडलेली आहेत. जिल्ह्यातील तालुकानिहाय रस्त्यांच्या टक्केवारीचा विचार केला असता सर्वांत जास्त रस्ते जोडणी ही धर्माबाद तहसीलमध्ये ९६.०८ आहे तर सर्वांत कमी पक्के रस्ते टक्केवारी मुदखेड १९.१६ आहे. तर एकूण जिल्ह्याचा विचार केल्यास जिल्ह्यात ७१.६४ रस्ते हे पक्के आहेत. जिल्ह्यातील १५४१ गावांपैकी ११०४ गावे हे पक्क्या रस्त्याने जोडलेली आहेत. एकूण जिल्ह्यातील रस्त्याच्या कि.मी. अंतराचा विचार केला असता ९५९८.३३ कि.मी. मध्ये पक्के रस्ते आहेत. तर जिल्ह्यातील मुखेड तालुक्यात सर्वाधिक पक्के रक्के ९८३ कि.मी. आहेत तर सर्वांत कमी अर्धापूर ३१५ कि.मी. आहेत.

नांदेड जिल्ह्यातील १६ तहसील हे नांदेड जिल्ह्याशी जोडले गेले आहेत. अनेक तालुक्यात बाजारपेठा उपलब्ध आहेत. त्यामुळे तेथील दळणवळण सोयीसुविधांचा वापर मोठ्या प्रमाणात होतो आणि जिल्ह्याच्या विकासाला चालना मिळते. तसेच जिल्ह्याचा विकास झपाट्याने होत असलेला दिसून येतो. ग्रामीण भागातून अनेक व्यापारी व शेतकरी शेतमाल विक्रीसाठी बाजारात आणतात. त्यासाठी दळणवळण सुविधांची गरज भासते. व्यापारी अनेक जिल्ह्यात मालाची खरेदी व विक्री करण्यासाठी दळणवळण साधनांचा वापर करतात. त्यामुळे दळणवळण सेवा ही एक महत्त्वाची सेवा आहे. नांदेड जिल्ह्यातील अनेक शेतकरी व व्यापारी या सेवेचा मोठ्या प्रमाणात उपयोग करतात.

**निष्कर्ष:**

१) नांदेड जिल्ह्यातील दळणवळण सेवाचे प्रमाण असमान आहे.

२) नांदेड जिल्ह्यातील अनेक भागात रस्ते कमी प्रमाणात आहेत.

३) जिल्ह्यात दळणवळणाची आधुनिक साधने मुबलक प्रमाणात आहेत.

४) जिल्ह्यात वाहतूक व दळणवळणाचा विकास झालेला दिसून येतो.

**संदर्भ:**

१) *नांदेड जिल्हा सामाजिक व आर्थिक समालोचन, २०११.*

२) *जनगणना अहवाल २०११ A-B Vol. 11-12*

३) *www.maharashtra.gov.in*

४) *www.nandeddistrict.in*

# परभणी जिल्ह्यातील लोकसंख्याचा अभ्यास

**डॉ. सुनिता एस. शिंदे**  
संशोधन मार्गदर्शक,  
भूगोल विभाग प्रमुख  
श्रीमती सुशिलादेवी देशमुख महिला महाविद्यालय, लातूर.

**दत्ता राधाकिसन शिंदे**  
संशोधक

**प्रस्तावना :**

पृथ्वीवरील सर्वात महत्वाचा व परिवर्तनशील घटक म्हणून लोकसंख्या या घटकाचा विचार केला जातो. विविध प्रदेशातील लोकसंख्या, लोकसंख्येची वाढ, जन्मदर मृत्यूदर, स्त्री-पुरूष प्रमाण, स्थलांतर, धर्म, भाषा, देश व आर्थिक स्थिती या बरोबरच भौगोलिक पर्यावरणाशी मानवाने केलेले समायोजन हा लोकसंख्या या घटकाचा मुख्य अभ्यास विषय आहे. (गायकवाड)

जगात लोकसंख्येचा अभ्यास अनेक वर्षापासून होत असला तरी या विषयाचे सखोल अध्ययन दुसऱ्या महायुध्दानंतरच सुरू झाले. कारण दुसऱ्या महायुध्दानंतर संयुक्त राष्ट्र संघटनेने लोकसंख्या गणनेवर भर दिला आहे. संयुक्त राष्ट्र संघटनेने जनगणनेविषयी मार्गदर्शक तत्त्वे घालून दिले आहेत. तसेच १९७४ ही जागतीक लोकसंख्या वर्ष म्हणून घोषित केले आहे. त्याच प्रमाणे ११ जुलै हा जागतिक लोकसंख्या दिन म्हणून साजरा केला जातो.

भारतात प्राचीन काळापासूनच लोकसंख्या अभ्यासाचे दाखले मिळतात. काही ग्रंथात प्राचीन भारतातील नोंदि मिळतात.चंद्रगुप्त मौर्याच्या काळात कौटिल्याने (३२३ ते ३००इ.स.पूर्व) शेती, उद्योगधंदे, लोकसंख्या आणि लोकांची संपत्ती या विषयी अभ्यास केल्याची नोंद आढळते. भारतात ब्रिटीश राजवटीपासून (इ.स. १८७२) जनगणना सुरू झाली. तेव्हापासून लोकसंख्येचा प्रत्येक बाजुने अभ्यास करण्यात येऊ लागला. (खतिब)

लोकसंख्येच्या संख्यात्मक व गुणात्मक आकारमानानुसार त्या-त्या विभागाची आर्थिक प्रगती अवलंबून असते. उत्पादन, उपभोग, राहणीमान इत्यादी बाबींवर लोकसंख्येचा प्रभाव पडतो. अतिरिक्त लोकसंख्या ही विकासाच्या दृष्टीकोणातून अनुकूल व प्रतिकूल या दोन प्रकारची असते.

## लोकसंख्येची व्याख्या :(Defection)

"लोकसंख्येचे विशेषतः जन्म, मृत्यू व स्थलांतर किंवा भौगोलिक क्षेत्रातील विशिष्ट काळातील एकूण लोक म्हणजे लोकसंख्या होय." -स्टेनफोर्ड

**उद्देश :**

१) परभणी जिल्ह्यातील लोकसंख्या वाढ-घट अभ्यासणे.
२) परभणी जिल्ह्यातील तालुकानिहाय लोकसंख्येचा अभ्यास करणे.

**गृहितके :**

१) परभणी जिल्ह्यातील लोकसंख्या वाढ व घट याचा अभ्यास केला गेला.
२) परभणी जिल्ह्यातील तालुकानिहाय लोकसंख्येचा अभ्यास केला गेला.

**संशोधन पध्दती :**

प्रस्तुत शोधनिबंधात अभ्यासासाठी प्राथमिक व द्वितीयक स्वरूपाच्या साधन सामग्रीचा वापर करून वर्णनात्मक व विश्लेषणात्मक तसेच संख्यात्मक संशोधन पध्दतीचा वापर करून त्यावर आधारित आलेखाचा वापर करण्यात आला आहे.

**परभणी जिल्ह्यातील लोकसंख्येचा अभ्यास :**

गोदावरी नदी खोऱ्यात वसलेल्या मराठवाडा विभागातील साधारणतः मध्यभागी असलेला एक प्रमुख जिल्हा आहे. पुरातनकाळी परभणीला प्रभावती या नावाने ओळखले जात असे.परभणी शहरात प्रभावती देवीचे सुंदर व भव्य असे मंदिर होते.याच प्रभावती देवीच्या नावावरून परभणी हे नाव पडले आहे असे मत व्यक्त केले जाते.

**भौगोलिक स्थान व क्षेत्रफळ :**

हा जिल्हा महाराष्ट्र राज्याच्या आग्नेय दिशेला वसलेला असून परभणी जिल्ह्याचा विस्तार १८°५०' ते १९°५०' उत्तर अक्षांश आणि ७६°१३' ते १७°१२' पूर्व रेखांशावर वसलेला आहे. या जिल्ह्याचे एकूण क्षेत्रफळ ६८९२.०४ चौ.कि.मी. असून आकारमान लक्षात घेता या जिल्ह्याचा महाराष्ट्रात २३ वा क्रमांक लागतो. परभणी जिल्ह्याच्या पूर्वेला नांदेड व हिंगोली, दक्षिणेला लातूर व बीड, पश्चिमेला बीड व जालना तर उत्तरेला जालना व हिंगोली जिल्हे आहेत. (देशमुख)

वरील भौगोलिक स्थानाचा अभ्यास केल्यावर परभणी जिल्ह्यातील एकूण लोकसंख्येचा (१९६१ ते २०११) अभ्यास पुढील तक्त्याच्या आधारे व विश्लेषणाद्वारे करता येईल.

तक्ता क्र. १ व आलेख क्र. १ मध्ये परभणी जिल्ह्यातील सन १९६१ ते २०११ या कालावधीमधील एकूण लोकसंख्या दर्शविली आहे. सन १९६१ मध्ये अभ्यास क्षेत्रातील एकूण लोकसंख्या ६.४१ लाख होती. यामध्ये सातत्याने वाढ होऊन सन २०११ मध्ये अभ्यास क्षेत्रातील एकूण लोकसंख्या १८.३६ लाख एवढी झाली आहे. सन १९६१ ते सन २०११ या कालावधीमध्ये सर्वाधिक ४.९५ लाख वाढ सन १९९१ मध्ये झाली आहे. तर सर्वाधिक कमी ०.४५ लाख वाढ सन २००१ मध्ये आली आहे असे दिसून येते.

### तक्ता क्र. १: परभणी जिल्ह्यातील लोकसंख्या (१९६१ ते २०११) लाखात

| अ.क्र. | वर्ष | लोकसंख्या | वाढ / घट | वृध्दीदर |
|---|---|---|---|---|
| १. | १९६१ | ६.४१ | - | - |
| २. | १९७१ | ८.०५ | १.६४ | २५.५८ |
| ३. | १९८१ | ९.८७ | १.८२ | २२.६० |
| ४. | १९९१ | १४.८२ | ४.९५ | ५०.१५ |
| ०५. | २००१ | १५.२७ | ०.४५ | ०३.०३ |
| ६. | २०११ | १८.३६ | ३.०९ | २०.२३ |
| एकूण | | ७२.७८ | ११.९५ | १२१.५९ |

**Formula :** *Present Value- Past valueX100*

स्त्रोत :१)जिल्हा सामाजिक व आर्थिक समालोचन, परभणी जिल्हा (२०१७), अर्थ व सांख्यिकी संचालनालय, महाराष्ट्र शासन, मुंबई.

२) *www.censwindio.gov.in*

३) *Census of India District Census Handbook Parbhani (1961, 1971, 1981), Directorate of census operations Maharashtra.*

### आलेख क्र. १: परभणी जिल्ह्यातील लोकसंख्या (१९६१ ते २०११)
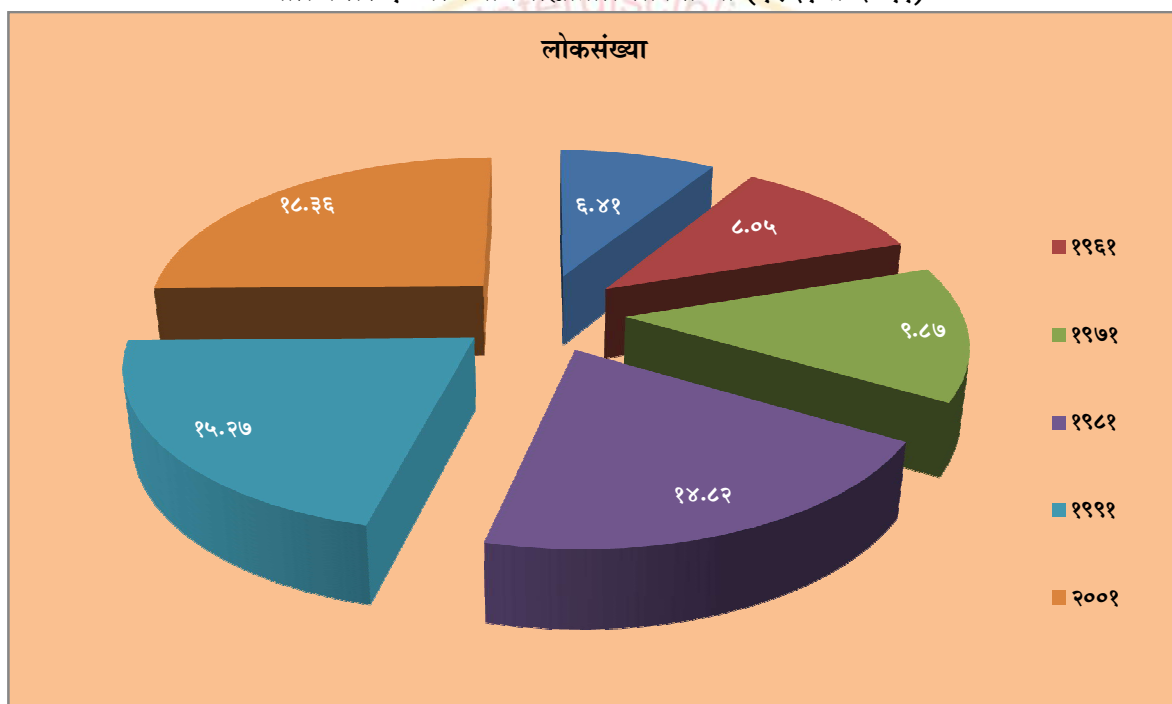


यावरून असे स्पष्ट होते की, अध्ययन क्षेत्रातील लोकसंख्यामध्ये सातत्याने वाढ होत आहे.

**परभणी जिल्ह्यातील तालुका निहाय लोकसंख्या :**

सन २०११ च्या जनगणनेनुसार परभणी जिल्ह्याची एकूण लोकसंख्या १८,३६,०८६ एवढी असून तालुकानिहाय लोकसंख्या पुढील प्रमाणे आहे. (जिल्हा सामाजिक व आर्थिक समालोचन २०१७)

### तक्ता क्र. २: परभणी जिल्ह्यातील तालुकानिहाय लोकसंख्या

| अ.क्र. | तालुका | एकूण क्षेत्रफळ (चौ.मि.) | एकूण लोकसंख्या | एकूण लोकसंख्येशी प्रमाण |
|---|---|---|---|---|
| १. | सेलू | ८८५.८६ | १६९१७४ | ९.२२ |
| २. | जिंतूर | १३०७.३२ | २८२७५६ | १५.४० |
| ३. | परभणी | ११५९.४५ | ५३७८१० | २९.२९ |
| ४. | मानवत | ८५४.५७ | ११६८१७ | ६.३६ |
| ०५. | पाथरी | ५३०.४२ | १३९०४६ | ७.५८ |
| ६. | सोनपेठ | ३७२.७१ | ८९५८२ | ४.८७ |
| ७. | गंगाखेड | ६७१.९४ | २०२८६७ | ११.०५ |
| ८. | पालम | ४९४.९१ | ११५३८२ | ६.२८ |
| ९. | पूर्णा | ६१४.८६ | १८२६५२ | ९.९५ |
| एकूण | | ६८९२.०४ | १८३६०८६ | १००.०० |

**Formula:** *Current Value/total value X 100.*

स्त्रोत : १) *www.censusiusindia.gov.in.*

२) जिल्हा सामाजिक व आर्थिक समालोचन (२०१७) परभणी जिल्हा, नियोजन विभाग, अर्थ व सांख्यिकी संचालनालय, महाराष्ट्र शासन, मुंबई.

तक्ता क्र. २ व आलेख क्र.२ मध्ये अध्ययन क्षेत्रातील तालुकनिहाय लोकसंख्या आणि तालुकानिहाय लोकसंख्येची एकूण लोकसंख्येशी असलेले प्रमाण दर्शविलेले आहे. सेलू तालुक्याची एकूण लोकसंख्या १,६९,१७४ एवढी आहे. अनुक्रमे जिंतूर तालुका २,८२,७५६, परभणी ५,३७,८१०, मानवत ४,६,८१७, पाथरी १,३९,०४६, सोनपेठ ८९,५८२, गंगाखेड २,०२,८६७, पालम १,१५,३८२ पूर्ण तालुक्याची लोकसंख्या १,८२,६५२, एवढी आहे. तालुका निहाय लोकसंख्याचा एकूण लोकसंख्येशी असलेल्या प्रमाणाचा अभ्यास केला असता सर्वाधिक २९.२९ टक्के प्रमाण परभणी तालुक्याचे असून सर्वाधिक २९.२९ टक्के परभणी तालुक्याचे असून सर्वाधिक कमी ४.८७ टक्के प्रमाण सोनपेठ तालुक्याचे आहे.

वरील अभ्यासावरून असे स्पष्ट होते की, सोनपेठ, मानवत आणि पालम या तीन तालुक्याचे एकूण लोकसंख्येशी प्रमाण इतर तालुक्यांच्या तुलनेत कमी आहे असे दिसून येते.

**आलेख क्र. २: परभणी जिल्ह्यातील तालुकानिहाय लोकसंख्येचे एकूण लोकसंख्येशी प्रमाण**
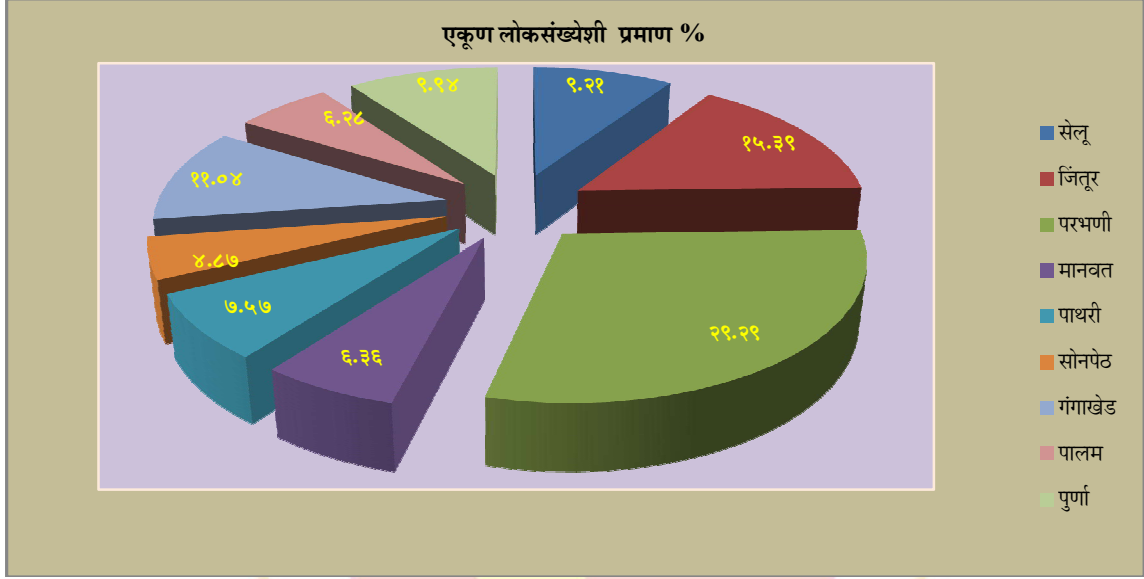
**संदर्भ सूची :**

१) केचे पांडुरंग (१९९७), 'महाराष्ट्राचा भूगोल ', कैलास पब्लिकेशन्स, औरंगाबाद, पृ.क्र. २१६.

२) गायकवाड जोगेंद्र (२००५), 'लोकसंख्या भूगोल ', कैलास पब्लिकेशन्स, औरंगाबाद, पृ.क्र.७.

३) खतीब ए.के. (२०११), 'लोकसंख्या भूगोल ', विद्या बुक्स पब्लिशर्स, औरंगाबाद, पृ.क्र. ३,४.

४) देशमुख रा.नी. (२०१२), 'आपला परभणी जिल्हा ', कल्पना प्रकाशन, नांदेड, पृ.क्र. ०५.

५) जिल्हा सामाजिक व आर्थिक समालोचन परभणी जिल्हा (२०१७; नियोजन विभाग, अर्थ व सांख्यिकी संचालनालय, महाराष्ट्र शासन, मुंबई पृ.क्र. ४.

६) Census Report (2001); Ministry of Home Affairs Government of India.

# परभणी जिल्ह्यातील कृषी यांत्रिकीकरणाच्या स्तराचा तहसीलनिहाय भौगोलिक अभ्यास

**डी.एस.धावणे**
संशोधक
श्री हावगीस्वामी महाविद्यालय,
उदगीर जि.लातूर

**डॉ. एस. एन. कळकसर**
मार्गदर्शक
भूगोल विभागप्रमुख
बी.पी. ग्रा.महाविद्यालय,हनेगाव
ता.देगलूर जि.नांदेड

**प्रस्तावना :**

कृषी हा भारतीय अर्थव्यवस्थेचा प्रमुख कणा आहे.भारतातील जवळपास ७० टक्के लोक हे कृषीवर अवलंबून आहेत.स्वातंत्र्यानंतर कृषीमध्ये आमूलाग्र बदल घडून आले.पहिल्या पंचवार्षिक योजनेपासून कृषीला महत्त्व देण्यात आले.कारण की देशातील लोकांची व वाढत्या लोकसंख्येची अन्नाची गरज पूर्ण करणे कृषीशिवाय शक्य नव्हते.१९६५-६६ ला देशामध्ये हरितक्रांती घडून आली.कृषिचे उत्पादन वाढविण्यासाठी कृषीमध्ये नवनवीन तंत्रज्ञानाचा वापर करण्यात आला.त्यात नवनवीन बि-बियाणे, खते, जलसिंचन सुविधा यामुळे देशातील अन्नधान्य उत्पादनात भरीव अशी वाढ झाली व भारत देश अन्नधान्य उत्पादनात समृद्ध झाला.तसेच कृषीमुळे शेतकऱ्यांचा आर्थिक दर्जा व राहणीमानात सुधारणा झाली.स्वातंत्र्यानंतर देशामध्ये अनेक कृषी विद्यापीठे स्थापन करण्यात आली व या विद्यापीठाच्या मार्फत शेतकऱ्यांना शेतीविषयक अद्ययावत माहिती पुरविण्यात आली.त्यामुळे शेतकऱ्यांनी शेतामध्ये नवनवीन पिके घेण्यास सुरूवात केली.त्यामुळे कृषी उत्पादकतेत मोठ्या प्रमाणात वाढ झाली.

परभणी जिल्हा हा कृषिप्रधान जिल्हा असून महाराष्ट्रात जेव्हा हरितक्रांती घडून आली त्यावेळेस कृषीमध्ये आमूलाग्र असे बदल इ ाले. कृषीमध्ये नवनवीन तंत्रज्ञानाचा वापर सुरू झाला.त्यामुळे अभ्यासक्षेत्रातील यांत्रिकीकरणाचा स्तर कालनिहाय बदलत गेला म्हणून त्याचा अभ्यास करणे आवश्यक ठरते.त्यामुळे प्रस्तुत शोधनिबंधासाठी या विषयाची निवड केलेली आहे.

**अभ्यास क्षेत्र :**

परभणी हा जिल्हा महाराष्ट्र राज्याच्या दक्षिणेस व मराठवाडा विभागात कृषीप्रधान म्हणून ओळखला जातो.हा जिल्हा गोदावरी, पुर्णा, दुधना, कापरा नदी पट्ट्यात येत असून हा भाग सपाट मैदानी गाळयुक्त मृदेनी व्यापलेला आहे.महाराष्ट्राच्या एकूण क्षेत्राच्या २.११% क्षेत्र परभणी जिल्ह्याने व्यापले आहे.तर वार्षिक पर्जन्यमान ८०४.५० मी.मी. असून ८७.१२% क्षेत्र सिंचनाखाली येते.

परभणी जिल्ह्याचा अक्षवृत्तीय विस्तार १८°४५। उ. ते २०°०१। उ. अक्षवृत्ताच्या दरम्यान असून रेखावृत्तीय विस्तार ७६°१३। पूर्व ते ७७°२६। पूर्व रेखावृत्ताच्या दरम्यान आहे.जिल्ह्याच्या उत्तरेस बुलढाणा व हिंगोली, पश्चिमेस जालना, दक्षिणेस बीड आणि लातूर व पुर्वेस नांदेड जिल्हा आहे. जिल्ह्याचे भौगोलिक क्षेत्र ६२५०.५८ चौ.कि.मी. आहे. २०११ नुसार परभणी जिल्ह्याची लोकसंख्या १५,२७७१५ एवढी आहे. जिल्ह्यास संतांची भूमी म्हटले जाते.उदा.नरसी गावचे संत नामदेव, गंगाखेडमधील संत जनाबाई इ.तसेच या शहराच्या ठिकाणी सुंदर व मनमोहक असे प्रभावती देवीचे मंदिर आहे.त्यामुळे यास 'प्रभावतीनगर' म्हणून ओळखले जाते.परभणी हे नाव प्रभावती या नावाचा अपभ्रंश होऊन रुढ इ ाले.प्रशासनाच्या सोयीसाठी ९ तालुके निर्माण करण्यात आले आहेत.



स्रोत : भारतीय स्थलदर्शक नकाशावर आधारीत.  नकाशा क्र. २.१

**उद्दिष्ट्य :**

परभणी जिल्ह्यातील कृषि यांत्रिकीकरणाच्या स्तराचा तहसीलनिहाय अभ्यास करणे हे प्रमुख उद्दिष्ट समोर ठेवून सदरील शोधनिबंध तयार करण्यात आला आहे.

**अभ्यास पद्धती :**

प्रस्तुत शोधनिबंधासाठी प्राथमिक व दुय्यम स्वरूपाची आकडेवारी संकलित केलेली आहे. दुय्यम स्वरूपाची आकडेवारी ही जिल्हा आर्थिक, सामाजिक समालोचन १९९० ते २००९, परभणी जिल्हा जनगणना पुस्तिका १९९१ आणि २०११, परभणी जिल्हा गॉझिटीयर २०११, जिल्हा कृषी विभाग, कृषी उत्पन्न बाजार समिती, जिल्हा परिषद कृषी अधिक्षक कार्यालय, कृषी विभाग वार्षिक अहवाल, शासकीय व निमशासकीय कार्यालयातील अहवाल, मासिके व इंटरनेट इत्यादी मधून संकलीत केलेली आहे.

यांत्रिकीकरणाच्या स्तराचा संयुक्त निर्देशांक (Ima) काढण्यासाठी जसबीर सिंग यांच्या खालील सूत्राचा वापर करण्यात आलेला आहे.

$$|\,|\,| \;=\; \frac{T_e}{T_r}+\frac{Toi_e}{Toi_r}+\frac{Oe_e}{Oe_r}+\frac{Ep_e}{Ep_r}+\frac{Th_e}{Th_r}+\frac{Pp_e}{Pp_r}+\frac{D_e}{D_r}$$

**विश्लेषण :**

परभणी जिल्ह्यातील कृषी यांत्रिकीकरणाच्या स्तर व कृषी यांत्रिकीकरणाचा तालुकानिहाय स्तर काढण्यात आला आहे.तसेच कृषी यंत्राच्या वापराचा संयुक्त निर्देशांक काढण्यात आलेला आहे.त्यासाठी जसबीर सिंग यांच्या सूत्राचा आधार घेतला आहे.

**कृषी यांत्रिकीकरणाच्या स्तरातील अभिक्षेत्रीय बदल (१९९९-२०००)**

परभणी जिल्ह्यातील तालुक्याचा यांत्रिकीकरणाच्या स्तराच्या अभ्यास करीत असताना संयुक्त निर्देशांक काढून त्याचे चार विभाग करण्यात आलेले आहेत. त्यात पहिला यांत्रिकीकरणाचा उच्च स्तर विभाग (१०० पेक्षा जास्त संयुक्त निर्देशांक), दुसरा यांत्रिकीकरणाचा मध्यम स्तर (८० ते १०० संयुक्त निर्देशांक), तिसरा यांत्रिकीकरणाचा कमी स्तर विभाग (६० ते ८० संयुक्त निर्देशांक), चौथा यांत्रिकीकरणाचा अति कमी स्तर विभाग (६० पेक्षा कमी संयुक्त निर्देशांक)

**तक्ता क्र. १: परभणी जिल्ह्यातील प्रति १००० हेक्टर लागवडीखालील क्षेत्रामागे कृषि उपकरणांची घनता**

| अ. क्र. | तहसील | प्रति १००० हेक्टर लागवडीखालील क्षेत्रामागे कृषि उपकरणांची घनता | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | ट्रॅक्टर | ट्रॅक्टरचलित यंत्रे | डिझेल पंप | विद्युत पंप | मळणीयंत्र | पिक संरक्षक उपकरणे | ठिबक संच |
| १ | परभणी | ०.२८ | ०.२८ | ०.३५ | २७.१३ | ०.६१ | २.६८ | ९४ |
| २ | जिंतूर | ०.३४ | ०.३४ | ०.८८ | २८.१४ | ०.२७ | १.३४ | २२ |
| ३ | पूर्णा | ०.६६ | ०.६६ | ०.६३ | १०.३३ | ०.६६ | २.५४ | ३३ |
| ४ | सेलू | ०.७९ | ०.७९ | ०.४९ | २८.०५ | ०.७३ | २.५० | ४२ |
| ५ | मानवत | १.१० | १.१० | १.०० | ४४.३२ | ०.९५ | २.७० | ५१ |
| ६ | पालम | १.१२ | १.१२ | १.४३ | ३८.५२ | ०.६९ | ३.०६ | ६९ |
| ७ | गंगाखेड | १.१८ | १.१८ | १.४१ | ४६.०८ | ०.६१ | २.७७ | ५३ |
| ८ | पाथरी | १.२१ | १.२१ | ०.५६ | १० | ०.६४ | १.७८ | ६२ |
| ९ | सोनपेठ | १.४७ | १.४७ | १.१२ | ५१.९० | १.२६ | २.६६ | ३९ |
| | एकूण | ०.७३ | ०.७३ | ०.७६ | २८.७८ | ०.६१ | २.३४ | ४६५ |

*स्रोत : संशोधकाने संकलित केलेल्या माहितीवर आधारित*

**१) यांत्रिकीकरणाचा उच्च स्तर विभाग (१०० पेक्षा जास्त संयुक्त निर्देशांक)**

सन १९९९-२००० मध्ये यांत्रिकीकरणाचा उच्च स्तर सोनपेठ, गंगाखेड, मानवत व पालम तालुक्यात दिसून येतो.कारण या तालुक्यात जलसिंचन सुविधांचा विकास झालेला आहे.

**२) यांत्रिकीकरणाचा मध्यम स्तर (८० ते १०० संयुक्त निर्देशांक)**

या विभागात पाथरी व सेलू या दोन तालुक्याचा समावेश होतो.या तालुक्यात जलसिंचनाच्या विहिरी व कुपनलिका या सुविधा उपलब्ध आहेत.

**३) यांत्रिकीकरणाचा कमी स्तर विभाग (६० ते ८० संयुक्त निर्देशांक)**

या विभागात पूर्णा व परभणी या दोन तालुक्याचा समावेश होतो.परभणी तालुका हा पर्जन्यछायेच्या प्रदेशात येत असल्यामुळे याठिकाणी यांत्रिकीकरणाचा स्तर कमी दिसून येतो.

**४) यांत्रिकीकरणाचा अति कमी स्तर विभाग (६० पेक्षा कमी संयुक्त निर्देशांक)**

या विभागात जिंतूर या एका तालुक्याचा समावेश होतो.जिंतूर हा तालुका डोंगराळ प्रदेशात येत असल्यामुळे याठिकाणची मृदा ही मध्यम प्रतीची असून जलसिंचन सुविधासुद्धा कमी प्रमाणात आहेत.

**निष्कर्ष :**

कृषी यांत्रिकीकरणाचा स्तर सोनपेठ, गंगाखेड, मानवत, पालम तालुक्यात असून मध्यम स्तर पाथरी व सेलू या दोन तालुक्यात आढळून येतो.तर कृषी यांत्रिकीकरणाचा कमी स्तर विभागात पूर्णा व परभणी तालुक्याचा समावेश होतो व अति कमी स्तरात जिंतूर या तालुक्याचा समावेश होतो.

**संदर्भ :**

१) कृषी भूगोल - सुरेश फुले, विद्याभारती प्रकाशन, लातूर
२) कृषी भूगोल- विठ्ठल घारपुरे, विद्या प्रकाशन, नागपूर
३) कृषी भूगोल-जसबीर सिंग
४) परभणी जिल्हा सामाजिक व आर्थिक समालोचन २०१५-१६
५) परभणी जिल्हा गॅझेटिअर
६) www.parbhani.nic.in

# नांदेड जिल्ह्यातील जलसिंचनाचा  त्यादनावरील प्रभाव  एक भौगोलिक विश्लेषण

**प्रा. डॉ. नामदेव गजरे**

सहाय्यक प्राध्यापक,

कला वाणिज्य विज्ञान महा. नवापुर

जि.नंदुरबार

**प्रा. डॉ. गोरख माधवराव कोरे**

सहाय्यक प्राध्यापक,

महात्मागांधी महा.   हमदपूर

जि.लातूर-४१३५१७

**प्रस्तावना :**

ब्रिटीश आमदानीत २० व्या शतकाच्या पहिल्या दशकात नांदेड जिल्ह्यात विहीरी या जलसिंचनाच्या मुख्य स्त्रोत होत्या आणि त्यांची एकूण संख्या ५,७६४ एवढी होती. एकूण१६९ लहान मोठे तळे होते.त्याचप्रमाणे कालवे व ओढे यासारखे १६३ जलसिंचन स्रोता मार्फत एकूण ४६ चौ.मैल इतके क्षेत्र सिंचनाखाली होते.महाराष्ट्र राज्य निर्मितीनंतर तत्कालीन पाटबंधारे खात्याचे मंत्री व अर्थमंत्री स.गो.बर्वे यांच्या अध्यक्षतेखाली भविष्यकालीन सिंचनाची दिशा व धोरण आखण्यासाठी सन १९५८ मध्ये स्वतंत्र पाटबंधारे विभागाची निर्मिती करण्यात आली. महाराष्ट्र सिंचन आयोग नेमण्यात आला. त्यानंतर राज्यातील सिंचन प्रकल्प निर्मितीला चांगली गती आली.

भारतातनव्हेतरमहारा ्तलोकसंख्यावाढीचाविचारकरता  ब्रधान्य त्यादनवाढविण्यासाठीशेतीएकमेवपर्याय  हे. म्हणूनयावाढत्यालोकसंखेचीअन्नाचीगरजभागविण्यासाठीनांदेडजिल्ह्यासमोरशेतीएकमेवपर्याय  हे.आज  सगळीकडे  शेतीसाठी,  पिण्यासाठी पाण्याची कमतरता भासत आहे. पाण्याची कमतरता भासण्याची दोन महत्वाची कारणे म्हणजे लोकसंख्या विस्फोट व वेगाने होणारी  र्थिक प्रगती होय. नांदेड जिल्ह्यातीलजलसिंचनाचा उत्पादनावरील परिणाम' अभ्यासण्यात  ला हे. मानवी शरीरामध्येज्याप्रमाणे रक्ताची भूमिका शरिराचीवाढ, क्रिया, हालचालआणि अस्तित्वाशी निगडीत आहे. त्याच प्रमाणे पिकांच्या वाढीची प्राथमिक आवश्यकता ही पाणी आहे. म्हणून पिक त्पन्नवाढविण्यासाठी  वेळेवर आणि नियमित, सुयोग्य प्रमाणात पाण्याचा पूरवठा करणे पिकांची उत्पादकता वाढविण्यासाठी  गरजेचे आहे.

**बीजसंज्ञाः**

जलसिंचन, कृषीउत्पादन, जलसिंचन स्रोत, उत्पादकता

**अभ्यासक्षेत्र (Study Area) :**

मराठवाड्याच्या पूर्वेकडील नांदेड जिल्ह्याचा अक्षवृत्तीय विस्तार १८° १६' ते१९° ५५' उत्तरअक्षवृत्तव७६° ५६' ते७८° १९' पूर्वरेखावृत्तयांच्यादरम्यानआहे.नांदेडजिल्ह्याचे  एकूण क्षेत्रफळ १०५२८ चौ. कि.मी.आहे. २०११ च्या जनगणनेनूसार जिल्ह्याचीलोकसंख्या ३३,५६,५६६ एवढी आहे. राज्याच्या तुलनेत नांदेडजिल्ह्याचे लोकसंख्या प्रमाण २.९६ टक्के आहे. तर जिल्ह्याचे क्षेत्रफळ महाराष्ट्राच्या एकूण क्षेत्रफ च्या३.४२ टक्के एवढे आहे.

जिल्ह्याच्या क्षेत्रापैकी २११.१ चौ.कि.मी.(२.०१ टक्के) क्षेत्र नागरी भागाचेअसून १०२९८.९ चौ.कि.मी.(९७.९९ टक्के) ग्रामीणभागाचे हे. महाराष्ट्रात क्षेत्रफळाच्या बाबतीत जिल्ह्याचा १४ वा क्रमांक लागतो तर लोकसंख्येच्या बाबतीत १२ वा क्रमांक लागतो.

**उद्दिष्ट्ये (Objectives) :**

१.  नांदेड जिल्ह्यातील जलसिनाचे तहसिलनिहाय प्रादेशिक वितरण अभ्यासणे.

२.  नांदेड जिल्ह्यातील जलसिंचनाचा प्रमूख पिकावर झालेला परिणाम अभ्यासणे.

**माहितीसंकलनाचेस्रोतव अभ्यास पद्धती :(Data Collection) :**

'नांदेड जिल्ह्यातीलजलसिंचनाचा उत्पादनावरील परिणाम' अभ्यासण्यासाठी १९९० ते २०१० या कालावधीतील माहितीचा आधार घेतला आहे.प्राथमिक माहिती ही सर्वेक्षण, प्रश्नावलीच्या माध्यमातून शेतकरी,त्यांच्याकडून मुलाखती घेऊनआकडेवारी संकलित केली आहे. दुय्यम स्वरूपाचीमाहिती ही जिल्हा  र्थिक व सामाजिक समालोचन,जनगणना पुस्तका, नांदेड जिल्हा गॅझेटियर, जिल्हा कृषी विभाग, कृषी उत्पन्न बाजार समिती, जिल्हा परिषद, कृषी अधिक्षक कार्यालय, नांदेड. इत्यादी मधून घेतलेली आहे.त्याधारेनकाशेतयारकरण्यात  ले  हेत.

**विषयविवेचन :**

प्राचीनका  पासूनशेतीसाठीजलसिंचन विहीरीद्वारे केले जात होते. ही पध्दत पूर्वी शेती करणाऱ्यासाठी योग्य होती. पारंपारिक पध्दतीने विहीरीद्वारे जलसिंचन करणेहा एक महत्वाचा जलसिंचन स्रोत आहे. विजेच्या साह्याने पाईपच्या माध्यमातून पाणी बाहेर काढले जाते. एका विहीरीच्याद्वारे एक ते दोन हेक्टर क्षेत्रसाधारणपणे ओलीताखाली येते. परंतु हे प्रमाण इतर सिंचनाच्या पध्दतीपेक्षा खूप कमीआहे. कारण पाण्याची पातळी खूप खोलवर जात आहे. त्याच बरोबर अनियमित, अत्यल्प स्वरूपाच्या होणाऱ्या मोसमी पावसामूळे पावसा या ऋतूनंतर बऱ्याच विहीरी या मान्सून काळानंतर कोरड्या पडलेल्या असतात.त्यामुळे इतर ऋतूमध्ये विहीरीतून पाणी बाहेर काढणे खर्चिक ठरते. एकंदरीत विहीरीद्वारे जलसिंचन करणे फायदयाचे ठरत नाही.
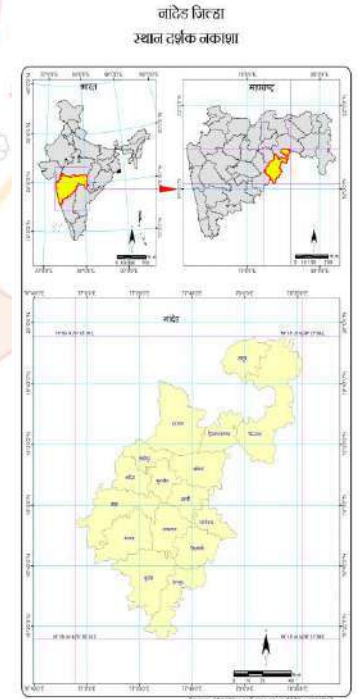
सन १९९०-९१ ते २०१०-११ या वर्षातील नांदेड जिल्ह्यातील तालूकानिहाय सिंचन विहीरी, वापरात असलेल्या व तसेच वापरात नसलेल्या विहीरीचा अभ्यास करता १९९०-९१ मध्ये १७३१७ सिंचन विहीरीद्वारे जलसिंचनाखाली आलेले क्षेत्र २७८०५ हेक्टर २१.१६ टक्केएवढे होते.तर२०१०-११मध्ये २२५५७सिंचन विहीरीद्वारे ५४७६४हेक्टर (१९.९६)टक्केएवढे क्षेत्र विहीरीद्वारे जलसिंचनाखाली असलेले दिसून येते.

### तक्ताक्र१.१:नांदेड जिल्ह्यातीलजलसिंचनस्त्रोताधारेजलसिंचीतक्षेत्र १९९०ते२०१०क्षेत्र(हे.)

| | | १९९०-९१ | | | २०१०-११ | | | |
|---|---|---|---|---|---|---|---|---|
| अ क्र | तालूके | सिंचनविहिरीच ीसंख्या | सिंचनाखाली ीक्षेत्र | सिंचनाखालीलक्षेत्रट क्केवारीत | सिंचन विहीरीचीस ंख्या | सिंचनाखाली ीक्षेत्र | सिंचनाखालीलक्षेत्रट क्केवारीत | जलसिंचनत ीव्रता २०१०-११ |
| १ | किनवट | २८२० | ३०३२ | १०.९० | १८८३ | १४९१ | २.७२ | १.३० |
| २ | नांदेड | ५४३० | ८९६५ | ३२.२४ | १३०६ | ५२५६ | ९.६० | १६.५९ |
| ३ | भोकर | १२९६ | २४८५ | ८.९४ | १२३३ | ३७०८ | ६.७७ | ७.०३ |
| ४ | बिलोली | १६२० | २३०९ | ८.३० | २२१९ | ३७६३ | ६.८७ | ८.०१ |
| ५ | कंधार | ३०९३ | ३३६१ | १२.०९ | ११३२ | ४६१५ | ८.४३ | ६.८४ |
| ६ | हदगाव | १००१ | ३२६५ | ११.७४ | १०४१ | २५४२ | ४.६४ | २.९२ |
| ७ | मुखेड | १३४५ | २११४ | ७.६० | १००८ | ४२६१ | ७.७८ | ५.०४ |
| ८ | देगलूर | ७१२ | २२७४ | ८.१८ | ९९१ | २९८२ | ५.४५ | ४.८५ |
| ९ | नायगाव | – | – | – | ८९८ | ३२५४ | ५.९४ | ६.४९ |
| १० | उमरी | – | – | – | ११७२ | २६२७ | ४.८० | ९.४८ |
| ११ | माहूर | – | – | – | २५३६ | ४४७४ | ८.१७ | २५.८५ |
| १२ | हिमायत नगर | – | – | – | १५८८ | ४३५१ | ७.९५ | १०.३७ |
| १३ | अर्धापूर | – | – | – | १३८१ | ४९६५ | ९.०७ | १८.२२ |
| १४ | मुदखेड | – | – | – | २०५४ | ७६५ | १.४० | २.६५ |
| १५ | लोहा | – | – | – | १०४१ | २५४२ | ४.६४ | ३.८८ |
| १६ | धर्माबाद | – | – | – | १०८१ | ३१६८ | ५.७८ | ११.४३ |
| | एकूण | १७३१७ | २७८०५ | १०० | २२५५७ | ५४७६४ | १००.०० | ६.५७ |

स्त्रोत: जिल्हापुस्तिका,जलसंपदाविभागनांदेड,१९९०ते२०१०

सन १९९०-९१ मध्ये जिल्ह्यातील एकूण १७३१७वापरात असलेल्या विहीरीद्वारे २०टक्क्यापेक्षाजास्त जलसिंचनाखालीलक्षेत्र नांदेड तालूक्यातअसूनतेथेविहीरींची संख्या ५४३० एवढी असून त्याद्वारे ८९६५ हेक्टर (३२.२४ टक्के) क्षेत्र सिंचनाखाली आलेले पहावयास मिळते. १०ते२० टक्केसिंचन क्षेत्रगटामध्येकंधार तालूका असून तेथे ३०९३ विहीरीद्वारे ३३६१हेक्टर (१२.०९टक्के) क्षेत्र, हदगाव तालूक्यात ३२६५ हेक्टर (११.७टक्के) जलसिंचन १००१ विहीरीद्वारे होते. किनवट तालूक्यात २८२० विहीरीद्वारे ३०३२ हेक्टर (१०.९टक्के) क्षेत्र जल सिंचीत होत असलेले पहावयास मिळते.१०टक्क्यापेक्षाकमीजलसिंचनाखालीलक्षेत्र गटामध्येभोकर तालूक्यात १२९६सिंचनविहीरीद्वारे२४८५ हेक्टर (८.९४ टक्के) क्षेत्र, देगलूर तालूक्यात ७१२ विहीरीद्वारे२२७४हेक्टर (८.१८ टक्के) क्षेत्र, बिलोलीतालूक्यात १६२० विहीरीद्वारे २३०९ हेक्टर (८.३० टक्के) क्षेत्र, मुखेड तालूक्यात १३४५ विहीरीद्वारे २११४ हेक्टर (७.६० टक्के) क्षेत्र, जलसिंचीत होत असलेले पहावयास मिळते.

सन २०१०-११ मध्ये जिल्ह्यातील एकूण २२५५७ सिंचन विहीरीद्वारे सिंचनखाली आलेले एकूण क्षेत्र ५४७६४ हेक्टर असलेले दिसून येते.८टक्क्यापेक्षाजास्त जलसिंचनाखालीलक्षेत्र गटामध्ये नांदेड तालूक्यात त्यापैकी सर्वात जास्त ५२५६ हे. (९.६०टक्के) क्षेत्र १३०६विहीरीद्वारे सिंचीत होते. अर्धापूर (९.०७टक्के) क्षेत्र, कंधार  (५.९४ टक्के) क्षेत्र, धर्माबाद (५.७८टक्के) क्षेत्र, देगलूर (५.४५टक्के) क्षेत्र, लोहा, उमरी (४.८०टक्के) हदगाव (४.६४ टक्के) क्षेत्रजलसिंचीत होते. ४टक्क्यापेक्षा कमी जलसिंचनाखालीलक्षेत्र गटामध्येकिनवट (२.७२टक्के) क्षेत्र, मुदखेड(१.४०टक्के) एवढे क्षेत्र जलसिंचीत होते.

**तक्ताक्र१.२: तालूकानिहायविहिरीचीसंख्या,सिंचनाखालीलक्षेत्र वजलसिंचनतीव्रता**
**(१९९०-११ ते २०१०-११)क्षेत्र(हे.)**

| अक्र | जलसिंचनस्त्रोत | जलसिंचीतक्षेत्रहेक्टरमध्ये१९९० | जलसिंचीतक्षेत्रहेक्टरमध्ये२०१० | टक्केवारीतीलबदल | सापेक्षवाढ/ऱ्हास |
|---|---|---|---|---|---|
| १ | मोठेप्रकल्प | २४०३५ (१८.२९) | ७९२११ (२८.८७) | १०.५८ | ५५१७६ |
| २ | मध्यमप्रकल्प | ११९२४ (९.०८) | ६२१२ (२.२६) | -६.८१ | -५७१२ |
| ३ | लघुप्रकल्प | ३५११५ (२६.७३ | १०९५९ (३.९९) | -२२.७३ | -२४१५६ |
| ४ | कोल्हापुरीबंधारे | १६४ (०.१२) | ९८७८ (३.६०) | ३.४८ | ९७१४ |
| ५ | तलाव | १७२८४ (१३.१६) | १९६१२ (७.१५) | -६.०१ | २३२८ |
| ६ | विहीर | २७८०५ (२१.१६) | ५४७६४ (१९.९६) | -१.२० | २६९५९ |
| ७ | कुपनलिका | १५०५५ (११.४६) | ९३७३७ (३४.१६) | २२.७१ | ७८६८२ |
| ९ | एकूण | १३१३८२ (१००) | २७४३७३ (१००) | | १४२९९१ |

स्त्रोत:जिल्हासामाजिकव आर्थिकसमालोचन१९९०-११ ते २०१०-११

**जलसिंचनाचा उत्पादनावरील परिणाम :**

नांदेड जिल्ह्यात मागील २०००-०१ ते २०१०-११ या दहा वर्षामध्ये जलसिंचनाचा प्रमुख पिकावर झालेला परिणाम पुढील प्रमाणे झालेला आहे. सर्वात जास्त प्रतिहेक्टरी कापूस या जलसिंचीतपिकाचे उत्पादन १८५० कि.ग्रॅ. एवढे होते.तर पर्जन्यायावर आधारितकोरडवाहू कापसाचे उत्पादन ७४० कि.ग्रॅ. झालेलेहोते. त्याची उत्पादनातील वाढ ही १५० टक्के एवढी दिसून येते. रब्बीजलसिंचीत सुर्यफुलपिकाचे प्रतिहेक्टरी उत्पादन ८५० कि.ग्रॅ. तर कोरडवाहू सुर्यफुल पिकाचे जलसिंचना अभावी६७५ कि.ग्रॅ. उत्पादन झालेलेहोते. त्यांची उत्पादनातील वाढ २५.९३ टक्के एवढी झालेलीआहे.

दुसऱ्या क्रमांकावर तूर या पिकांच्या उत्पादनावरसिंचनामुळे होणारापरिणाम पाहता प्रतिहेक्टरी १४५० कि.ग्रॅ. एवढे उत्पादन झालेलेहोते. तर जलसिंचनाअभावी ७४७ कि.ग्रॅ. उत्पादन झालेलेहोते. व उत्पादनातील वाढ ९४.११ टक्के निदर्शनासआलेली आहे. तिसऱ्याक्रमांकावर सिसम पिकाचे प्रतिहेक्टरी उत्पादन ३५० कि.ग्रॅ. जलसिंचीत क्षेत्रात होत असलेले दिसून येते.तर कोरडवाहू क्षेत्रात पर्जण्यावर आधारीत केवळ २०० कि.ग्रॅ. उत्पन्न झाले होते आणि त्यांची उत्पादनातील वाढ ७५ टक्के एवढी आहे. हरभरा पिकाचे जलसिंचनामुळे प्रतिहेक्टरी उत्पादन१३०० कि.ग्रॅ. झालेलेहोते.तरजलसिंचनाअभावी ते७५० कि.ग्रॅ. झाले होते आणि उत्पादनातील वाढ ७३.३३ टक्के झालेली निदर्शनास येते.

**तक्ताक्र१.३:नांदेडजिल्ह्यातीलजलसिंचनाचाउत्पादनावरहोणारापरिणाम**

| अ.क्र | | पर्जन्यावर आधारितउत्पादनप्रति.हेकि. ग्रॅ | जलसिंचीत क्षेत्रातील उत्पादनप्रति.हे कि. ग्रॅ | उत्पादनातीलवाढटक्केवारीत |
|---|---|---|---|---|
| १ | भात | ७२३ | १२३० | ७०.१२ |
| २ | तूर | ७४७ | १४५० | ९४.११ |
| ३ | भुईमूग | ८२२ | १२६० | ५३.२८ |
| ४ | सोयाबीन | १०६३ | १७८० | ६७.४५ |
| ५ | कापूस | ७४० | १८५० | १५० |
| ६ | रब्बीज्वारी | ८२० | १२३० | ५० |
| ७ | हरभरा | ७५० | १३०० | ७३.३३ |
| ८ | सूर्यफूल | ६७५ | ८५० | २५.९३ |
| ९ | सिसम | २०० | ३५० | ७५ |
| १० | रब्बीसुर्यफूल | ७०० | ११२५ | ६०.७१ |

नांदेड जिल्हा हा एक महाराष्ट्रातील कृषीदृष्ट्या महत्वपूर्ण जिल्हा आहे. जिल्ह्यामध्ये विभिन्न जलसिंचन स्त्रोताधारे शेतीकेली जाते.

गोदावरी नदिवरील विष्णूपूरी प्रकल्पामूळे जलसिंचन क्षेत्रात मोठ्या प्रमाणावर वाढ होवून पिक प्रारूपामध्ये मोठा बदल झालेला आहे.

**निष्कर्ष:**

प्रस्तूत संशोधनात नांदेड जिल्ह्यातील स्थल-काल सापेक्ष जलसिंचनांचे वितरण स्पष्ट करण्यात आलेले आहे. त्याचबरोबर जलसिंचनाचा पिक प्रारूपावर वपिकांच्याउत्पादनावर होणारा परिणाम अभ्यासलेला आहे.विहीरीद्वारे अभ्यास क्षेत्रातील सिंचनाखालील क्षेत्राचा अभ्यास करता असे निदर्शनास आलेले आहे की, सन १९९०-९१ मध्ये एकूण १७३१७ विहीरीद्वारे २७८०५हेक्टर एवढे क्षेत्र जलसिंचनाखाली होते. त्यापैकी सर्वात जास्त सिंचन क्षेत्र नांदेड तालुक्यात ५४३० एवढ्या विहीरींची संख्या होती. त्याद्वारे ८९६५ हेक्टर (३२.२४ टक्के) क्षेत्र जलसिंचीत होते. तर देगलूर तालुक्यात सर्वात कमी ७१२ विहीरी द्वारे २२७४ हेक्टर (८.१८टक्के) क्षेत्र सिंचित झालेले होते.

सन २०१०-११ मध्ये २२५५७ विहीरीद्वारे ५४७६४ हेक्टर क्षेत्र जलसिंचनाखाली होते. त्यामध्ये सर्वाधिक नांदेड तालुक्यात ५२५६ हेक्टर (११.३१ टक्के) क्षेत्र १३०६ विहीरीद्वारे जलसिंचीत होते. तर किनवट तालुक्यात १८८३ विहीरीद्वारे १४९१ हेक्टर (२.७२ टक्के) क्षेत्र जलसिंचित होत असलेले दिसून येते. त्यामुळेजिल्ह्यातील जलसिंचन पध्दतीमध्ये ठिबक व तुषार सिंचनाची मूख्य भूमिका आहे. पारंपारीक पीक पध्दतीमध्येवपिक प्रारूपात अमूलाग्र बदल होवून शेतीच्या विकासात सकारात्मक बदल झालेलाआहे. कृषीची उत्पादकता वाढलेली दिसून येतआहे.

**संदर्भ ग्रंथ :**

१) *महाराष्ट्रशासन,जलसंपदाविभागलाभक्षेत्रविकासप्राधिकरण,नांदेडजिल्हापुस्तिकासन२०१०-११.*

२) *जिल्हापरिषदकृषीअधिकारीअहवाल,नांदेडजिल्हासन२०१०-११*

३) *डॉ.रामचंद्रनिवृत्तीसाबळे, कृषीघटकअनमोलप्रकाशनपुणे- २*

४) *)प्रा.अजय भा.देशपांडे, डॉ.उत्तम सा.वायसे (२००७): सिंचनतंत्र, साकेत प्रकाशन औरंगाबादपृ.क्र.२६, ७५*

५) *Bansode, R. B. (1997): Lift irrigation and problem associated with it in Karveer tahsil: A Geopgraphical analysis, unpublished M. Phil Dissertation, Kolhapur p. 51-52.*

६) *Comprehensive District Agriculture Plan (C DAP), Nannded District, 2010- 11 Govt. Of MaharashtraDept.of Agriculture Pp.26, -69.*
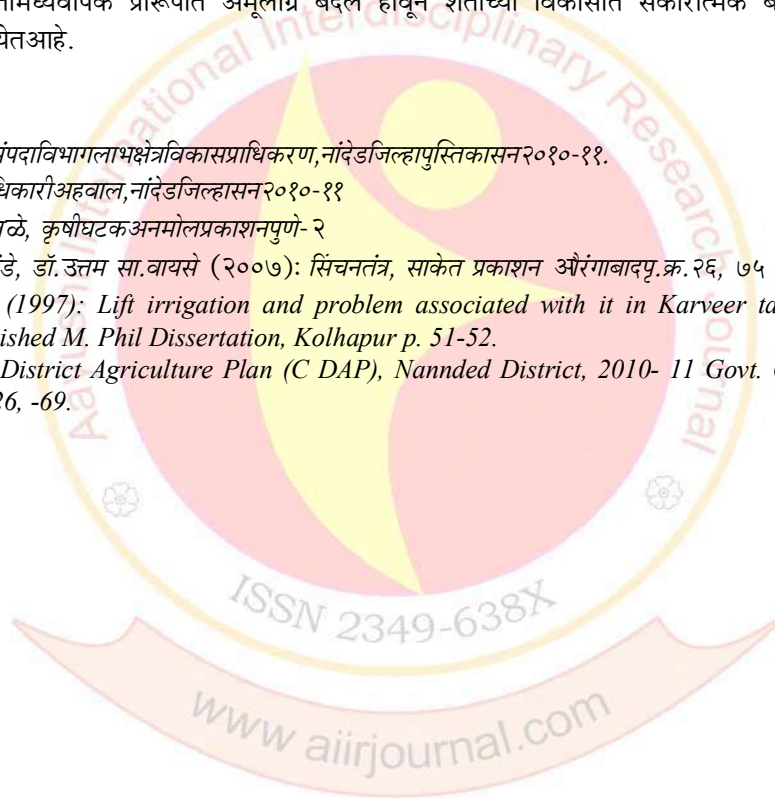
# नैसर्गिक शेतीचे वाढते महत्त्व : एक भौगोलिक अभ्यास

**प्रा. डॉ. डी. एस. इटले**
भूगोल विभाग
श्री.छत्रपती शिवाजी महाविद्यालय,
उमरगा जि.उस्मानाबाद

**डॉ. आर. एस. भुरे**
महात्मा गांधी विद्यालय, केसरजवळगा
ता. उमरगा जि.उस्मानाबाद

**सारांशः**

रासायनिक शेतीतील दुष्परिणाम लक्षात घेऊन जागतिक पातळीवर नवनवीन कृषीपद्धतीचा अवलंब केला जात आहे. त्यातील एक म्हणजे नैसर्गिक शेती **(ZBNF)**तंत्र होय. या तंत्राचे पुरस्कर्ते **सुभाषपाळेकर** आहेत. यात कृषी लागवड शुन्य करणे हे मुख्य उद्दिष्ट आहे. खते, किटकनाशके, मशागतीवरील खर्च इत्यादी कमीत कमी करणे. देशी बी-बियाने वापरावर अधिक भर देणे. देशी गो-वंशाचे जतन करणे. विषमुक्त अन्न-धान्यांचे उत्पादन घेऊन मानवी आरोग्य टिकवण्याबरोबरच पर्यावरण संरक्षण व संवर्धन करणे. या कृषीतंत्रातील मुख्य बाबीमध्ये **जीवामृत** याचा समावेश होतो. यापासून सद्दृढ पिकांच्या वाढीसाठी संजीवक म्हणून लाभ होतो. जमिनील पाण्याच्या 50%व हवेच्या 50%अशा स्थितीस **वाफसा** असे म्हणतात. या अवस्थेसाठी पिकांना परंपरागत कृषी पद्धतीपेक्षाही कमी पाण्याची गरज भासते. तण नियंत्रण व ओलावा टिकून ठेवण्यासाठी **आच्छादन** वापरण्यावर भर दिला जातो. विविध वनस्पतींच्या पानांपासून दशपर्णी अर्क, निमास्त्र, ब्रम्हास्त्र असे किटकनाशक तयार केले जातात. भारतीय वातावरणात राज्यनिहाय पिकविले जाणारे परंपरागत देशी वाण संग्रहित करणे व प्रसारण करणे इत्यादी या कृषीतंत्राची उद्दिष्टे आहेत. भारतात महाराष्ट्र, कर्नाटक, आंध्रप्रदेश, तेलंगणा, केरळ, गुजरात व हरियाणा इत्यादी राज्यात नैसर्गिक तंत्राने शेती केली जात आहे. **युनो** ने देखील या कृषीतंत्राची दखल घेतली आहे. हवामान बदल व जागतिक तापमान वाढ या संदर्भाने नैसर्गिक शेती तंत्राचे महत्त्व दिवसेंदिवस वाढत आहे.

**बीज संज्ञाः** जीवामृत, वापसा, आच्छादन, सापळा पिके, देशी बियाणे व किटकनाशके इत्यादी.

**प्रस्तावना:**

वेगाने वाढत जाणारी जागतिक लोकसंख्या व त्याच्या उदरनिर्वाहासाठी वाढत जाणारी अन्नाची मागणी याचे परिणाम म्हणजे **रासायनिक शेतीचे** उगम होय मर्यादित भूमीतून अधिकाधिक उत्पादन घेण्यासाठी रासायनिक शेतीचा मार्ग अवलंबिला गेला. त्यासाठी विविध रासायनिक खते, किटकनाशके व संकरित बी-बियाने यांचा बेसुमार वापर करण्यात येऊ लागला. सुरुवातीची काही दशके **(१९६३ ते २००३)** पर्यंत याचे फायदे दिसू लागले. परंतु ही शेती मुळातच **अनैसर्गिक पद्धतीने** केली जात असल्याने याचे दुष्परिणाम समोर येऊ लागले. मृदाधुप, जलप्रदूषण, वायुप्रदूषण यांसारख्या समस्या भेडसावू लागल्या. पर्यावरणाचे समतोल बिघडत चालले. सर्वात महत्वाचे म्हणजे रासायनिक शेतीतील रसायनयुक्त अन्न मानवी आरोग्यासाठी अपायकारक ठरू लागले. यामुळे मधुमेह, उच्च रक्तदाब, कर्करोग, ह्दयविकारासारखे भयावह आजार वाढू लागले. या सर्वावर उपाय म्हणून पर्यावरण पुरक कृषीपद्धतीचा उगम झाला. मानव जातीसमोरील विषयुक्त अन्नाला सक्षम पर्याय देण्याच्या दृष्टीने नैसर्गिक शेती तंत्र सकारात्मक दृष्टीने विकसित केले जात आहे. नैसर्गिक शेतीचे पुरस्कर्ते सुभाष पाळेकर यांनी विषयुक्त अन्नाला पर्याय दिलेले आहे. ते म्हणजे **शुन्यलागवड नैसर्गिक शेती(ZBNF)**तंत्र होय. आज देशातील जवळपास चाळीस लाख शेतकरी या नैसर्गिक पद्धतीने शेती करत आहेत. या शेतीतंत्रात कुठलीही कृषीनिविष्ठा खरेदी करण्याची गरज नाही. स्वतः शेतकरी वरील निविष्ठा तयार करतो.

**उद्देश:**

१) निसर्ग चक्राशी सुसंगत कृषीपद्धती विकसित करणे.
२) कृषी निविष्ठावरील खर्च कमी करणे.
३) पर्यावरणाचे संरक्षण व संवर्धन करणे.
४) मानवी आरोग्यासाठी सकस आहाराचे उत्पादन करणे.
५) संकरित वाणाऐवजी देशी व पर्यावरण पुरक वाणाला वाव देणे.
६) देशी गाईचे संगोपन करणे व $A_2$ प्रकारचे दुध उपलब्ध करून देणे.
७) नैसर्गिक शेती समजून घेणे.

**अभ्यास पध्दतीः**

प्रस्तुत शोधनिबंध हे प्रामुख्याने प्राथमिक व दुय्यम स्त्रोतांवर आधारीत असून ही माहिती प्रत्यक्ष स्थळांना भेटी देवून व विविध संदर्भग्रंथ, जरनल, मासिके व इंटरनेट यांचा उपयोग करण्यात आला आहे.

**विषय विवेचनः**

● **जीवामृत :** जीवामृत एक अत्याधिक प्रभावी जैविक संजीवक आहे. याच्या वापराने पिके व वनस्पतीची वाढ निकोप व जोमाने होते. **प्रकाश संश्लेषणाची** गती वाढण्यास मदत होते. जीवामृत वापराने मृदेतील **सुक्ष्म जिवाणूंची** वाढ होते. **अतिनील किरणांपासून** पिकाचे संरक्षण होते. जीवामृत दोन प्रकारे तयार करतात.

१) **द्रव जीवामृत :** द्रव जीवामृत तयार करण्यासाठी दोनशे लीटर पाणी, दहा लिटर देशी गाईचे गोमुत्र व एक टोपले शेण, दोन किलो गुळ, दोन किलो कडधान्याचे पीठ व एक मुठ जीवाणूयुक्त माती इत्यादी सर्व बॅरेलमध्ये मिसळून घ्यावे. दररोज सकाळी व संध्याकाळी घड्याळाच्या काट्याप्रमाणे वर्तुळाकार काठी या द्रावणात फिरवावे. तिसऱ्या दिवसापासून जीवामृत गाळून फिल्टरने व स्प्रेने देता येते. सात दिवसापर्यंत वापरण्यास उत्तम.

२) **घन जीवामृत :** यासाठी शंभर किलो देशी गाईचे शेण, दोन किलो गुळ, दोन किलो कडधान्याचे पीठ, दोन लीटर गोमुत्र इत्यादी एकत्रित मिसळून घेवून त्यावर तीन दिवस गोणपाठ झाकावे. चौथ्या दिवशी सावलीत शेणास पसरून वाळवावे. पेरणी करताना रासायनिक खताऐवजी याचा वापर करावा.

● **वाफसा :** पिकाला नेमके किती पाणी लागते? या बद्दल शेतकऱ्यात मतमतांतरे आहेत. सर्वसामान्यपणे पिकाला प्रमाणापेक्षा अधिक पाणी दिले जाते. यामुळे **फुलगळ होणे, पाने पिवळे पडणे** (करपा रोग) इत्यादी रोगांची लागण होते. यासर्वांवर नैसर्गिक शेतीतंत्राने पाणी देण्याची अत्यंत उपयुक्त पद्धत सुचविली आहे. ती म्हणजे वाफसा स्थिती होय. **मातीतील दोन कणांमध्ये 50%पाण्याच्या व 50%हवेच्या स्थितीला वाफसा असे म्हणतात.** वाफसा अवस्थेत जमिनीत हवा खेळती राहते व पिकांची वाढ जोमाने होते. पाणी नेहमी फळझाडाच्या दुपारच्या सावली व उन्हाच्या अंतिम वर्तुळाकार रेषेभोवती गोलाकार पद्धतीने द्यावे.

● **आच्छादन :** शेतीतील उत्पादन खर्चातील सर्वाधिक वाटा (40%) तण नियंत्रणाचा आहे. शेतीतील मनुष्यबळ दिवसेंदिवस कमी होत आहे. त्यामुळे तण नियंत्रण करण्यासाठी विविध रासायनिक औषधे फवारली जात आहेत. उदा. टू फोर डी, ॲट्राझिन, ग्लायफोसेट, ४१ एस.एल. इत्यादी. तण नाशके आहेत. यांच्या अतिवापराने जमिनीतील जिवाणूंची संख्या घटून उत्पादन क्षमता वेगाने घटत आहे. वरील समस्येवर नैसर्गिक शेती तंत्र आच्छादन पद्धतीने तण नियंत्रणाचे उपाय सुचवले आहे.

**आच्छादनाचे प्रकार :**

१) **मृद आच्छादन :** तण अंकुरण अवस्थेत कोळपणे. यातून दोन फायदे होतात. १) तण नियंत्रण होते. २) जमिनीच्या आतील ओलावा टिकून राहते. जमिनीस तडे जात नाहीत.

२) **हरित आच्छादन :** वेलवर्गीय फळभाज्यांचे जमिनीवर आच्छादन करून तण नियंत्रण व ओलावा टिकवणे सोपे होते.
उदा. काकडी, टरबूज, खरबूज इ.

३) **काष्ट आच्छादन :** फळ बागेतील तण नियंत्रणासाठी व ओलावा टिकून ठेवण्यासाठी विविध पिकांचे काष्ट आच्छादन म्हणून वापरले जाते. यामुळे तण नियंत्रण तर होतेच शिवाय कालांतराने काष्ट कुजून सेंद्रिय कर्ब जमिनीस उपलब्ध होते.

● **सापळा पिके व रोग नियंत्रण :-**
मुख्य पिकांवर किडीचा हल्ला होऊ नये म्हणून त्या शेजारी लावण्यात येणाऱ्या पिकांस सापळा पिके म्हणतात. यासाठी किडींना मुख्य पिकांपेक्षा जास्त संवेदनशील असे पिक लावले जाते. ज्यामुळे मुख्य पिक सुरक्षित राहून हे गौण पिक किडींद्वारे खाऊन टाकले जातात.

**कोणत्या पिकांसाठी कोणते सापळा पिक वापरावे?:**

| अ.क्र. | मुख्य पिके | सापळा पिके/आंतर पिके | फायदे |
|---|---|---|---|
| १) | कापूस | चवळी, कोथिंबीर, मका व झेंडू | मित्र किटकात वाढ होते. (लेडीबर्ड, सीरफीड माशी) त्यांनी मावा रोग नियंत्रीत होतो. |
| २) | सोयाबीन | एरंडी व सुर्यफुल | उंटअळी व केसाळ अळी नियंत्रित होते. |
| ३) | तुर | ज्वारी | घाटेअळी व सुत्रकृमी नियंत्रीत होते. |
| ४) | भूईमुग | सुर्यफुल | उंटअळी व केसाळ अळी नियंत्रित होते. |

*संदर्भ:- ॲग्रोवन डॉट कॉम वरील डॉ. एन.के. भूते यांची लेख.*

● **सापळा पिकांचे फायदे :**
१) किटकनाशकांचा कमी वापर
२) मित्र कीट संवर्धन
३) पिक संरक्षण खर्चात बचत
४) माती व पर्यावरण संवर्धन

● **देशी बियाणे :** नैसर्गिक शेतीमध्ये विशिष्ट दिर्घकालिन वातावरणात व मृदेमध्ये तयार झालेले परंपरागत बी बियाणे वापरले जातात. त्यामुळे पिकाची प्रतिकारक क्षमता वाढते व उत्पादन ही वाढते. तसेच अन्नातील पौष्टीक घटक टिकून राहतात. नैसर्गिक शेतीतंत्र देशी वाणाचे संवर्धन करण्यावर अधिक भर देते.

● **किटकनाशके :** यात विविध वनस्पतीच्या पानांचे अवशेष, गोमुत्र, तंबाखू, लसूण इ. बाबी मिसळून किटकनाशके तयार केली जातात.

१) **अग्निअस्त्र :**यासाठी २० लिटर देशी गाईचे गोमूत्र, १ किलो तंबाखू, अर्धा किलो हिरवी मिरची, अर्धा किलो लसूण व पाच किलो कडूलिंबाची पाने वाटून त्याचा लगदा वरील मिश्रणात टाकावे. या मिश्रणास पाच वेळा उकळी द्यावे. २४ तासानंतर वरील मिश्रण गाळून घ्यावे. १०० लिटर पाण्यात ५ लिटर अग्निअस्त्र मिसळून फवारावे. पाने गुंडाळणारी अळी यामुळे नियंत्रीत होते.

२) **ब्रम्हास्त्र :**देशी गाईचे २० लिटर गोमुत्र, कडूलिंबाची ३ किलो पाने, सिताफळ पपई डाळिंब, पेरू यांचा प्रत्येकी दोन किलो पानांचा वाटलेला लगदा वरील मिश्रणात टाकावे. पाच वेळा उकळी द्यावे व गाळून घ्यावे. १०० लिटर पाण्यात ३ लिटर ब्रम्हास्त्र मिसळून फवारावे. फळ पोखरणारी अळी नियंत्रीत होते.

**संदर्भग्रंथ:**

१) *सुभाष पाळेकर - नैसर्गिक शेती — तत्वज्ञान व तंत्रज्ञान.*

२) *सुभाष पाळेकर - गावरानी गाय — एक कल्पवृक्ष कृषी संस्कृती*

३) *सुभाष पाळेकर - नैसर्गिक शेती काळाची गरज*

४) *सुभाष पाळेकर - आपली जमिन पहेलवान कशी बनवावी?*

५) *सुभाष पाळेकर - नैसर्गिक शेतीचे पोषणशास्त्र भाग- १ व २*

६) *सुभाष पाळेकर - गावरानी बीज राखा. भावी गुलामी रोखा.*

७) *सुभाष पाळेकर - काय रासायनिक शेती षड्यंत्र आहे.*

८) *सुभाष पाळेकर — ज्वलंत शेतमजुर समस्या व समाधान*

९) *ॲग्रोवन डॉट कॉम वरील कृषी वाटा*

# लातूर जिल्हयातील भूजल पातळीचे भौगोलिक विश्लेषण

**डॉ. एम. पी. मानकरी**

भूगोल विभाग प्रमुख

महाराष्ट्र उदयगिरी महाविद्यालय,

उदगीर जि.लातूर

**प्रा. एस. एच. गर्जे**

भूगोल विभाग

महात्मा फुले महाविद्यालय,

अहमदपूर जि.लातूर

**सारांश :**

लातूर जिल्हयातील वारंवार पडणा-या दुष्काळाची कारणे शोधण्यासाठी जिल्हयात पडणारे पर्जन्य याचा भूजल पातळीवर काय परिणामहोतोहा अभ्यास केला आहे. प्रस्तुत शोध निबंधामध्ये २००८-०९ व २०११-१२ च्या नोंदीचा अभ्यास करून असे निष्कर्ष काढण्यात आले आहेत कीजिल्हयामध्ये २००८-०९ च्या तुलनेतसरासरी पर्जन्य १०४२ मी.मी असून देखील २०११-१२ च्या सरासरी ९९० मी.मी कमी पर्जन्याचा भूजल पातळीवर जास्त परिणाम झालेला दिसून येत नाही. भूजल पातळीमध्ये केवळ २ से.मी.ची घट झालेली दिसून येते.म्हणजे जिल्हयात पडणारे पर्जन्य तसेच भू-गर्भातील पाण्याचा उपसा या घटकाचा परिणाम भूजल पातळीवर होतो.

**बीजसंज्ञा :**पर्जन्य, भूजलपातळी

## प्रस्तावणा:

मराठवाडयातील लातूर जिल्हाहा पाण्याच्या दुष्काळासाठी वारंवार चर्चेत असलेला दिसून येतो.पाण्याचा प्रश्न सोडवण्यासाठी लातूरला विशेष रेल्वेने पाणी मागवावे लागले.पाण्याची समस्या ही प्रत्यक्ष व अप्रत्यक्षरित्या भूजल पातळीशी निगडीत आहे.प्रचंड पाण्याचा उपसा आणि अपूरे जलसंधारण यामुळे भूजल पातळी खोल जात आहे.या बरोबरच पर्जन्याचा लहरीपणा व सरासरी पेक्षा कमी पर्जन्य या कारणामुळे देखील भूजल पातळी खोल जाताना दिसून येत आहे.

लातूर जिल्हयाची लोकसंख्या २०११ च्या जनगणनेनुसार२४५५५४३ आहे. आणि ७१५७ चौ.की.मी. इतकी भूमि जिल्हयास लाभलेली आहे.जिल्हयामध्येसरासरी६६६ मी.मी. पर्जन्य मिळते.जिल्हयातील जलसंधारणाचा प्रमुखस्त्रोतहे पर्जन्य आहे.परंतु पर्जन्य मर्यादित प्रमाणात पडत असल्यामुळे जलसंधारण प्रभावी होत नाही.व त्याचा परिणामहा भूजल पातळीवर होतो.

## उदिष्टये:

पर्जन्याचा भूजल पातळीवर होणारा परिणाम अभ्यासणे.

## अभ्यास पध्दती :

प्रस्तूत शोध निबंधामध्ये दुय्यम स्वरूपाच्या आकडेवारीचा वापर करण्यात आला आहे.भूजल सर्व्हेक्षण आणि विकास यंत्रणा, पूणे यांच्याकडून प्रकाशित करण्यात आलेल्या अहवालातील आकडेवारिचे विश्लेषण स्तंभालेखाच्यासाहयाने करण्यात आले आहे.

## अभ्यास क्षेत्र :

वारंवार दुष्काळी परिस्थितीसाठी चर्चेत असणा-या लातूर जिल्हयाचा अभ्यास क्षेत्र म्हणून निवड करण्यात आला आहे.जिल्हयातील दहा तालूक्याच्या २००८-०९ व २०११-१२ च्या पर्जन्य व भूजल पातळीचातौलनिक अभ्यास प्रस्तूत शोध निबंधात करण्यात आला आहे.

## विषय विवेचन :

भूजल पातळीचा संबंध हा पर्जन्याशी असला तरी भूजलाच्या पातळीतील बदलास पर्जन्य हा घटकच कारणीभूत राहत नाही.ब-याच वेळी पर्जन्य भरपूर होऊन देखील भूजल पातळी खालावलेली असते.या ठिकाणी २००८-०९ व २०११-१२ मध्ये झालेलेसरासरी पर्जन्य दाखवलेले आहे.अनुक्रमे १०४२ मी.मी.व ९९० मी.मी. इतका पर्जन्य जिल्हयामध्ये झाला.या मध्ये सर्वाधिक देवणी व उदगीरतालुक्यात झाला असूनसरासरी पेक्षा जास्त उदगीर, देवणी, लातूर, निलंगा आणि शिरूर अनंतपाळतालुक्यात पर्जन्य झालेला आहे.मान्सून पूर्व जिल्हयात जवळ जवळ सर्वच तालुक्यामध्ये भूजल पातळी खोल गेलेली दिसून येते.आणि ही भूजल पातळी शिरूर अनंतपाळतालुक्यात सर्वात खोल गेलेली असूनतुलनेत रेणापूरतालुक्यात भूजल पातळी उथळ असलेली दिसून येते.शिरूर अनंतपाळ, औसा, लातूर आणि निलंगा तालुक्यातसरासरी पेक्षा भूजल पातळी खोल गेलेली दिसून येते.

मान्सून नंतरसरासरी भूजल पातळीमध्ये २००८-०९ च्या तुलनेत २०११-१२ मध्ये केवळ २ से.मी. ची घट इ ाली आहे.कारण जिल्हयात २००८-०९ मध्येसरासरी पर्जन्य १०४२ मी.मी. झालेहोते. ते २०११-१२ मध्ये फक्त ९९० मी.मी.पर्जन्य झाले.जिल्हयामध्ये लातूरतालुक्यात मान्सून नंतर भूजल पातळी सर्वात खोल आढळून येते.व



लातूर जिल्हयातील सरासरी मान्सून नंतर भूजल पातळी से मी मध्ये २००८-०९ व २०११-१२
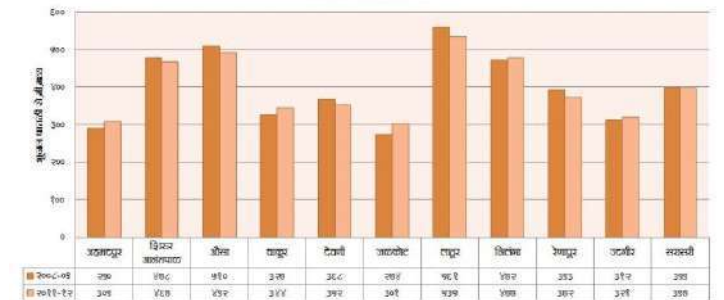
जळकोटतालुक्यात भूजल पातळी उथळ दिसून येते.तसेच याच तालुक्यात २००८-०९ ची भूजल पातळी आणि २०११-१२ च्या भूजल पातळीत तफावत दिसून येते. लातूर, औसा, शिरुर अनंतपाळ, निलंगा या तालुक्यात जिल्हयाच्या सरासरी भूजल पातळी पेक्षा या तालूक्यांची भूजल पातळी खोल दिसून येते.

२००८-०९ च्या मान्सून नंतर जिल्हयाच्या सरासरी भूजल पातळीत३९९से.मी.वाढ झाली असूनती २०११-१२ च्या मान्सून नंतर३९७से.मी.तुलनेत वाढ झाली.

### निष्कर्ष :

भूजल पातळीचा प्रत्यक्ष संबंध हा त्या वर्षातील मान्सून मध्ये पडण-या पर्जन्यावर अवलंबून असतो.मान्सून पूर्वी भूजल पातळी कितीहोती याचा देखील परिणाम वर्तमान भूजल पातळीवर होतो.जिल्हयामध्ये २००८-०९ च्या तूलनेतसरासरी पर्जन्य १०४२ मी.मी असून देखील २०११-१२ च्या सरासरी ९९० मी.मी कमी पर्जन्याचा भूजल पातळीवर जास्त परिणाम झालेला दिसून येत नाही.भूजल पातळीमध्ये केवळ २ से.मी.ची घट झालेली दिसून येते.म्हणजे जिल्हयात पडणारे पर्जन्य तसेच भू-गर्भातील पाण्याचा उपसा या घटकाचा परिणाम भूजल पातळीवर होतो.





### संदर्भग्रंथ :

1. *जिल्हा सामाजिक व आर्थिक समालोचन २०११.*
2. *Ground Water Information Latur district (2011). Central Ground Water Board, Maharashtra.*
3. *Report on the Dynamic Ground Water Resources of Maharashtra (2008-09). Minstry of Water Resources, MS.*
4. *Report on the Dynamic Ground Water Resources of Maharashtra (2011-12), Ministry of Water Resouces, MS.*
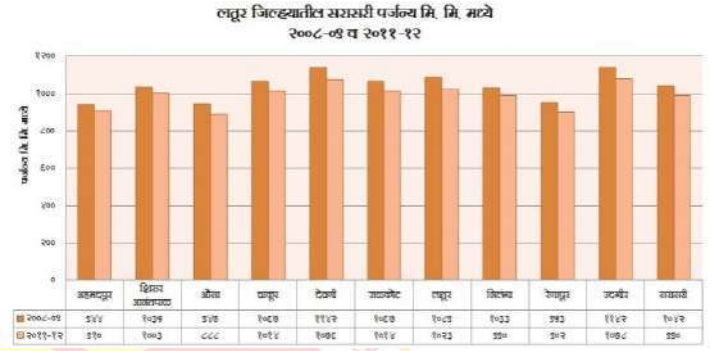
# रोस्टोच्या प्रतिमानातील विकास अवस्था : विशेष संदर्भ लातूर शहर, महाराष्ट्र

**डॉ. सुरेश ज्यो. फुले**
संशोधक मार्गदर्शक, भूगोल विभाग
राजर्षी शाहू महाविद्यालय (स्वायत्त), लातूर

**कु. स्वाती पटणे**
संशोधक

**सारांश :**

जगामध्ये पहिले नगर जे तयार झाले असेल ते निश्चितपणे लहान आकाराचे असणार आणि त्यावेळी शहर व नगर यांच्यात फरक करणे अवघड होते. नवनवीन शोध लागून आधिक मोठया वसाहती तयार होऊ लागल्या. गावाचा व शहरांचा विकास होत गेला. इ.स. पूर्व ३००० पासून नवीन शोधाचा प्रभाव इजिप्त मेसोपोटेमिया आणि भारतावर झाला. या देशांमध्येच वसाहती निर्माण झालेल्या आहेत. तसेच प्राचील काळामध्ये नागरीकरण मर्यादित स्वरुपात आढळून येते.

विसाव्या शतकाच्या मध्यापर्यंत म्हणजे इ.स. १९६५ सालापर्यंत तरी भारतीय जनगणनेच्या अहवालामध्ये नागरीकरणाला फारसे महत्त्व दिलेले नव्हते. इ.स. १९६७ च्या जनगणनेनंतर भारतातील नागरिकरणाच्या पध्दतशीर अभ्यासाला आरंभ झाला. इ.स. १९०१ ते १९११ या दहा वर्षांच्या काळात नागरी लोकसंख्या वाढीचा दर कमी होता मात्र पुढच्या दहा वर्षात म्हणजे १९११ ते १९२१ या काळात त्यात एकदम वाढ इ ाली. त्यानंतरच्या तीन दशकांमध्ये म्हणजे १९२१ ते १९५१ पर्यंत नागरी लोकसंख्येच्या वाढीचा दर झपाटयाने वाढत गेला.

**बीज** – रोस्टो प्रतिमान, विकास, पारंपारिक समाज इत्यादी

**प्रस्तावना :**

मानवी संस्कृतीचा विकास नगर विकासाबरोबर झालेला दिसून येतो. आज नगर म्हणजे आधुनिक किंवा विकसित संस्कृतीचे केंद्र मानले जाते. याच शहराच्या माध्यमातून आर्थिक विकास होत असतो. आर्थिक विकासाची प्रक्रिया स्पष्ट करणारे एक वैशिष्टयपूर्ण आणि महत्त्वकांक्षी प्रत्यन म्हणजे प्राध्यापक डब्ल्यू. रोस्टो यांचा विकास अवस्था सिध्दांत होय. हे एक आर्थिक विकास अवस्था स्पष्ट करणारे प्रतिमान आहे. हा प्रतिमान म्हणजे आधुनिक विकास अवस्थाचे बारकाईने, अभ्यासपूर्ण आर्थिक विकासाचे निष्कर्ष आहेत. हे निष्कर्ष केवळ अंदाज नसून समाज व्यवस्थामधील प्रत्यक्ष बदलांचे स्पष्टीकरण देण्याचा एक प्रयत्न आहे. आर्थिक प्रवृत्ती व आर्थिक स्थितीतील दुवे एकत्रित करण्याचा प्रयत्न या प्रतिमानात दिसून येतो. रोस्टो यांच्या प्रतिमानामध्ये अर्थव्यवस्थेचा विकास पाच अवस्थामधून होतो हे स्पष्ट केले आहे. रोस्टोनी भांडवलशाही विकासाऐवजी विकास हा राजकीय व सांस्कृतिक इच्छेतून होतो असे रोस्टोचे मत होते. रोस्टोच्या वरील मतापामाणे लातूर शहराला भांडवलशाही अर्थव्यवस्था नसताना देखील राजकीय आणि सांस्कृतिक इच्छेतून विकास झालेला आहे. यामुळेच संशोधन पत्रिकेसाठी या प्रतिमानापमाणे लातूर शहराचा विकास अवस्था मांडण्याचा प्रयत्न पुढील प्रमाणे केला आहे.

**अभ्यासक्षेत्र :**

१९८२ मध्ये उस्मानाबाद जिल्हयातून निर्माण झालेला जिल्हा व शहराचे ठिकाण आहे. शहराचा अक्षवृत्तीय विस्तार १८° २२ˈ उ. ते १८° २६ˈ उ. आहे तर ७६° ३२पू. ते ७६° ते ३७ˈ पू. रेखावृत्तीय विस्तार आहे. शहराच्या पूर्वेस औसा रोड, पश्चिमेस बार्शीरोड शहराचे एकूण क्षेत्रफळ ३२.५५ चौ.कि.मी. इतके आहे. शोधनिबंधासाठी निवडलेले अभ्यासक्षेत्र हे महाराष्ट्र राज्याअंतर्गत येत असून हे एक मागास भागातील म्हणजेच मराठवाडा विभागातील एक जिल्हा म्हणून ओळखला जातो. विकसित होवू पाहणारा व आर्थिकदृष्टया आणखीनही सक्षम न झालेला जिल्हा आहे.

अभ्यासक्षेत्रामध्ये एकूण लोकसंख्येपैकी ८० टक्के लोकसंख्या प्राथमिक उद्योगांमध्ये गुंतलेले दिसून येते. अभ्यासक्षेत्रामध्ये ९२२ ग्रामीण आणि ५ नागरी केंद्र येतात. एकूण ५ नागरी केंद्रापैकी लातूर हे 'अ' दर्जामधील शहर आहे. हेच ठिकाण जिल्हयाचे ठिकाण म्हणून ओळखले जाते. या पाठोपाठ उदगीर, निलंगा, औसा व अहमदपूर यांचा समावेश होतो. या ५ नागरीकेंद्रापैकी लातूर नागरी क्षेत्र हे गाभा क्षेत्र म्हणून ओळखले जाते.

**उद्देश :**

सदर संशोधनाचे प्रमुख उद्देश हा रोस्टोच्या विकास अवस्थेतील बदल सदरील अभ्यासक्षेत्राशी जूळवून विकास अवस्था दर्शविणे असा आहे याबरोबर खालील उद्देश निश्चित केली आहेत.

१. अभ्यासक्षेत्रातील नगराचे स्थान, विस्तार, उत्क्रांती व विकास यासंबंधी माहिती मिळविणे.
२. अभ्यासक्षेत्रातील विविध सामाजिक, शैक्षणिक, वैद्यकीय सोयी-सुविधांचा अभ्यास करणे.
३. अभ्यासक्षेत्रातील नगरांच्या विविध समस्येचा अभ्यास करणे.
४. नागरी व त्या लगतच्या झालर क्षेत्रात सुरु असलेला अनिर्बंध व अनियमित विकास नियंत्रित करणे, त्याचप्रमाणे सेवा-सुविधा वरील ताण, जमिनीच्या वाढत्या किंमती, प्रदुषण, पाणीटंचाई इ. भेडसावणाऱ्या प्रश्नांचा सर्वसाधारण अभ्यास करुन त्याच्या योग्य नियंत्रणासाठी अभ्यास करणे.

**अभ्यासपध्दती व माहिती स्त्रोत :**

संशोधन पत्रिका हा द्वितीय स्त्रोतावर आधारित आहे. अभ्यासासाठी लातूर शहराची निवड केल्यामुळे प्रकाशित व अप्रकाशित माहिती स्त्रोतातून घेतली आहे. या द्वितीय स्त्रोतात जिल्हा आर्थिक व सामाजिक समालोचन व जनगणना पुस्तिकाचा समावेश होतो. तसेच जनगणना हा घटक विचारात घेण्यासाठी १९८१ ते २०११ हा कालखंड विचारात घेतलेला आहे. त्याचप्रमाणे विविध संख्यात्मक तंत्रे व नकाशाशास्त्राचा वापर करुन वेगवेगळी ठिकाणे अभ्यासण्यात आलेली आहेत. योग्य ठिकाणी नकाशे वापर करुन विविध घटकांची माहिती देण्यात आलेली आहे.

**विकास आवस्था :**

**आत्मनिर्भर आवस्था -**     स्थानिक लोकांचे उत्पादन वाढ नोकर वर्ग वृध्दीगत, सुरक्षेत वाढ इ.

⇧

**अतिउपयोगावस्था -**     राष्ट्रीय स्तरावरील वाढ, मुलभूत गरजाबरोबर, शहरीकरण, औद्योगिकरण, सेवा क्षेत्रामध्ये वाढ, भांडवली वस्तूपेक्षा उपभोगी वस्तूउत्पादनांवर आधिक भर.

⇧

**उड्डान अवस्था -**     हा काळ २०-३० वर्षांचा असून विकासाचे टर्निंग पॉईंट म्हणून यास ओळखले जाते.

यामध्ये औद्योगिक क्रांती मोठया प्रमाणात घडून येते.

**उड्डान पूर्वआवस्था -**     हा काळ १०० वर्षांचा मानलेला असून यामध्ये व्यापार उद्योग, शेती तंत्रामध्ये बदल, आशावादी विचारप्रणाली आढळते.

⇧

**पारंपारिक आवस्था -**     या काळात अर्थव्यवस्था स्थिर असून दैववादावर आधारित अर्थव्यवस्था आढळते. केंद्रीय

सत्तेचा अभाव, राजकीय संगठन पारंपारिक शेतीतंत्राचा वापर, विकासाची गती मर्यादित स्वरुपात आढळते.

**प्राथमिक किंवा पारंपारिक अवस्था :**

इ.स. पूर्व २५० ते २२७ पर्यंत महाराष्ट्रात सातवाहनांची सार्वभौम सत्ता होती. या राजवटीने महाराष्ट्रात एकूण ५०० वर्ष राज्य केले. या वेळेस पैठण ही राजधानी होती. यानंतर इ.स. ४थ्या, ५ व्या व ६ व्या शतकात काही शिलालेख आणि ताम्रपट या आधारावर राष्ट्रकुटाचे राज्य या ठिकाणी होत राष्ट्रकुटाच्या काळात लातूर ही राजधानी होती. त्यानंतर महाराष्ट्रावर राज्य करणारा एक मोठा वंश म्हणून यादवांचा संदर्भ होतो. यादव कालीन राजवटीत लातूरची प्राचीनता अधिकच स्पष्ट होते. याचा पुरावा म्हणून उदगीर तालुक्यातील कानेगाव येथील ७ डिसेंबर १२५८ चा शिलालेख महत्त्वाचा ठरतो. याशिवाय अंबाजोगाई येथील श्र्वोलेश्वराच्या मंदिरात असलेल्या शिलालेखातही लातूर क्षेत्र असल्यामुळे वाहतूकीची कसलीही सुविधा त्यावेळी नव्हती. नगरावती अनेक राज्यकर्त्यांनी राज्य केले गेल्यामुळे त्यांच्या लोक जीवनात कसलाही बदल या राज्यकर्त्यांनी केला नाही. इ.स. ८ व्या शतकामध्ये भारतामध्ये निजामांनी प्रवेश केलेला होता. १९५६ पर्यंत महाराष्ट्राच्या काही भागावर विशेषत: मराठवाडयावर त्याचे राज्य होते. म्हणूनच राज्यकर्त्यांनी या कालावधीत लोकांना अधिक गुलामीत कसे ठेवता येईल याकडे लक्ष दिले. विकासाकडे त्यांनी पूर्णता दुर्लक्ष केले. थोडक्यात प्राथमिक अवस्थेत फारसा कोणताही विकास झाला नाही.

**उड्डाण पूर्वअवस्था :**

पहिल्या महायुध्दाच्या म्हणजे इ.स. १९१८ ते १९२५ च्या काळात ज्ञानकोशकार केतकरांचा द्वारा या प्रांतात झाला. १९२६ साली त्यां-नी प्रसिध्द केलेल्या ज्ञानकोशात लातूर हे १०००० वस्तीचे पण कापूर आणि अन्नधान्याच्या व्यापाराचे एक प्रमुख केंद्र होते. यामुळे पारंपारिक अवस्थेतनंतर येणारी आर्थिक विकासातील ही दूसरी अवस्था प्राथमिक जीवनाला थोडा वेगळा मोड मिळवून देते. लातूर हे कापूस आणि अन्नधान्याच्या व्यापाराचे प्रमुख केंद्र म्हणून ओळखले जाते.

सुमारे ३०० वर्षांपूर्वी आजचे खडक हनुमान मंदिर ही लातूरची दक्षिणेकडील सीमा होती. उत्तरेकडील जुने गाव हेच मुळचे लातूर होते. कालांतराओ हे वाढत वाढत जाऊन व्यापाराचे केंद्र बनत गेले. लातूरला व्यापारी केंद्र म्हणून परदेशापर्यंत ख्याती प्राप्त करुन देणारे भारताच्या इतिहासातील, स्वातंत्र्य युध्दातील श्री लोकमान्य टिळक हे होते. यांनी १८११ मध्ये श्री परांजपे यांच्या देखरेखीखाली लातूर जिनिंग फॅक्टरी स्थापन केली. गिरणीमुळे अनेक लोक शेती व्यतिरिक्त व्यापाराच्या कारणाने ते लातूरला आले. येथील स्थायी मालमत्तेचे मालक बाले. १८९८ ते १८९९ या कालावधीत प्रचंड मोठा दुष्काळ ओढावला. या स्थितीत ही लातूर शहरातील व्यापारानिमित्ताने बार्शी प्रमाणे लातूरला ही मिळत होते. पुढे पुढे लातूरने गरुड क्षेपच घेतली. कारण लातूरला १९११ मध्ये बार्शी लाईट रेल्वे सुरु झाली. रेल्वेमुळे व्यापाराचे जाळे वाढण्यास मदत झाली त्यातच स्वदेशी प्रेम वाढल्यामुळे स्वदेशी व्यापारास चालना मिळाली.

या स्थितांतराबरोबर शहरामध्ये विविध कारणांसाठी भाडेकरु व्यापाऱ्यांची संख्या वाढू लागली त्यामुळे प्राथमिक अवस्थेतील शहरातील लोकसंख्या शेतीवर आधारित होती ती आता कमी होऊन उद्योग, व्यापार, वाहतूक, दळणवळण वर अधारित राहू लागली. गंजगोलाई हे व्यापाराचे केंद्र बनले. येथे कापड दुकाने, भांडी दुकाने, स्टेशनरी, सोन्याचे दुकाओ याला पुरक व्यवसायाची कार्यालये अशी विविध केंद्रे नि-र्माण झाली.

रोस्टोच्या मतानुसार हा काळ १०० वर्षाचा मानला जातो परंतु उड्डानपूर्व अवस्था गाठण्यासाठी लातूर शहराला इ.स. ३०० ते स्वातंत्र्यापर्यंतचा काळ लागला. रोस्टोंने सांगितल्याप्रमाणे शेतीबरोबर उद्योगांची निर्मिती अधिक झाली, लोकसंख्याही वाढली. वाढत्या लोकसंख्येला अनुसरून शेती उत्पादनात तंत्र व यंत्राचा वापर केला गेला. शहरात भांडवल निर्मिती करण्यात आली. कापड गिरणी सोबत इतर ही कारखाने या ठिकाणी निर्माण झाले. यातूनच समाजामध्ये दैववादी विचारातून आशावादी विचार निर्माण झाले. शेतीचा विकास झाला, उपलब्ध साधनसंपत्तीचा पुरेपूर उपयोग होऊ लागला. यामुळे आर्थिक उन्नति सुरु झाली या सर्व संक्रमण काळानंतर आर्थिक गतिशीलता मिळाल्यानेच उड्डान अवस्था निर्माण होण्यास पोषक वातावरण निर्माण झाले.

**उड्डान अवस्था :**

रोस्टोने सांगितलेल्या दुसऱ्या अवस्थेनंतर येणारी ही तिसरी अवस्था होय. उड्डान हा शब्द रोस्टोने अतिशय योग्य अर्थाने वापरला आहे. आकाशात क्षेप घेण्यापूर्वी विमानाला प्रचंड वेग घ्यावा लागतो. ठराविक विमानाचे उड्डान होत असते. मागील अवस्थेमध्ये लातूर शहराची आर्थिक प्रगती वेगाने वाढण्यास मदत झाली. याच अवस्थेमध्ये सांगितलेल्या किमान अटी पूर्ण झाल्या. विकासाचे एक टर्निंग पॉईंट प्राप्त झाले. यामुळेच विकास ही सामान्य प्रक्रिया बालेली दिसून येते. व्यक्तीच्या प्रत्येक इच्छा पूर्ण करणारी ही अवस्था आहे. म्हणूनच या अवस्थेला रोस्टो-ने उड्डान अवस्था ही औद्योगिक क्रांती असे मानले आहे. हा काळ २० ते ३० वर्षांचा मानला जातो.

लातूरात उद्योगाची स्थिरता, गुंतवणूकीमध्ये वाढ, राहणीमानामध्ये वाढ, शहराच्या क्षेत्रामध्ये वाढ, नवावीन उद्योगधंद्यांची गुतंगुंत, शेतीतील बदल, शैक्षणिक सुविधातेत वाढ, सामाजिक सेवा, नागरी सेवा सुविधा व प्रबल राजकीय इच्छाशक्ती यामुळे उड्डाण अवस्था लातूरने गाठलेली दिसून येते.

रोस्टोने सांगितल्याप्रमाणे लातूर सध्या उड्डाण अवस्थेमध्ये आहे. लातूर शहरामध्ये शहरीकरण, औद्योगिकरण, सेवा क्षेत्रात वाढ, भांडवली वस्तूपेक्षा उपभोगी वस्तू उत्पादनावर अधिक भर आणि समाजकल्याण व सुरक्षिततेत वाढ या घटकांसोबत लातूर शहरात नागरीकरणाच्या उच्च सेवांचा अभाव, सेवा क्षेत्रांचा विकास नाही, लोकांच्या चैनीमध्ये व सुखामध्ये वाढ नाही, सुरक्षितेत वाढ नाही, करमनुकीच्या साधन‍ात वाढ नाही. मोठया प्रमाणात समाज परिवर्तन दिसून येत नाही. एकूणच म्हणता येईल हवे ते बदल झालेले नाहीत. म्हणूनच रोस्टोच्या ४ व ५ व्या अवस्थेमधे लातूर शहर पोहचले नाही.

**LATUR TOWN**
**PHASES OF EVOLUTION**



Map No.3.1

**निष्कर्ष :**

१. शहराचा विस्तार पश्चिम व दक्षिण भागाकडे वाढत चाललेले आहे. २०११ मध्ये महानगरपालिकेची निर्मिती होवून शहराच्या सीमा सभोवतालच्या क्षेत्रामध्ये वाढ करण्यात आली आहे. शहराच्या पश्चिम भागामध्ये उद्योगक्षेत्र असल्याकारणाने शहराचा विस्तार व विकास या भागाकडे होत आहे.

२. लातूर शहर हे जिल्ह्याचे मध्यवर्ती ठिकाण आहे. यामुळे शहरामध्ये सर्वच सोयी सुविधा उपलब्ध असतात. त्याचबरोबर लातूर हे शिक्षणाची पंढरी म्हणून ओळखली जात आहे. शिक्षणामध्ये लातूर शहराचा मोठया प्रमाणात विकास झालेला आहे.

३. नागरी व त्या लगतच्या झालर क्षेत्रात सुरू असलेल्या अनिर्बंध व अनियमित विकास नियंत्रित करणे, त्याप्रमाणे सेवा सुविधावरील ताण, प्रदुषण, घर टंचाई इ. प्रश्नांवर उपाययोजना राबविल्या नाहीत.

४. रोस्टो यांनी विकासाच्या पाच अवस्था सांगितल्या आहेत. परंतु लातूर शहर पहिल्या तीन अवस्थेमध्येच दिसून येतात. रोस्टोच्या विकास अवस्थेच्या सिद्धांतावरून असे लक्षात येते की लातूर शहराचा औद्योगिकरण, शहरीकरण, सुरक्षितता यामध्ये अद्याप विकास झालेला नाही.

**शिफारसी :**

१. प्राकृतिकदृष्ट्या शहराचा विकास होत आहे. पण नैसर्गिक साधनसंपत्तीचा अपुरा पुरवठा आहे. यामुळे जिल्ह्यातील व शहराच्या प्रत्येक रिकाम्या जागेवर, रस्त्यांच्या बाजूने जास्तीत जास्त वृक्षांची व वनाची लागवड करावी.

२. भांडवली वस्तू निर्मिती उद्योगांमध्ये वाढ करणे आवश्यक आहे जेणेकरून विकासाची गती वाढण्यास मदत होईल.

३. बाजारपेठेचे विस्तारीकरण करण्यासाठी शहराच्या चारही बाजूची निवड करण्यात यावी. मध्यवर्ती असणारी दुकानांची गर्दी कमी करुन वार्ड निहाय अल्पदरात उपलब्ध होणारी मोठी मॉल निर्माण करावीत व शहरातील मालमत्तेच्या किमंतीमध्ये स्थिरता आणणे आवश्यक आहे.

४. लोकसंख्या वाढ व वितरण शहरातील सगळ्या भागात समान स्वरुपात आणणे आवश्यक आहे जेणे करुन एकाच वार्डावर अधिक ताण पडला जाणार नाही.

५. रस्त्यांचे रुंदीकरण करणे गरजेचे आहे व जास्तीत जास्त फुटपाथची निर्मिती करणे आवश्यक आहे. तसेच शहरातील मुख्य समस्या म्हणजे पार्किंगची व्यवस्था नसणे. कोणत्याही भागात, बाजारात वाहने पार्क करण्यासाठी वाहनतळ निर्माण केले नाही. त्यासाठी जुन्या शासकीय इमारती, रिकाम्या जागा, रस्त्यावरील अतिक्रमण हटवून वाहनतळ उभे करावे.

६. औद्योगिक रचना बदलली जावी जास्तीत जास्त तृतीय, चतुर्थ व पंचम व्यवसाय उभा करण्याकडे किंवा स्थापन करण्याकडे प्रशासनाने भर द्यावा.

**संदर्भग्रंथ :**

१) सौताडेकर व्ही. एस. (२००३) : लातूर काल आणि आज विलासराव देशमुख फाऊंडेशन लातूर

२) डॉ. जयद्रथ जाधव (२०१७) : लातूर : वसा आणि वारसा प्रकाशक - वितरक

३) प्रा. शंकरराव शेटे, प्रा. सुरेश फुले, प्रा. ओमप्रकाश शहापूरकर (१९९८) : लोकसंख्या भूगोल

४) दंडे व्ही. सी. (२०१२) : "लातूर जिल्ह्यातील नागरी केंद्राचा भौगोलिक अभ्यास", अप्रकाशित शोधप्रबंध स्वा.रा.ती.म.वि. नांदेड

५) रॉजर हिम (२००५) : 'दक्षिण पश्चिम प्रदेश वसल्याच्या कार्यप्रणालीचे विश्लेषण '

६) डॉ. गोडबोले बी. एम. (२०१६) : "Latur - A Study In Urban Geography" P.hd Thesis, SRTMU Nanded.

# लातूर जिल्ह्यातील यात्रा केंद्र व पर्यटनस्थळांचा अभ्यास

**केरबा कांबळे**
संशोधक विद्यार्थी
महाराष्ट्र उदयगिरी महाविद्यालय,
उदगीर जि.लातूर

**प्रा. डॉ. आर. एस. धनुश्वर**
मार्गदर्शक
भूगोल विभागप्रमुख
भाई किशनराव देशमुख महाविद्यालय,
चाकूर जि.लातूर

**प्रस्तावना :**

महाराष्ट्रामध्ये लातूर जिल्हा एक ऐतिहासिक जिल्हा म्हणून प्रसिद्ध आहे. यात्रांच्या मानाने प्राचीन काळापासून यात्रा भरवल्या जातात. त्या आजही मोठ्या जोमाने व आनंदात भरवल्या जातात. त्यात विशेषतः सर्वधर्मियांच्या सहकार्याने यात्रा भरवून बाहेरून येणारे यात्रेकरू, व्यावसायिक, व्यापारी, रहिवाशी यांच्यामार्फत उत्साहात यात्रा करून जातात. महाराष्ट्रात मराठी महिन्यांना अनन्यसाधारण असे महत्त्व आहे. त्यात चैत्र, वैशाख, माग, फाल्गुन, आश्विन, कार्तिक या महिन्यात मोठ्या प्रमाणात यात्रा भरतात. लातूर जिल्ह्यातील यात्रा केंद्र व पर्यटन स्थळांचा इतिहास पाहता प्राचीन कालीन हेमाडपंथी मंदिरे व कुंड उपलब्ध असल्याने लोकांच्या श्रद्धाआजही टिकून असलेल्या दिसतात.

**अभ्यासक्षेत्रः**

लातूर जिल्ह्यातील यात्रा केंद्र व पर्यटन स्थळांचा अभ्यास करण्यासाठी लातूर जिल्हा हे अभ्यासक्षेत्र निवडले आहे. लातूर जिल्ह्याचा अक्षवृत्तीय विस्तार १७°५२। उत्तर ते १८°५२। उत्तर अक्षवृत्ताच्या दरम्यान तर रेखावृत्तीय विस्तार ७६°१८। पूर्व ते ७९°५२। पूर्व रेखावृत्ताच्या दरम्यान आहे. या जिल्ह्याचे क्षेत्रफळ ७१५७ चौ.कि.मी. असून जिल्ह्याच्या उत्तरेस परभणी जिल्हा असून हा जिल्हा महाराष्ट्र-कर्नाटक सीमाभागात वसलेला आहे. सन २०११ च्या जनगणनेनुसार जिल्ह्याची लोकसंख्या ५४५४१९६ इतकी असून त्यात १२७३१४० पुरुष तर स्त्रियांची संख्या ११८१०५६ इतकी आहे.

**अभ्यासाची उद्दिष्ट्येः**

१) अभ्यासक्षेत्रातील पर्यटन व यात्रास्थळांचा अभ्यास करणे.
२) यात्रा केंद्राचे स्थान व ठिकाणांचे विश्लेषण करणे.

**अभ्यासपद्धती**

प्रस्तुत शोधनिबंधात प्रामुख्याने माहितीचे स्रोत प्राथमिक व द्वितीयक स्वरूपाचे आहेत. जिल्ह्याचे सामाजिक-आर्थिक समालोचन, जिल्हा जनगणना अहवाल, विविध प्रकारचे यात्रास्थळे, पर्यटन अहवाल, विविध संदर्भ ग्रंथ यातून माहिती मिळवून त्याचे विश्लेषण करण्यात आले आहे.

**विश्लेषणः**

लातूर जिल्हा बालाघाट डोंगररांगात वसलेला असून तो सांस्कृतिक घटकांनी संपन्न आहे. अभ्यासक्षेत्रात विपूल प्रमाणात यात्रा केंद्र व पर्यटनस्थळांची उपलब्धता दिसून येते. लातूर जिल्ह्यातील यात्रा केंद्र व पर्यटनस्थळे खालीलप्रमाणे आढळून आली.

१) नामानंद महाराज मठ, महापूर ता.चाकूर
२) हनुमान मंदिर, चिंचोलीराववाडी (ता.लातूर)
३) रोकडेश्वर मंदिर धनेगाव
४) गणेशनाथ मंदिर, सारसा
५) विठ्ठल रुक्मिणी मंदिर तांदुळवाडी (ता.लातूर)
६) साई कल्याण पाटील बाबा देवस्थान, बोपला (ता.लातूर)
७) उदगीर बाबा (उदगीर किल्ला)
८) माणिक डोलार पीर (ता.उदगीर)
९) सय्यद सदरोद्दीन खाजा बाशा दर्गा, उदगीर
१०) निळकंठेश्वर मंदिर निलंगा ता.निलंगा
११) समर्थ धोंडुतात्या मठ, डोंगरशेळकी ता.उदगीर
१२) समर्थ धोंडुतात्या देवस्थान, देऊळवाडी ता.उदगीर
१३) हावगीस्वामी मठ, उदगीर ता.उदगीर
१४) महादेव मंदिर, शंभुउमरगा ता.उदगीर
१५) सय्यद सदरोद्दीन ख्वाजा बाशा दर्गा उदगीर ता.उदगीर
१६) श्री.अंबामाता मंदिर, देवी दापका ता.उदगीर
१७) श्री. मारोती मंदिर, माकणी थोर ता.निलंगा
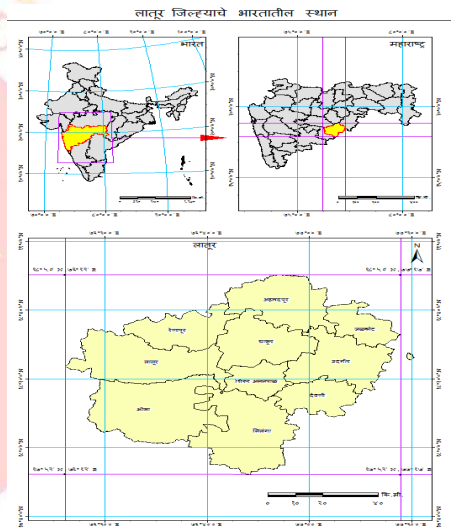
१८) देवी मंदिर, हल्याळी ता.निलंगा

१९) भुईकोट किल्ला, औसा ता.औसा

२०) खरोसा लेणी, खरोसा ता.औसा

२१) निळकंठेश्वर मंदिर, किल्लारी ता.औसा

२२) गणेशनाथ मंदिर, उजनी ता.औसा

२३) ज्ञानेश्वर महाराज समाधी श्रीक्षेत्र गोपाळपूर ता.औसा

२४) श्री.व्यंकटेश बालाजी मंदिर, औसा

२५) महात्मा गांधी यात्रा, उजेड

२६) संजीवनी बेट, वडवळ ता.चाकूर

२७) साईनंदनवनम्, आनंदवाडी ता.चाकूर

२८) महादेव मंदिर, तीर्थ ता.चाकूर

२९) बालाजी मंदिर, कलकोटी ता.चाकूर

३०) श्री.अंबिका देवी मंदिर, रोहिणा ता.चाकूर

३१) महादेव मंदिर वडवळ ता.चाकूर

३२) बालाजी मंदिर, अजनसोंडा ता.चाकूर

३३) हनुमान मंदिर, परचंडा ता.अहमदपूर

३४) श्री रोकडोबा मंदिर, सावरगाव ता.अहमदपूर

३५) नारायणजी अप्पामहाराज जानकीदेवी देवस्थान, ढाळेगाव ता.अहमदपूर

३६) महादेव मंदिर, नागझरी ता.अहमदपूर

३७) महादेव मंदिर, सताळा ता.अहमदपूर

३८) महादेव मंदिर, चिलका ता.अहमदपूर

३९) रेणुकादेवी मंदिर रेणापूर ता.रेणापूर

४०) केशवराज महाराज मंदिर, खरोळा ता.रेणापूर

४१) महादेव मंदिर, शिरुर अनंतपाळ ता.शिरुर अनंतपाळ

४२) महादेव मंदिर, हिप्पळगाव ता.शिरुर अनंतपाळ

४३) शेषनाथ महाराज मंदिर, लासोना ता.देवणी

४४) समर्थ धोंडुतात्या मंदिर, विराळ ता.जळकोट

४५) सैलानीबाबा - शिऊर

४६) किनगाव पीर उरुस ता.अहमदपूर

४७) पीर उरुस, निलंगा

याशिवाय अनेक बाजार केंद्रे ही यात्रेसारखे स्वरूप निर्माण करतात. ज्यामध्ये १) हाळी २) हंडरगुळी ३) नळेगाव ४) वलांडी ५) मुरूड ६) रोकडे मारुती ७) औराद शहाजनी ८) करडखेड यांचा समावेश होतो. याठिकाणी मोठ्या स्वरूपाचे बाजार भरतात व यात्रेचे स्वरूप येते.

यात्रा केंद्राठिकाणी सेवाभावी संस्थांकडून, शासनामार्फत कृषि विभाग, जिल्हा परिषद, पंचायत समिती यांच्यामार्फत वेगवेगळ्या कार्यक्रमांचे आयोजन केले जाते. त्यातून विविध विषयावर जाणीवजागृती केली जाते. पथनाट्ये, बॅनर्स, मोफत भोजनाची सोय असे विविध उपक्रम राबविले जातात.

**निष्कर्ष:**

१) अभ्यासक्षेत्रात मोठ्या प्रमाणात यात्रा भरल्या जातात. त्यामुळे येथील लोकजीवन संपन्न बनले आहे.

२) यात्राकेंद्राठिकाणी दूरवरुन अनेक व्यापारी येऊन व्यवसाय करतात त्यामुळे व्यवसायाला आणि पर्यायाने त्याठिकाणच्या स्थानिकांना रोजगार मिळण्यास मदत होते.

३) मराठवाड्यातील ISO प्रमाणपत्र प्राप्त असलेली पहिली जिल्हापरिषद म्हणून लातूर जिल्हा परिषदेला हा सन्मान मिळाला आहे.

४) यात्रेकरू व व्यावसायिकांना व्यापारासाठी विविध गाळे व मैदानांची आणि मूलभूत सोयींची उपलब्धता करून देण्यात येते.

**संदर्भ:**

१) *लातूर जिल्हा सामाजिक व आर्थिक समालोचन*

२) *भारतीय जनगणना अहवाल २०११*

३) *Dhanushwar R.S. (2009), 'A Study of Spatial Organization of Market Centres in Latur District', Unpublished Ph.D. Thesis submitted to Swami Ramanand Teerth Marathwada University, Nanded*

४) *Cooper, C. (1999), 'Tourism Principle and Practices', Addison Wesley, Longman Publishing, New York, P.124-182*

५) *विठ्ठल घारपुरे- पर्यटन स्थळ अभ्यास*

# पर्यावरणीय समस्या व व्यवस्थापन

**प्रा. एन. पी. मुसळे**

भूगोल विभाग

संभाजिरावकंद्रे महाविद्यालय, जळकोट

**प्रा. डॉ. बी. एस. राठोड**

भूगोल विभाग प्रमुख

संभाजिरावकंद्रे महाविद्यालय, जळकोट

**प्रस्तावना :**

आपल्यावर परिनामकरणारी कोणतीही बाहयशक्ती म्हणजे पर्यावरण होय. आज जगात सर्वात मोठी वाढतचाललेली समस्या म्हणजे पर्यावरणीय समस्या होय. जगामध्ये १८ व्या शतकापासुन औद्योगिक प्रगतीस सुरूवात झाली तेव्हापासुनघरगुती उत्पादन मोठया प्रमाणातकारखान्यात होऊ लागली त्यामुळे जे उत्पादनतयार होण्यासाठी पूर्वीकाळी अनेकदिवस लागायचेते आज काही तासात होऊ लागले. जसजशी औद्योगिक प्रगती होऊ लागली तसतसेत्याचाविस्तार वाढतगेला. वाढती लोकसंख्या व औद्योगीक प्रगती याचा परिनाम म्हणुन जमिनीचा मोठया प्रमाणातवापर होऊ लागला व वनांचे प्रमाणकमीझाले.मानवी कृतीमुळे पर्यावरणाची घटलेलीगुणवत्ता वाढविणे व पर्यावरणाचीस्थिती सुधारण्यासाठी अभ्यासक, शासनतसेच पर्यावरणतज्ञ या समस्येवरविचारविनिमयकरीत आहे यातुनच पर्यावरण व्यवस्थापन संकल्पना पुढे आलेली आहे. पर्यावरण व्यवस्थापन ही विकास व नियोजनाच्या संदर्भातील आहे. यामध्ये समाजाचा सर्वांगिणविकासकरणेतसेचनैसर्गीक संसाधनाचा समतोल वापरकरुन सामाजिक व आर्थिक विषमता दुरकरणे ही उद्दिष्टे साध्यकरणे होय.

पर्यावरण व्यवस्थापन ही मानव व निसर्ग यामध्ये समन्वयकरणारी प्रक्रिया आहे. प्रदेशातीलनैसर्गिक आणि भौतिक परिस्थिती, नैसर्गीक संसाधने, पर्यावरण लोकसंख्याइत्यादी घटकाचा सखोल अभ्यास करुन पर्यावरणीय घटकतसेचनैसर्गीक संसाधनांचा मर्यादित वापरकरणारीनवीनजिवन प्रणाली आत्मसातकरणे म्हणजे सुरक्षितविकास होय. पर्यावरणाचे व्यवस्थापन विशिष्ट प्रदेशकिंवा राष्ट्र यांच्याशी मर्यादितनसुनती संपूर्ण जगाची गरज आहे. भविष्यात मानवी समाजाच्या उपयोगासाठी परिसंस्थेचे रक्षणकरणे व परिसंस्थातील अखंडत्व राखणे हे पर्यावरण व्यवस्थापनाचेध्येय आहे.

**पर्यावरण व्यवस्थापनेचे उद्दिष्टे :**

१.  पर्यावरणातीलविविध घटकाचे संशोधनकरणे.

२.  साधनसंपत्तीचे महत्त्व ओळखणे.

३.  मानवाला प्रदुषणाच्या परिणामापसुन सुरक्षीत ठेवणे.

४.  पर्यावरणाचादर्जा राखला जावा म्हणुन विशिष्टनियमावली वा तत्व ठरविणे प्रदुषण नियंत्रणाव्दारे पर्यावरणाच्यागुणवत्तेचे रक्षणकरणे.

५.  पर्यावरण संरक्षणासाठीनियम व कायदेकरुनत्याचीकाटेकोरपणे अंमलबजावणीकरणे.

६.  शैक्षणिक स्तरावर पर्यावरणशिक्षण व प्रशिक्षणदेण्याची व्यवस्थाकरणे.

**पर्यावरणाच्या प्रमुख घटकांचे व्यवस्थापन :**

पर्यावरण हे जैविकतसेच अजैविक घटकापासुन बनलेले आहे. नैसर्गिक साधनसंपत्तीचा वेगाने होणारा संख्यात्मक व गुणात्मकऱ्हास यामुळे त्याचे व्यवस्थापन व संवर्धन काळाची गरज आहे. यासाठीकेंद्रसरकारतसेच राज्यसरकार पर्यावरण संवर्धनासाठी पुढाकारघेतलेला आहे. महाराष्ट्र जल प्रदुषण प्रतिबंध अधिनियम १९६९ च्या तरतुदीनुसार महाराष्ट्र प्रदुषण नियंत्रण मंडळाची स्थापना १९७१ मध्ये झाली. जल प्रदुषण प्रतिबंध व नियंत्रण अधिनियम १९७४ राज्यात १९८१ ख-या अर्थाने लागु झाली.हे मंडळ राज्याला पर्यावरणाशीनिगडीत विषयावर मार्गदर्शनकरते. यामध्ये हवेची गुणवत्ता, नद्या, समुद्र, भूजलचा दर्जा, औधोगीक सांडपाणी व ध्वनी प्रदुषण यावरनियंत्रण ठेवते.

**वायु प्रदुषण :**

वायु प्रदुषणाची प्रमुख कारणे औद्योगीकरण, परिवहन, ज्वलानासाठी वापरलेलेइंधनजसे कोळसा, लाकुड, वाळलेली गवत व पालापाचोळा इ. आहेत. महाराष्ट्रामध्येविविध शैक्षणीक संस्थांच्या मदतीने राज्याच्या १७ जिल्ह्यातील ८२ ठिकाणी प्रदुषण नियंत्रण मंडळ वायुच्या गुणवत्तेच्या सनियंत्रणकरीत आहेत. वायुप्रदुषण नियंत्रणकरण्यासाठीकमीगंधक असलेलीडिझेल वापरणे, शिसे रहीत पेट्रोल वापरणे. सीएनजी/एलपीजी हे पर्यायी इंधन वापरणे, पीयुसी अनिवार्यकरणे, १५ वर्ष झालेल्या वाहनांना सीएनजी / एलपीजी वापरण्यासाठी रुपांतरकरणे अशा उपाय योजनाकरण्यात येत आहेत.

**जलप्रदुषण :**

राष्ट्रीय जल गुणवत्ताकार्यक्रमांतर्गत महाराष्ट्र प्रदुषण नियंत्रण मंडळ हे जागतीक पर्यावरण सनियंत्रण व भारतीय राष्ट्रीय. जलस्रोतनियंत्रण प्रकल्प राबवीत आहेत. सध:स्थितील मंडळाद्वारे २०० ठिकाणीजमिनीवरील पाण्याचे व ५० ठिकाणी भुजलाचे असे २५० सनियंत्रणकरण्यात येत आहेत. प्रदुषण नियंत्रण मंडळाने 'जल व वायु प्रदुषण अधिनियम' अंतर्गत २०१०-२०११ मध्येविविध उद्योगाच्या स्थापनाकिंवाविस्ताराबाबत १३८४३ समती पत्रेदिलेली आहेत. या नियमावलीच्यातरतूदीनुसार प्रदुषण नियंत्रण मंडळाने विशिष्ट उद्योग व स्थानिक स्वराज्य संस्थाकडुनत्यांनी वापरलेल्या पाण्यासाठी ३०.४२ कोटीइतकी पाणी पट्टीकर वसूली केलेली आहे.

**ध्वनी प्रदुषण :**

ध्वनी प्रदुषण हा अतिहानीकारक पर्यावरण प्रदुषणाचा प्रकार असुन हा प्रमुख पर्यावरणाचा प्रश्न आहे. याची संपूर्णजगातजाणीवझालेली आहे. ध्वनी प्रदुषणामुळे मानवाच्या आरोग्यावर मोठा परिनाम पडत आहे. या प्रतिकुल परिनामाच्या वाढत्याजाणीवेबरोबर पर्यावरणातीलध्वनी प्रदुषणाबाबतची सहनशिलता कमी होणाया लोकांच्या संस्थेत मोठी भर पडत आहे. ध्वनी प्रदुषण अधिनियम २००० नुसार औद्योगीक, निवासी, वाणिज्यके आणि शांतता विभाग असे विभाग तयारकरण्यात आलेले आहेत. त्यामुळे

विशिष्ट विभागातध्वनी स्तर विशिष्ट डेसिबल पर्यंत मर्यादितकेलेले आहेत. ध्वनी प्रदुषण कमीकरण्यासाठी सणासुदीच्याकालावधीमध्ये १२५ डेसिबलपेक्षाजास्त आवाज करणाया फटाक्यावर बंदीतसेच सण साजरेकरतानाध्वनीवर्धक लावणे व मोठ्या आवाजाचे फटाके वाजविणे यावर वेळेचे बंधन ठेवण्यात आलेले आहेत.

## भुमी प्रदुषण :

भुमीचे प्रदुषण म्हणजे एखाद्या प्रदेशातील मृदेचीगुणवताकमी होऊनतीजमिन दुषीत व वापरण्यास अयोग्य होणे होय. भुमी प्रदुषीत होण्यासाठी रासायनिकखाते व किटकनाशकेजबाबदार नाहीत तरत्यासाठी आणखीदुस-याबाबीकारणीभुत आहेत. यामध्येकारखान्यातीलकचरासेघातक वायु व रसायने, अयोग्य व घातकसिंचन प्रक्रिया, आम्लपर्जन्य, कारखान्यातुननिघणाराधुर पावसात मिळणे, वाहनातील इंधन गळती तसेच पाण्यात टाकलेल्या कच-याचीचुकीची विल्हेवाट इत्यादी बाबी भुमीचे प्रदुषण करण्यातकारणीभुत आहेत. प्रदुषणाचे जमिनीवरील परिणाम भयावह असुनते पर्यावरणाचासमतोल व जमिनीवरील प्राणीमात्राच्या अरोग्यास हानीकारक आहेत.

## सुरक्षिसविकासाचेउपाय :

प्रदेशातीलनैसर्गिक आणि भौतिक परिस्थीती, नैसर्गिक संसाधने पर्यावरण, लोकसंख्याइत्यादी बाबीचा काळजीपुर्वक अभ्यास करूननैसर्गिक साधनसंपत्तीचा मर्यादित वापरकरूननविनजिवनप्रणाली आत्मसातकरणे म्हणजे सुरक्षितविकास होय.

१. नैसर्गिक साधनसंपत्तीचेजतनकरणे— पृथ्वीवरीलनैसर्गिक घटकापैकी ज्या-ज्या घटकाचा मानवाला प्रत्यक्ष व अप्रत्यक्ष उपयोग होतो. त्या सर्व बाबी मानवाने व्यवस्थीत वापराव्यात म्हणजे सुरक्षितविकास साधता येईल.

२. साधनसंपत्तीचे महत्व ओळखणे - साधनसंपत्तीशिवाय मानव जगु शकत नाही, साधनसंपत्तीची काळजीपूर्वक वापरकरणे अत्यअवश्यक आहे, म्हणुन साधनसंपत्तीचे महत्व ओळखणे गरजेचे आहे.

३. उर्जासाधनाचा योग्य वापरकरणे—निसर्गात ज्या विविध घटकातऊर्जा साठवलीजातेती सर्व ऊर्जा साधने आहेत. या ऊर्जासाधनाच्या वापराने मानवालाविविधकार्यकरण्यास बळ मिळते. त्यासाठीदगडी कोळसा, खनिजतेल, जळाऊ लाकुड या प्रमुख उर्जासाधनाचा व्यवस्थीत वापरकरावा.

४. वनीकरणकरणे - मानवीकार्याने ज्या-ज्या ठिकाणी मोठ्या प्रमाणात वृक्षतोड झालेली आहे अशा ठिकाणी मोठ्या प्रमाणातझाडे लावण्याचाउपक्रम हाती घेतला जावा. त्यामुळे प्रदुषण टाळता येईल व सुरक्षितविकासकरणे सुलभ होईल.

५. नैसर्गिक पर्यावरणाचे महत्व ओळखणे — पर्यावरणातीलनैसर्गिक घटक मानवीकार्यांसाठी खूपच उपयुक्त आहेत. या नैसर्गिक घटकांच्या बळावर मानव आपलेजीवन सुखी व आरामदायी बनते. नैसर्गिक पर्यावरणातील प्रत्येक घटक मानवाच्या दृष्टीने अत्यंत उपयुक्त व महत्वाचे आहे म्हणुन नैसर्गिक पर्यावरणाचे महत्व ओळखणे अत्यंत महत्वाचे आहे.

अशा प्रकारे सुरक्षितविकासाठी मानवाने पर्यावरणाचा महत्व ओळखुन पर्यावरणालाधोका होणार नाही. पर्यावरण राखले जाईल या दृष्टीनेकार्यकरणेगरजेचे आहे.

## निष्कर्ष :

पर्यावरणीय समस्या व व्यवस्थापनाचा अभ्यास केला असता असे लक्षात येतेकी, भारतात पर्यावरणासंबंधी २०० कायदे अस्थित्वात आहे. परंतू औधोगीक प्रगतीद्वारे मानवाने स्वत:चाविकासकरताना पर्यावरणाचा व पर्यावरणातीलइतर सजीवांचा फारसा वापरकेलेला नाही. त्यामुळे पर्यावरणाची हानी झालेलीदिसून येते. ही झालेली हानी थांबवण्यासाठी प्रदुषणावर व वाढत्या लोकसंस्थेवरनियंत्रण ठेवणे अत्यंत आवश्यक आहे. त्यासाठी पर्यावरण संरक्षणाबाबत असणाऱ्याकायद्यांचीकडक अमलबजावणीकरावी. पर्यावरण व मानवीविकास हे एकमेकांस पूरक असलेतरी अज्ञान, बेजबाबदारी मानवी प्रवृत्तीमुळे पर्यावरणाचे भरुनन येणारेनुकसानझाले आहे. हा ठासाळलेला तोल सावरुनतो पुन्हा मुळ पदावर आणणे हे प्रत्येक मानवाचेकर्तव्य आहे.

## संदर्भ :

१. महाराष्ट्राची आर्थिक पाहणी २०११-२०१२.
२. पर्यापरण व्यवस्थापन—विकिपीडीया—जयकुमार मगर.
३. पर्यावरणकीचुनौतिया : समस्या तथा समाधान, बी.के. शर्मा, आर्या पब्लिकेशनदिल्ली, २०१२.
४. भूगोल व पर्यावरण, ए.बी. सवदी, निराली प्रकाशन पुणे , जानेवारी २०१६.

# बिदर जिल्ह्यातील लोकसंख्या घनतेचा अभ्यास

**प्रा. सागावे व्दि. एन.**

कै. बापूसाहेब पाटील एकंबेकर ग्रामीण महाविद्यालय,
हणेगांव ता. देगलूर जि. नांदेड

**श्री. राठोड बालाजी रतन**

संशोधक विद्यार्थी
कै. बापूसाहेब पाटील एकंबेकर ग्रामीण महाविद्यालय,
हणेगांव ता. देगलूर जि. नांदेड

**प्रस्तवना :**

लोकसंख्येच्या वितरणाचा अभ्यास करण्यासाठी लोकसंख्येच्या घनतेचा अभ्यास करणे आवश्यक ठरते. सर्व प्रथम असा अभ्यास हेन्री डी. हर्नेस यांनी इ.स. १८३७ मध्ये आर्यलंडमधील लोकसंख्येचे केंद्रीकरण जानुन घेण्यासाठी दर चौरस कि.मी. मैलास किती लोक राहतात यांचा अभ्यास केला. एक चौरस किलो मीटर क्षेत्रावर किती लोक राहतात. हे दर्शविणाऱ्या संख्येस लोकसंख्येची घनता असे म्हणतात. लोकसंख्या घनतेच्या अभ्यासावरून त्या प्रदेशातील नैसर्गिक साधन संपत्ती आणि सांस्कृतिक साधन संपत्ती पुरेशा प्रमाणात आहे किंवा नाही याची माहिती मिळू शकते. लोकसंख्येची घनता अति जास्त किंवा जास्त असल्यास नैसर्गिक आणि सांस्कृतिक साधनसंपत्तीवर भार किंवा तान पडतो आणि अनेक समस्या निर्माण होऊ शकतात. लोकसंख्येची घनता मध्यम असल्यास नैसर्गिक आणि सांस्कृतिक साधन संपत्तीचा योग्य प्रमाणात उपयोग आणि उपभोग होतो. लोकसंख्येची घनता कमी असल्यास नैसर्गिक आणि सांस्कृतिक साधन संपत्तीचा वापर कमी प्रमाणात होतो त्यामुळे प्रदेशाचा विकास होण्यासाठी अनेक समस्या निर्माण होतात. म्हणजेच लोकसंख्येची घनता जास्त किंवा कमी असल्यास प्रदेशाच्या विकास योग्य प्रमाणात होऊ शकत नाही. जर लोकसंख्येची घनता संतुलित असेल तर प्रदेशाचा विकास योग्य प्रमाणात होतो.

**अभ्यास पध्दती :**

या शोध निबंधसाठी द्वितीय सामग्रीचा वापर करण्यात आला आहे. यासाठी इंटरनेट, संदर्भ ग्रंथ, वर्तमान पत्रे आणि लेख यांचा आधार घेण्यात आला आहे. या शोध निबंधासाठी विश्लेषणात्मक, सांख्यिकी आणि आलेखात्मक पध्दतीचा वापर करण्यात आला आहे.

**उद्दीष्ट्चे :**

या शोध निबंधाची उद्दीष्ट्चे खालील प्रमाणे आहेत.
१) बिदर जिल्ह्यातील तालुकानिहाय घनतेचा अभ्यास करणे.
२) बिदर जिल्ह्यातील तालुकानिहाय महिला आणि पुरुष लोकसंख्येचा अभ्यास करणे.

**विषय विवेचन :**

बिदर जिल्हा हा कर्नाटक राज्यात आहे. या जिल्ह्याच्या सिमा महाराष्ट्र व तेलंगना राज्याच्या सिमेला मिळतात. हा जिल्हा कर्नाटक राज्याच्या इशान्येस आहे. या जिल्ह्याच्या इशान्येस महाराष्ट्र राज्यातील उत्तरेस नांदेड, लातूर आणि वायव्येस उस्मानाबाद जिल्हा आहे. अग्नेयेस तेलंगाना राज्यातील जहिराबाद आणि पूर्वेस निझामाबद हा जिल्हा आहे. या जिल्ह्याच्या दक्षिणेस गुलबर्गा जिल्हा आहे.

बिदर जिल्ह्याचा अक्षवृत्तीय विस्तार १७°३१'३८'' उत्तर अक्षवृत्त ते १८°२३'१५'' उत्तर अक्षवृत्त असून रेखावृत्तीय विस्तार ७६°४५'२०'' पूर्व रेखावृत्त ते ७७°३९'५२'' पूर्व रेखावृत्त असा आहे. या जिल्ह्याची पूर्व पश्चिम लांबी ९३.४ किलोमीटर व उत्तर दक्षिण लांबी ११५.२ किलोमीटर आहे. या जिल्ह्याचे एकूण क्षेत्रफळ ५४४८ चौ. किलोमीटर इतके आहे. कर्नाटक राज्यात क्षेत्रफळाच्या बाबतीत या जिल्ह्याचा १७ व्या क्रमांक लागतो.

लोकसंख्येची गणितीय घनता म्हणजे प्रदेशाची एकूण लोकसंख्या व त्याच प्रदेशाचे एकूण क्षेत्रफळ यांच्या मधील गुणोत्तर होय. गणिती घनता दर चौरस किलो मीटरला किती व्यक्ती राहतात हे दर्शविते. लोकसंख्या घनतेच्या अभ्यासावरून लोकसंख्या वितरणाची कल्पना येते. यावरून दाट, मध्यम व विरळ लोकवस्तीचे प्रदेश ठरविता येतात. लोकसंख्या घनतेवरून लोकसंख्या आणि साधनसंपत्ती यांच्या परस्पर संबंधाचे स्वरूप निश्चित करून प्रदेशातील लोकसंख्या रिक्त, पर्याप्त की अतिरिक्त आहे याची माहिती होते. प्रदेशातील लोकसंख्येचा आर्थिक, सामाजिक व सांस्कृतिक विकास करण्यासाठी लोकसंख्या घनतेच्या आधारे नियोजन करता येते. एखादा प्रदेश मानवी जीवनासाठी अनुकूल आहे कि प्रतिकूल आहे या विषयीची माहिती लोकसंख्या घनतेच्या अभ्यासावरून होते. तसेच लोकसंख्या स्थलांतराविषयी अंदाज बांधता येतो.

गणिती घनता काढण्यासाठी खालील सुत्राचा वापर केला जातो.

$$\text{लोकसंख्येची घनता} = \frac{\text{एखाद्या प्रदेशाची एकूण लोकसंख्या}}{\text{त्याच प्रदेशाचे एकूण क्षेत्रफळ}}$$

बिदर जिल्ह्याच्या लोकसंख्या घनतेचा सन १९९१ ते २०११ या वर्षाचा अभ्यास करण्यात आला आहे. तसेच बिदर जिल्ह्यातील महिला व पुरुष संख्येचाही अभ्यास करण्यात आला आहे. या अभ्यासावरून असे दिसून येते की, बिदर जिल्ह्याची १९९१ ची घनता दर चौ. कि.मी. ला २३०.०८ एवढी असून सन २०११ मध्ये ३११.४७ एवढी असल्याचे दिसून येते. सन १९९१ ते २०११ या विस वर्षाच्या कालावधीमध्ये बिदर जिल्ह्याची लोकसंख्या घनता ८१.३९ ने वाढली आहे.

## तालुकानिहाय बिदर जिल्ह्याची महिला आणि पुरुषांची संख्या आणि लोकसंख्या घनता

| तालुका | क्षेत्रफळ | १९९१ | | | | २०११ | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | महिला | पुरुष | एकूण | लो. घनता | महिला | पुरुष | एकूण | लो. घनता |
| औराद | १२२४.४ | १०३११४ | १०६९२६ | २१००४० | १७१.५४ | १३५७६८ | १४२३०७ | २७८०७५ | २२७.११ |
| बस्वकल्याण | १२०५.९ | १२१३७१ | १२४९६९ | २०३५९२ | १६८.८२ | १६८४७४ | १७६४६७ | ३४४९४१ | २८६.०४ |
| भालकी | १११७.३ | १०८८८० | ११४०३८ | १९६०४२ | १७५.४६ | १३५३२९ | १४९९७३ | २७७३०२ | २४८.१८ |
| बिदर | ९२६.० | १५९०९१ | १७२३६१ | ३३१४५२ | ३५७.९३ | २२६९४८ | २३९६६६ | ४६६६१४ | ५०३.९० |
| हुमनाबाद | ९८५.३ | १२०१५१ | १२४८९६ | २०१३७८ | २०४.३८ | १६२६४९ | १७०४३७ | ३३३०८६ | ३३८.०५ |
| बिदर जिल्हा एकूण | ५४५८ | ६१२६०७ | ६४३१९० | १२५५७९९ | २३०.०८ | ८२९१६८ | ८७०८५० | १७०००१८ | ३११.४७ |

स्त्रोत : *Bidar District at a Glance*
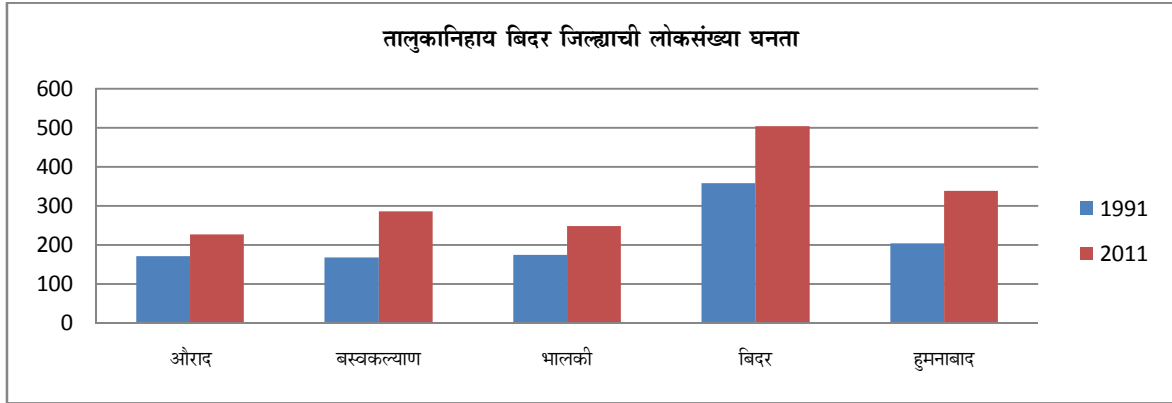


**आलेख क्रमांक ०१**

तालुकानिहाय बिदर जिल्ह्याच्या लोकसंख्येचा अभ्यास केल्यास असे दिसून येते की, बिदर तालुक्यामध्ये सन १९९१ आणि २०११ मध्ये लोकसंख्येची घनता सर्वात जास्त असून ती अनुक्रमे ३५७.९३ आणि ५०३.९० एवढी आहे. बिदर तालुक्यातील विस वर्षाच्या कालावधीमध्ये लोकसंख्या घनतेमध्ये १४५.९७ एवढी वाढ झाली आहे. त्याखालोखाल हुमनाबाद तालुक्यामध्ये सन १९९१ आणि २०११ मध्ये लोकसंख्येची घनता असून ती अनुक्रमे २०४.३८ आणि ३३८.०४ एवढी आहे. या तालुक्यामध्ये विस वर्षाच्या कालावधीमध्ये लोकसंख्या घनतेमध्ये १३३.६७ एवढी वाढ झाली आहे. भालकी तालुक्यामध्ये सन १९९१ आणि २०११ मध्ये लोकसंख्येची घनता असून ती अनुक्रमे १७५.४६ आणि २४८.१८ एवढी आहे. या तालुक्यामध्ये विस वर्षाच्या कालावधीमध्ये लोकसंख्या घनतेमध्ये ७२.७२ एवढी वाढ झाली आहे. औराद तालुक्यामध्ये सन १९९१ मध्ये लोकसंख्येची घनता १७१.५४ असून सन २०११ मध्ये बिदर जिल्ह्यात सर्वात कमी २२७.११ एवढी आहे. या तालुक्यामध्ये विस वर्षाच्या कालावधीमध्ये लोकसंख्या घनतेमध्ये ५५.५७ एवढी वाढ झाली आहे. बस्वकल्याण तालुक्यामध्ये सर्वात कमी लोकसंख्येची घनता सन १९९१ मध्ये १६८.८२ एवढी असून २०११ मध्ये लोकसंख्येची घनता २८६.०४ एवढी आहे. या तालुक्यामध्ये विस वर्षाच्या कालावधीमध्ये लोकसंख्या घनतेमध्ये ११७.२२ एवढी वाढ झाली आहे.

तालुकानिहाय बिदर जिल्ह्यातील लोकसंख्या घनतेच्या वाढीचा अभ्यास केल्यास असे दिसून येते की, बिदर तालुक्यामध्ये सर्वात जास्त लोकसंख्या घनतेमध्ये वाढ झाली आहे. तर सर्वात कमी लोकसंख्या घनतेमध्ये वाढ औराद तालुक्यात झाली आहे.

बिदर जिल्ह्याची एकूण लोकसंख्या सन १९९१ मध्ये १२५५७९९ एवढी असून सन २०११ मध्ये १७०००१८ एवढी आहे. यामध्ये सन १९९१ पुरुषांची संख्या ६४३१९० एवढी असून महिलांची संख्या ६१२६०७ एवढी आहे. सन २०११ मध्ये पुरुषांची संख्या ८७०८५० एवढी असून महिलांची संख्या ८२९१६८ एवढी आहे.
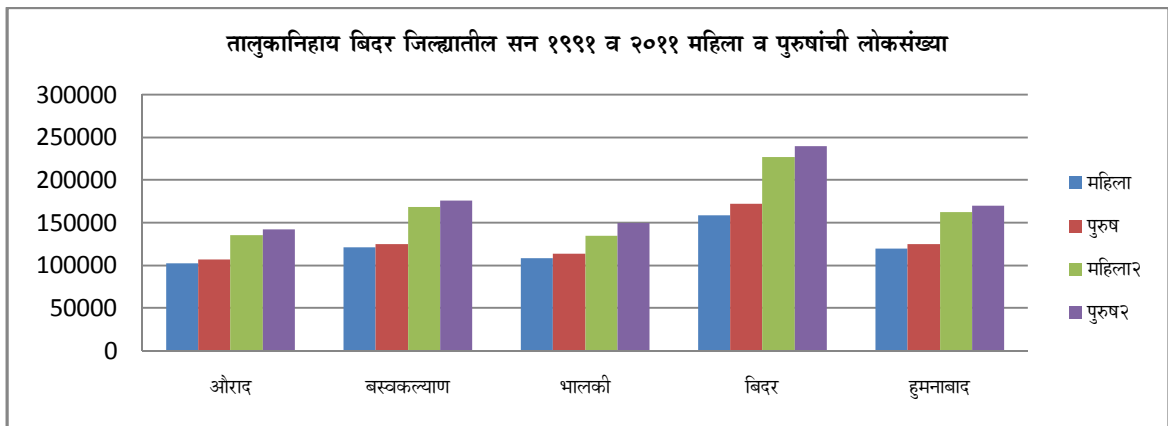


**आलेख क्रमांक ०२**

वरील सारणी आणि आलेखाचा अभ्यास केल्यास असे दिसून येते की, बिदर जिल्ह्यातील तालुकानिहाय पुरुष आणि महिलांच्या संख्येचा विचार केल्यास, बिदर तालुक्यामध्ये सर्वात जास्त सन १९९१ पुरुषांची संख्या १७२३६१ असून महिलांची संख्या १५९०९१ एवढी आहे. तर सन २०११ मध्ये पुरुषांची संख्या २३९६६६ एवढी असून महिलांची संख्या २२६९४८ एवढी आहे. औराद तालुक्यामध्ये सर्वात कमी सन १९९१ पुरुषांची संख्या १०६९२६ असून महिलांची संख्या १०३११४ एवढी आहे. तर सन २०११ मध्ये पुरुषांची संख्या १४२३०७ एवढी आहे. सन २०११ भालकी तालुक्यामध्ये सर्वात कमी महिलांची संख्या असून ती १३५३२९ एवढी आहे.

बिदर जिल्ह्यातील लोकसंख्या घनतेचा अभ्यास केल्यास असे दिसून येते की, बिदर तालुक्यामध्ये लोकवस्ती दाट आहे. बस्वकल्याण आणि हुमनाबाद तालुक्यामध्ये लोकवस्ती मध्यम आहे. तर औराद आणि भालकी तालुक्यात लोकवस्ती विरळ आहे.

## निष्कर्ष :

१)  बिदर जिल्ह्यातील लोकसंख्या घनतेचा अभ्यास केल्यास असे दिसून येते की, बिदर तालुक्यामध्ये लोकवस्ती दाट आहे. बस्वकल्याण आणि हुमनाबाद तालुक्यामध्ये लोकवस्ती मध्यम आहे. तर औराद आणि भालकी तालुक्यात लोकवस्ती विरळ आहे.

२)  बिदर तालुक्यामध्ये लोकसंख्येची घनता सर्वात जास्त असून सन १९९१ ला बस्वकल्याण तालुक्यात लोकसंख्येची घनता सर्वात कमी आहे. तर सन २०११ मध्ये औराद तालुक्यात लोकसंख्येची घनात सर्वात कमी आहे.

३)   बिदर तालुक्यातील विस वर्षाच्या कालावधीमध्ये लोकसंख्या घनतेमध्ये  १४५.९७ एवढी वाढ झाली असल्याचे दिसून येते. तर औराद तालुक्यामध्ये सर्वात कमी वाढ ५५.५७ एवढी वाढ झाली असल्याचे दिसून येते.

४)  बिदर हे जिल्ह्याचे ठिकाण असल्यामुळे येथे लोकसंख्येची घनता जास्त आहे.

## संदर्भ ग्रंथ :

१)  *Bidar District at a Glance*

२)  *https://en.wikipedia.org/wiki/Bidar_district.*

३)  *"A BASELINE SURVEY OF MINORITY CONCENTRATION DISTRICTS OF INDIA - Bidar (Karnataka)" (PDF). Retrieved 22 February 2015.*

४)  *लोकसंख्या भूगोल, डॉ. सुरेश फुले.*

५)  *लोकसंख्या भूगाले, डॉ. विठ्ठल घारपूरे, पिंपळापूरे अँण्ड कंपनी पब्लिशियर्स लातूर.*

# पर्यावरण प्रदुषण आणि मानवी आरोग्य : एक चिकित्सा

**प्रा. डॉ. जे.के. वाघमारे**

भूगोल विभाग

भाई किशनराव देशमुख महाविद्यालय,

चाकुर जि.लातूर

**प्रा. डी. व्ही. झिंजुर्डे**

भूगोल विभाग

श्री पंडितगुरु पार्डिकर महाविद्यालय

सिरसाळा ता. परळी वै. जि. बीड

**प्रस्तावणा :**

मानवी जीवन हे सर्वस्वीपने पर्यावरणावर अवलंबुन असते. पर्यावरण चांगले तर मानवी आरोग्य चांगले. सभोवतालचे पर्यावरण हे अनेक रोगांना प्रतिबंधीत करत असते. मात्र त्याच पर्यावरणातील घटक जर प्रदुषीत झाले तर ते अनेक रोगांना निमंत्रीत ही करत असते. मानवी विकासा बरोबर दिवसेन दिवस मानवाच्या वाढत्या हस्तक्षेपामुळे पर्यावरणाची गुणवत्ता दिवसेन दिवस ढासळत चालली आहे. मानवी आरोग्यावर त्याचा प्रत्यक्ष - अप्रत्यक्ष प्रभाव पडु लागला आहे. त्यामुळे नव नविन आजाराला सामोरे जावे लागत आहे. मानवाचे आरोग्य हे डॉक्टर च्या संख्येवर व मोठ्या मोठ्या दवाखाण्यावर अवलंबुन नसते तर तेअसते पर्यावरणाच्या संपन्नतेवर. पर्यावरण शुध्द व संपन्न ठेवणे हे मानवाचेच काम आहे.

प्रदुषित पर्यावरणाचा मानवी आरोग्यावर व्यापक परिणाम होत असतो. वाढती लोकसंख्या हवा, पाणी, अन्न, जमिण, ध्वनी यांचे होणारे प्रदुषण, ऋतुचक्रातिल बदल यामुळे मानवी आरोग्य प्रभावित होवुन नवनविन आजार उद्भवत असतात. एखाद्या आजारावर नियंत्रण मिळवण्यासाठी चांगले औषध शोधुन काडले तर काही काळानंतर नविनच आरोग्याची समस्या निर्माण होते. त्यामुळे चांगले स्वस्थ राखायचे असेल तर स्वच्छ पाणी, हवा अन्न मिळणे गरतेचे असते. बदलत्या पर्यावरणामुळे चक्रीवादळे, पुर, दुष्काळ येतात. यातुन उदभवनाऱ्या साथिच्या रोगाच्या गंभिर समस्या निर्माण होवुन हजारो लोक मृत्युमुखी पडतात.

**उद्देश :**

1. आरोग्याची संकल्पना स्पष्ट करणे.
2. पर्यावरण संवर्धनाचे मानवी जिवनातील महत्व अभ्यासणे.
3. बदलत्या पर्यावरणाचा मानवी आरोग्यावर होणारा परिणाम अभ्यासणे.

**गृहितके:**

1. पर्यावरणीय प्रदुषणाचा मानवी आरोग्यवर विपरीत परिणाम होत आहे.
2. पर्यावरणीय संतुलन आरोग्यासाठी आवश्यक आहे.
3. आरोग्य बद्दल लोकांना फारशी जाणिव नाही.

**संशोधन पध्दती :**

सदरिल शोधनिबंध लिहिण्यासाठी दुय्यम स्त्रोतांचा उपयोग करण्यात आला आहे. त्यात संदर्भ ग्रंथ, संशोधन पत्रिका, मासिके, वर्तमान पत्रे, पुस्तके, इंटरनेट यांचा वापर करण्यात आला आहे.

**विषय विवेचन :**

**आरोग्य म्हणजे काय ?**

आरोग्य म्हणजे शरिर आणि मन हे दोन्ही व्यवस्थित असतात. आणि आपण अपली नेहमिची कामे व्यावस्थित करु शकतो.

"आरोग्य म्हणजे केवळ आजार किंवा व्यंगाचा अभाव नव्हे तर आरोग्य म्हणजे शारिरीक, मानसिक आणि सामाजिक स्वास्थ होय".- जागतीक आरोग्य संघटना

मानवी जीवन पर्यावरणाने पुर्णपणे प्रभावित झालेले असते. मानवाने वेळोवेळी पर्यावरणाचा वापर जीवनात केलेला आहे. परंतु आलिकडील काळात पर्यावरण व साधन संपत्तीवरिल तान वाढत आहे. जगाची वाढती लोकसंख्या, कृषीतील बदलते तंत्रज्ञान, औद्योगीकरण, नागरीकरण यामुळे अनेक पर्यावरणीय गुणवत्ता दिवसेन दिवस खालावत आहे. हवा, पाणी, ध्वनी, अन्न, मृदा प्रदुषणाबरोबरच जागतीक तापमानवाढ, ओझोन क्षय, अम्ल वर्षा या सर्वांचा परिणाम मानवी आरोग्यावर होत आहे व मानवी आरोग्य प्रभावित होत आहे.

**हवेचे प्रदुषण आणि मानवी आरोग्य**

हवे मध्ये नैसर्गीक व मानवीय कारकामुळे अनेक अपायकारक वायु मिसळल्यामुळे हवेचे प्रदुषण होते. त्यास हवा प्रदुषण म्हणतात. वातावरणातील कार्बन डाय - ऑक्साईड, कार्बन मोनॉक्साईड, सल्फर डाय ऑक्साईड, हायड्रोजन सल्फाईड, हायड्रोतन फ्लोराईड, हायड्रोजन कार्बन, पारा, शिसे , कॅडियन, सिलिका, आर्यन ऑक्साईड यांचे संतुलीत प्रमाण बिघडते तेव्हा डोकेदुखी, डोळेदुखी, फुफुसाचे व ऱ्हादयाचे विकार शिसारी, अंगदुखी, श्वसन विकार, हडाचे व दाताचे विकार, फुफुसाचा कर्करोग, ॲलर्जी, दमा असे विविध आजाराचे प्रमाण वाढते.

जागतीक आरोग्य संघटनेच्या मते प्रत्येक वर्षी 2.4 लाख लोक प्रत्यक्ष वायु प्रदुषणामुळे मरतात. जास्त वायु प्रदुषित शहरातील जन्मदर कमी होवुन निमोनीया, दमा आणि श्वसनासंबंधी आजार वाढु शकतात.

**जल प्रदुषण व मानवी आरोग्य :**

पाणी हे जीवन आहे. औद्योगीकरणाबरोबर विविध कारणांनी पाणी प्रदुषीत होत आहे. पाण्यात मिसळणाऱ्या विविध अपायकारक घटकामुळे पाणी प्रदुषीत होवुन कॉलरा, विषमज्वर, अमांश, कावीळ यासारखे आजार होवुन उलटी, अतिसार, पोटदुखी, डायरिया असे प्राणघातक आजार होतात. 1990 च्या दशकात आर्सोनील चे प्रमाण वाढले व 1998 मध्ये अतिसारामुळे 2.8 लाख लोकांना प्राण गमवावे लागले.

दुष्काळी भागात पाण्याची भिषण समस्या निर्माण झाली आहे. या भागात पाण्याचे योग्य संबर्धन व व्यवस्थानपण होणे गरजेचे आहे सध्या अस्तित्वात असलेल्या पाण्याच्या आयोग्य वापरामुळे पाण्याची नासाडी होत आहे. पाण्याच्या प्रदुषणाकडे दुर्लक्ष होत आहे. पाणी साठे व पाण्याद्वारे पसरणारे रोग परस्पर संबंधीत आहेत. याकडे दुर्लक्ष होत आहे व यातुन मोठी आरोग्याची समस्या निर्माण होत आहे.

दुषित पाण्यामुळे प्रत्येक दिवशी 14000 लोक मरत आहेत. त्यातील 580 लोक भारतीय असतात. चिन मध्ये 90% पाणी दुषीत आहे. भारतात 3.6 कोटी लोक दुषित पाणी पितात त्यामुळे लहान मुलांच्या वाढीवर परिणाम झाला आहे.

## अन्न पदार्थातील भेसळ व आरोग्य :

रासायनिक घटकांनी प्रदुषित झालेल्या अन्नामुळे मानवी आरोग्य विषयक समस्या निर्माण होत आहेत. अन्नातील विशेषत: डाळी , मसाले, खाद्य तेलातीलच भेसळ, शेतीत वापरली जाणारी रसायणे हे अन्न पदार्थात मिसळल्यास आरोग्य समस्या उदभवु शकतात.

अन्नात मिसळणाऱ्या सालमोनेला या जिवानुमुळे होणाऱ्या विषबाधेचे प्रमाण गेल्या 25 वर्षात वाढले आहे. कॉलरा या आजाराचे प्रमाण वाढले आहे. कोलो या जीवानुमुळे अतिसाराचे प्रमाण वाढले आहे. लिस्टेरिया या जीवानुमुळे गर्भपात व नवजात शिशुमध्ये अनेक विकृती निर्मीती होतात. भारतातील पंजाब, हरियाना ही राज्य कृषी मध्ये आग्रेसर राज्य आहेत येथे शेतीत. रासायनिक घटकांचा वापर सर्वात जास्त होतो. तेथेच भारतातील सर्वात जास्त कर्करोगाचे रुग्न आढळत आहेत.

## ऋतू बदल व मानवी आरोग्य :

ऋतू बदल हा निसर्गाचा नियम या ऋतू बदलानुसार विविध संसर्गजन्य व असंर्गजन्य रोगाच्या साथी पसरतात. पाऊस हा उत्साह घेवुन येणारा ऋतू परंतु त्या बारोबर तो विविध व्याधीही घेवुन येतो. पावसाळ्यात सर्दी, खोकला त्वचेचे रोग, डोळे येणे, अतिसार मलेरिया, या सारखे आजार पसरतात. हिवाळा हा आरोग्या दायी ऋतू परंतु यातही श्वसनाचे आजार जडतात. मधुमेह, मुत्र पिंड, वात या सारखे आजार उदभवतात तर उन्हाळयामध्ये अंगदुखी , सांधेदुखी, दाह सारखे आजार जडतात.

## पर्यावरणीय संकटे, अपत्ती व मानवी आरोग्य :

पर्यावरणीय संकटामध्ये भुकंप, ज्वालामुखी, अवर्षन, अतिवृष्टी, वैश्वीक तापमान वाढ, ओझोन क्षय, अम्ल पर्जण्या याचा समावेश होतो. यांच्या मुळे मोठया प्रमाण प्राणहानी होते. त्या नंतरही विविध आजारांना सामोरे जावे लागते. ओझान क्षयामुळे त्वचेच्या कर्करोगाचे प्रमाण वाढले आहे. अम्ल पर्जण्यामुळे श्वसनाचे आजार दमा ऱ्हदयरोग बळावतात.

तसेच अण्वीक अपघातात किरणोत्सर्गी पदार्थ वातावरणात मिसळतात. व विविध रोग पसरतात 26 एप्रिल 1986 मध्ये युक्रेन मध्ये अणुभट्टी वितळली आणि कर्करोगाचे प्रमाण वाढले. 6 ऑगष्ट 1945 ला जपानच्या हिरोशिमा वरिल अणुबॉमच्या हल्याचे परिणाम आजही जन्मास येणाऱ्या आपत्यावर झालेले दिसुन येतात.

## निष्कर्ष :

1. मानवास आरोग्य बद्दल समज नाही.
2. हवा, पाणी, ध्वनी प्रदुषणा मुळे मानवी आरोग्य धोक्यात आले आहे.
3. नौसर्गीक आपत्तीचे संकट सातत्याने वाढत आहे.
4. आरोग्यावर भविष्यात होणाऱ्या परिणामाचा सामना करण्यासाठी योग्य डावपेचाचा विचार करणे गरजेचे आहे.

## उपाय योजना :

पर्यावरणीय बदलाचा आरोग्यावर होणारा परिणाम लक्षात घेता खालील उपाययोजनाची अमलबजावणी करणे गरजेचे आहे.

1. पर्यावरणीय जनजागृती प्रभावीपणे करणे गरजेचे आहे.
2. हवा, पाणी, ध्वनी प्रदुषणावर प्रभावी नियंत्रण ठेवावे.
3. पर्यावरणाचे महत्व पटवुन देवुन फायदे तोटे स्पष्ट सांगावे.
4. अन्न सुरक्षा व शुध्द अन्नाचा पुरवठा करण्यासाठी प्रभावी उपाय योजना आखणे गरजेचे आहे.

## संदर्भ ग्रंथ :

1. *पर्यावरणशास्त्र*       :- ए.बी.सवदी - पी.एस.कोळेकरर
2. *पर्यावरण*       :- प्रा. जवाह चौधरी - प्रा. मेजर गोडसे
3. *पर्यावरण शास्त्र*       :- एरक मरुचा
4. *पर्यावरण शास्त्र*       :- प्रा. बी. पी. वांगीकर
5. *वायु प्रदुषण*       :- डॉ. किशोर पवार
6. *लोकराज्य*       :- नोव्हेंबर 2002
7. *निसर्ग आणि पर्यावरन प्रदुषण*       :- भा.प. जोशी अ.ना. चौधरी

# नैसर्गिक आपत्ती आणि व्यवस्थापन : एक अभ्यास

**भांगे संगमेश्वर ज्ञानोबा**
संशोधन विद्यार्थी
श्रीहावगीस्वामी महाविद्यालय, उदगीर

**प्राचार्य डॉ. एस. एच. गोणे**
मार्गदर्शक
उज्वल ग्रामीण महाविद्यालय, घोणसी

**प्रस्तावना :**

मानवनिर्मित आणि निसर्गनिर्मित असे आपत्तीचे दोन प्रकार आहेत. विशेषतः हवामानातील बदलामुळे नैसर्गिक आपत्तीत आकस्मिकपणे उद्भवते. त्यामुळे अशा नैसर्गिक आपत्तीत जीवित व वित्त हाणी होण्याची शक्यता नाकारता येत नाही. भूकंप, महापूर, चक्रीवादळ, अतिवृष्टी हया सारख्या विविध सर्व घटना नैसर्गिक आपत्तीमध्येच मोडणाऱ्या आहेत अशा आपत्तीमध्ये होणारी जीवित व वित्त हानी टाळयासाठी आपत्ती व्यवस्थापन प्राधिकरणाची स्थापना करण्यात आली आहे. केंद्र शासनाने २००५ मध्ये आपत्ती व्यवस्थापन कायदा पारित करण्यात आलेला आहे. निसर्ग कोपातून निर्माण झालेल्या आपत्तींचा समावेश नैसर्गिक आपत्तीमध्ये होत असल्याने त्या आपत्तीच्या व्यवस्थापनात दुरदृष्टी, भविष्यकालीन संकटे आणि पर्याय उपायोजनांचा जास्त विचार करणे आवश्यक आहे त्यामुळे आपत्ती व्यवस्थापनात संकट पूर्व व्यवस्थापन, संकट काळातील व्यवस्थापन आणि संकटोत्तर व्यवस्थापन या तिन्ही परिस्थिती विचारात घेऊन नियोजन करणे आवश्यक आहे.

**उद्दिष्टे:**

१. आपत्ती व्यवस्थापनाच्या नियोजनाचा अभ्यास करणे.
२. आपत्ती व्यवस्थापनाच्या संदर्भात शासनाच्या भुमिकेचा आढावा घेणे.
३. आपत्ती व्यवस्थापनातील घटकाचा अभ्यास करणे.

**विषय विवेचन :**

आपत्ती व्यवस्थापनाचा अभ्यास करत असताना खालील घटक महत्वपूर्ण ठरतात.

**१. आपत्ती व्यवस्थापनाचे नियोजन :**

आपत्ती व्यवस्थापनाचे नियोजन करत असताना वैज्ञानिक व तांत्रिक दृष्टिकोनातून नियोजन करण्याची आवश्यकता आहे. उदा. त्सुनामी, भूकंप अशा क्षेत्रामध्ये भूकंपाची यंत्र, उपकरणे, कॅमेरे इ. बसविणे आवश्यक असते. आवर्षण, महापूर या सारख्या आपत्तीच्या पूर्वी तांत्रिक दृष्टया नियोजन करुन संकटे टाळता येतात. त्यामुळे त्या संकटाची तीव्रता कमी करता येते व नैसर्गिक आपत्तीवर यश मिळविणे सहज शक्य होते. अवर्षण ग्रस्त भागात किंवा नदी, धरणाच्या परिसरात खोलगट भागातील मानवी वस्त्या हया सुरक्षित स्थळी स्थलांतर करणे हा नियोजनाचा मार्ग आहे. असे म्हणने काही वावगे ठरणार नाही. पूर, महापूर, वादळे, चक्रीय वादळे, भूकंप यासारख्या आपत्ती येण्या आगोदर पूर्व प्रयत्न साधने, समाज व त्या प्रदेशाचा यामध्ये समन्वय साधने ही व्यवस्थापनाची एक महत्वपूर्ण जबाबदारी आहे.

**२. शासकीय धोरणः**

नैसर्गिक आपत्ती व्यवस्थापनामध्ये शासकीय धोरण किंवा शासकीय भूमिका ही संकटे टाळण्यासाठी कशी प्रयत्नशील राहतील हे महत्वाचे आहे. धोरणे ठरवित असताना शासकीय हस्तक्षेपातील अंतर्गत व बर्हिगत घटकांचा विचार करणे आवश्यक आहे. शासकीय घटकांचा प्रभाव लक्षात घेऊनच आर्थिक धोरणे आणि भूमीका निश्चित होत असतात. त्यात नियोजनात्मक, संरक्षणात्मक, विकासात्मक, संवर्धनात्मक आणि कायदेशीर भूमीका अति महत्वाच्या असतात.

नैसर्गिक आपत्ती किंवा संकटाच्या विध्वंसतेचा पुरेपूर अंदाज येत नाही. पण काही प्रमाणात औद्योगिक क्रांतीमुळे अद्ययावत उपकरांनी आपत्तीची माहिती पूर्वीच मिळु शकते. मात्र वैज्ञानिक, नैसर्गिक व्यवस्थेनुसार प्राणीमात्रांना, पशुनां या संकटाची माहिती अधीच प्राप्त होत असते. उदा : अलीकडच्या काळातील त्सुनामी लाटांनी दक्षिन आशियात जो हा हाःकार माजविला त्याचा अभ्यासअंती हे सत्य स्पष्ट उघड झालेले आहे. तसेच नैसर्गिक आपत्तीमध्ये शासकीय धोरणाच्या बाबतीत सांगावयाचे झाले तर ३० सप्टेंबर १९९३ रोजी लातूर व उस्मानाबादच्या महाभंयकर भूकंपाचा सामना तेथील ग्रामस्ताना करावा लागला पण मुख्य सचिवांनी ती परिस्थिती सुरळीत व नियोजनबध्द करण्याचा प्रयत्न मोठया प्रमाणात केला आहे.

**३. आपत्ती व्यवस्थापनातील घटक :**

नैसर्गिक आपत्ती व्यवस्थापन हा कोणत्याही एका व्यक्तीचा किंवा विभागाचा भाग नाही. त्यासाठी सर्वांनी मिळून आपत्ती विषयी विचार करणे, कृती व जागृकता बाळगण्याची गरज आहे. त्यासाठी वेगवेगळया आपत्तीचे ज्ञान असणे आवश्यक आहे. आपत्ती व्यवस्थापनामध्ये बहूदा खालील विविध विषय व त्याचे घटक निगडीत आहेत.

**१. अर्थशास्त्र**

आपत्ती व्यवस्थापनाच्या संदर्भामध्ये वेगवेगळया क्षेत्रामध्ये नवनवीन योजना, बांधकाम, पूर्णवसन, राष्ट्राचे अगणित नुकसान, शासकीय कार्यालयाचे नुकसान, वास्तू इ. उभारण्यासाठी व्यवस्थापनात अर्थशास्त्रीय मार्गदर्शन आणि अभ्यास आवश्यक असते. देशाचा विकास आणी त्याचा आर्थिक निधी जोपासणे व्यवस्थापनाच्या दृष्टीने महत्वाचे असते.

**२. भौतिकशास्त्र**

भौतिकशास्त्रातील गुरुत्वाकर्षण, चुंबकार्षण इ. आपत्तीस जबाबदार राहू शकतात. कोणत्याही आपत्ती मागे त्या शक्तीत कोणती भौतिकता दडली आहे हयाचा अभ्यास करणे आवश्यक आहे. उदा. एखाद्या ठिकाणी जमीन खचते किंवा इमारत कोसळते त्यावेळी त्या

गुरुत्वाकर्षणाची सुप्त शक्ती दडलेली असते. त्यामुळे व्यवस्थापनामध्ये त्याचा विचार करणे आवश्यक असते. निरनिराळया उपकरणामध्ये, यंत्रामध्ये ज्या नोंदी होतात त्या नोंदी भौतिकशास्त्राला अनुसरुनच असतात.

## ३. रसायनशास्त्र

आपत्ती निर्मितीमध्ये अनेक प्रकारच्या रासायनिक घटक जबाबदार असतात. काही रसायनांच्या संयुगातून आपत्ती निर्मिती होते. उद्योग धंद्यातील क्रिया प्रक्रिया, वायू गळती, विषारी वायू निर्मिती इत्यादी परिस्थितीमध्ये आपत्तीचा जन्म होतो.
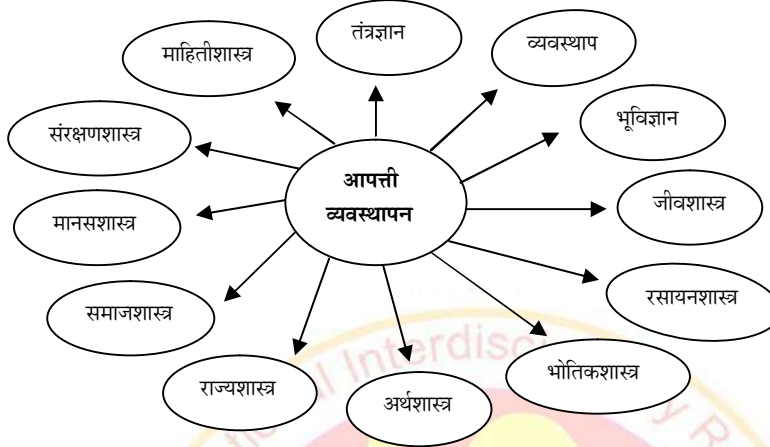


## ४. जीवशास्त्र

आपत्ती प्रत्यक्ष आणि अप्रत्यक्ष संबंध सजीवांशी असतो. सजीवांना संरक्षण मिळावे, त्यांच्या जातीप्रजाती कायम राहाव्यात हा पर्यावरणाचा उद्देश असतो. आपत्तीला कारणीभूत ठरणाऱ्या निरनिराळया विषाणु, जीवाणू किंवा रोगजंतूचा अभ्यास आणि त्यावरील उपाय जीवशास्त्राचे अभ्यास घटक आहेत.

## ५. भूविज्ञान

आपत्ती संदर्भातील बहुतांशी आपत्ती ही भूविज्ञाशी संबंधित आहे. नैसर्गिक आपत्ती किंवा मानवनिर्मित आपत्तीची व्याप्ती किंवा तीव्रता भूविज्ञानाच्या संरचनेवर अवलंबून असते. उदा. भूकंप, ज्वालामुखी, त्सुनामीलाटा, आवर्षण, चक्रिय वादळे, पूर-महापूर, दुष्काळ, आग इत्यादी आपत्तीला भौगोलिक घटक जबाबदार असतात.

## ६. व्यवस्थापन

आपत्तीच्या काळात आपत्तीचे निवारण करण्याची फार मोठी गरज असते. आपत्तीच्या याकाळात गतीमानता आवश्यक असते. आपत्ती व्यवस्थापनात बचाव कार्य, औषधी, स्थलांतर, डॉक्टर पथके, अन्नाची पाकिटे,मदत कार्य, पुनर्वसन, पुननिर्माण आणि सुधारणा इत्यादीची व्यवस्था करणे गरजे असते.

## ७. तंत्रज्ञान

आपत्ती व्यवस्थापनासाठी किंवा निवारणासाठी अत्याधुनिक तंत्रज्ञानाची आवश्यकता असते. आपत्ती व्यवस्थापनातील वेगवेगळया भागातील योजना, आराखडा, बांधकाम, भूरचना, विस्कळीत झालेले जनजीवन सुधारण्यासाठी नवनवीन तंत्रज्ञानाची आवश्यकता असते.

## ८. माहितीशास्त्र

आपत्ती व्यवस्थापनात माहितीशास्त्र अत्यंत उपयुक्त आहे. कारण नैसर्गिक आपत्तीची परिस्थिती कशी आहे हयाची माहिती मिळणे आवश्यक असते. यावरुनच कोणत्याही आपत्तीचे नियोजन करण्यास मदत होते. आपत्ती व्यवस्थापना बरोबर मदत कार्य, लोकांचे संरक्षण, सामाजिक संस्था, सरकारी संस्था, पोलीस दल, लष्कर, वैद्यकीय सेवा अशा विविध संघटनाची मदत कार्यासाठी महत्वाची भूमीका असते.

## ९. संरक्षणशास्त्र

आपत्तीच्या काळात आपत्ती व्यवस्थापनाचा मुख्य उद्देश जीवित हाणी व वित्त हाणी यांचे संरक्षण करण्याचा असते. संरक्षणशास्त्रात निरनिराळया मार्गाचा, योजनांचा, विविध सुविधा अभ्यास समावलेला आहे.

## १०. मानसशास्त्र

अचानक उदभवलेल्या आपत्तीमुळे मानवी जीवन विस्कळीत होते व त्याचा परिणाम मानवाच्या आर्थिक, सामाजिक, हया घटकावर होतो. व मानवी मनवर मोठा ताण व मानसीक संतुलन बिघडते त्यांना त्या मनोविकारातून बाहेर येणे आवश्यक आहे. आपत्तीमुळे झालेले नुकसान भरुन निघत नाही. मानवाच्या मनातील भिती, दडपण, दहशत, स्वार्थ, भविष्यकाळीतल कल्पना याचा मानवी मनवर विपरित परिणाम होणार नाही म्हणून आपत्ती व्यवस्थापनात मानसशास्त्रीय विचारांचा अभ्यास करणे आवश्यक आहे.

## ११. समाजशास्त्र

आपत्ती काळात बेशिस्तपणा, गर्दीचा फायदा, लोटालोटी, चेंगराचेंगरी होऊन वेगवेगळया आपत्ती उदभवतात. त्यामुळे आपत्ती व्यवस्थापनात समाजशास्त्राची भूमिका, अभ्यास याकडे दुर्लक्ष करुन चालन नाही. व्यवस्थापनात समाजशास्त्र आवश्यक आहे.

## १२. राज्यशास्त्र

राष्ट्राचा विकास आणि संरक्षण त्याच्या राजनितीशी संबंधीत असतो. प्रशासकीय अधिकारी, नेते किंवा प्रशासकीय पध्दती या सर्वांचा संबंध देशाच्या विकासाशी असतो. राजकीय दृष्टीकोनातून आपत्तीसाठी सर्वांनी एकत्रित सहकार्य करणे अत्यावश्यक असते. व ते अपेक्षित ठेवूनच व्यवस्थापन कार्यरत होते.

**सांराश :**

भूकंप, महापूर, चक्रीवादळ यासारख्या सर्व घटना नैसर्गिक आपत्तीत मोडतात. आपत्तीमध्ये होणारी जिवीत व वित्त हानी टाळण्यासाठी आपत्तीव्यवस्थापनात प्राधिकरणाची स्थापना करण्यात आली. आपत्तीचे नियोजन करत असताना वैज्ञानिक व तांत्रिक दृष्टीकोनातून नियोजन करण्याची आवश्यकता आहे. नैसर्गिक आपत्तीच्या व्यवस्थापनामध्ये शासकीय धोरणाची महत्वाची भूमिका आहे. तसेच आपत्ती व्यवस्थापनाचे घटक महत्वपूर्ण असतात. आपत्ती व्यवस्थापनामध्ये जाणिवजागृती महत्वाची आहे.

**संदर्भग्रंथ :**

१. चौधरी ण.पी. (२०१३) संपूर्ण पर्यावरणशास्त्र, प्रशांत पब्लिकेशन, जळगाव
२. डॉ. नागतोडे पी.एम. (२०१२) पर्यटन भूगोल, विद्याप्रकाशन, नागपूर
३. आर्थिक भूगोल – डॉ. रमेश मुगावे
४. *Vikaspedia.in*

# राणीसावरगाव ग्रामवस्तीतील कृषी उत्पादनावरील हवामान बदलाच्या परिणामाचा भौगोलिक अभ्यास

प्रा. डॉ. मुळे अंबादास मारोतीराव

भूगोल विभाग

महात्मा फुले महाविद्यालय, किनगाव

प्रा. डॉ. राठोड सुनिल धोंडीराम

भूगोल विभाग

महात्मा गांधी महाविद्यालय, अहमदपूर

## प्रस्तावना (Introduction):

अलिकडच्या काळातील हवामान बदल या समस्येमुळे पिकांचे व शेतीचे मोठे नुकसान होत आहे. जमिनीची निर्मिती होत असताना हवामान या घटकाचा फार मोठा वाटा असतो. हवामानातील ऊन, वारा, पाऊस, सुर्यप्रकाश, आर्द्रता, तापमान इ. घटकांचा जमिनीवर सतत प्रभाव पडत असतो. याचा परिणाम जमिनीच्या सुपिकतेवर होवून पिक उत्पादनातील वाढ व घट होण्याची क्रिया घडत असते. ऐतिहासिक काळातील मानवाची प्रगती कित्येक प्राकृतीक व सामाजिक घटकांच्या बाबतीत गोगल गायीच्या गतीसारखी होती. परंतु पाषाण युगामध्ये मानव शिकार व अन्न गोळा करण्यात कुशल बनला. कृषीचा उगम कधी झाला याविषयी शास्त्रज्ञामध्ये मतभेद असले तरीही इ.सन पूर्व १४०० ते १२०० च्या दरम्यान झाला असावा असे ब्राउनचे मत आहे. मानव जंगल, पाणी, मृदा, हवामान या घटकांचा विचारी करून वस्ती करून राहू लागला. जमिनीची मशागत करून विविध पिकांचे उत्पादन घेवू लागला. परंतू दिवसेंदिवस वाढत चाललेल्या प्रदूषणामुळे हवामानात बदल होवून त्याचा परिणाम मानवी आरोग्यावर व वनस्पती पिक उत्पादनावर होत आहे.

## अभ्यास क्षेत्र (Study Area):

संशोधन कार्यासाठी परभणी जिल्ह्यातील गंगाखेड तालुक्यातील राणीसावरगाव ग्रामीण वस्तीचा अभ्यास क्षेत्र म्हणून निवड केली आहे. हा भाग सरासरी डोंगराळ असून काळ्या मृदेचे प्रमाण कमी आहे. तर मध्यम, भूरकट, तांबड्या मृदेचे प्रमाण जास्त आहे. त्यामुळे पावसाचे पाणी, तलाव, विहीरीवर शेती अवलंबून आहे. तेथील सरासरी तापमान किमान १२° से.ग्रे. ते १४° से.ग्रे. इतके असते व कमाल तापमान ४०° से.ग्रे. ते ४२° से.ग्रे. इतके असते. तेथिल अक्षवृत्तीय विस्तार १८° ५१' ३८'' उत्तर अक्षवृत्तर व रेखावृत्तीय विस्तार ७६° ५१' ५६'' पूर्व रेखावृत्त इतका आहे.

## अभ्यासाची उद्दिष्ट्ये (Objectives):

''पिक उत्पादनातील वाढ व घट यांच्यावरील हवामान बदलाचा परिणाम अभ्यासणे.''

## संशोधन पध्दती (Research Methodology):

परभणी जिल्हयातील गंगाखेड तालुक्यातील राणीसावरगाव ग्रामीण वस्तीतील शेतीविषयक अभ्यास करीत असताना सर्वेक्षण पध्दतीचा वापर करून मुलाखत व प्रश्नावलीच्या सहाय्याने माहिती संकलित केली आहे. त्यासाठी नमुना निवड पध्दतीचा वापर करून निवडक २० शेतकऱ्यांची निवड केली असून इ.सन २०१३-१४ ते २०१७-१८ या पाच वर्षाच्या कालावधीतील मुग, सोयाबीन, कापूस, ज्वारी, तूर इत्यादी पिकांच्या झालेल्या उत्पादनांचा आढावा घेण्यात आला आहे.

**राणीसावरगाव ग्रामीण वस्तीतील २० शेतकऱ्यांचे उत्पादन (टक्केवारीमध्ये)**

| अ.क्र. | पिके | २०१३-१४ | २०१४-१५ | २०१५-१६ | २०१६-१७ | २०१७-१८ | सरासरी |
|--------|------|---------|---------|---------|---------|---------|--------|
| १ | मुग | ०.८०% | ०.६८% | १.००% | १.४०% | ०.९१% | २.१०% |
| २ | सोयाबीन | १२.२८% | १६.४६% | १८.७१% | २१.००% | २४.८०% | ३०.४०% |
| ३ | कापूस | १३.९२% | १९.६८% | २७.४०% | ३६.०७% | ४०.०१% | ४९.९३% |
| ४ | ज्वारी | ३.००% | २.४८% | ४.२०% | ५.५०% | ६.५०% | ८.८७% |
| ५ | तूर | १.३०% | ३.७०% | ५.४३% | ४.५०% | ५.८०% | ८.६०% |
| | सरासरी | १४.४४% | ११.७६% | १३.४६% | २९.९२% | ३०.४२% | १००% |

स्त्रोत :- संशोधकाने संकलित केलेल्या अधिकृत माहितीवर आधारीत.

वरील तक्त्यात राणीसावरगाव ग्रामवस्तीतील २० शेतकऱ्यांचे इ.सन २०१३-१४ ते २०१७-१८ या पाच वर्षाच्या कालावधीतील पिकांचे उत्पादन टक्केवारीमध्ये दर्शविलेले दिसून येते. हवामान बदलाचा शेतीतील पिकांच्या उत्पादनावर झालेला परिणाम स्पष्ट करण्यात आलेला आहे.

## १.मुग (Mung Bean):

इ.सन २०१३-१४ ते २०१४-१५ या कालावधीत मुग पिकांचे उत्पादन ०.८० टक्के व ०.६८ टक्के इतके कमी झाले आहे. नंतर त्यामध्ये वाढ होवून इ.सन २०१५-१६ व २०१६-१७ साली १.०० टक्के व १.४० टक्के इतके झाले आहे. आणि २०१७-१८ ला घट होवून ०.९१ टक्के इतके मुग पिकाचे उत्पादन झाले आहे. तर या कालावधीत पावसाचे प्रमाण कधी कमी कधी जास्त होवून त्याचा परिणाम मुग या पिक उत्पादनावर झालेला आहे.

## २. सोयाबीन (Soyabean):

राणीसावरगाव ग्रामवस्तीतील सोयाबीन पिकाच्या उत्पादनाचा विचार केला असता इ.सन २०१३-१४ साली १२.२८ टक्के व २०१४-१५ ला १६.४६ टक्के इतके उत्पादन झाले आहे. नंतरच्या काळात पावसाच्या प्रमाणात समतोल राखल्या कारणामुळे सोयाबीन

पिकाच्या उत्पादनात वाढ झालेली दिसून येते. इ.सन २०१५-१६ व २०१६-१७ ला १८.७१ टक्के, २१.०० टक्के इतके उत्पादन झाले आहे. आणि २०१७-१८ साली २४.८० टक्के सोयाबीन पिकांचे उत्पादन झालेले दिसून येते.

### ३.कापूस (Cotton):

राणीसावरगाव या ग्रामवस्ती सभोवतालचा प्रदेश तांबड्या मृदेचा डोंगराळ असल्याकारणामुळे कापसाच्या पिकांचे प्रमाण मध्यम स्वरूपाचे आहे. इ.सन २०१३-१४ साली १३.९२ टक्के इतके आहे. तर २०१४-१५ ला १९.६८ टक्के इतके कापसाचे उत्पादन झाले आहे. आणि २०१५-१६ साली १३.९२ टक्के आहे. परंतु त्यामध्ये वाढ होऊन २०१६-१७ ला ३६.०७ टक्के झाले आहे. इ.सन २०१७-१८ साली ४०.०१ टक्के इतके कापसाचे उत्पादन झाले आहे. इतर पिकापेक्षा हवामान बदलाचा परिणाम कापूस या पिकावर लगेचच होत असतो.

### ४.ज्वारी (Jowar):

या भागातील लोकांचे मुख्य अन्न म्हणून वापरले जाणारे पिक म्हणजे ज्वारी हे आहे. पावसाचे प्रमाण चांगले असेल तर या पिकाचे उत्पादन चांगले होते. इ.सन २०१३-१४ साली ३.०० टक्के इतके उत्पादन या पिकाचे होते, नंतर त्यामध्ये घट होऊन २०१४-१५ साली २.४८ टक्के इतके कमी झाले आहे. आणि २०१५-१६ ला ४.२० टक्के उत्पादन ज्वारी पिकाचे झाले आहे. तसेच २०१६-१७ व २०१७-१८ ला त्यामध्ये समतोल राखून अनुक्रमे ५.६० टक्के, ६.५० टक्के उत्पादन ज्वारी पिकाचे झाले आहे.

### ५. तूर (Tur):

तूर हे पिक जास्त कालावधी लागणारे पिक आहे. या पिकाचे उत्पादन इ.सन २०१३-१४ साली १.३० टक्के इतके कमी आहे. नंतरच्या काळात त्यामध्ये वाढ होऊन इ.सन २०१४-१५ ला ३.७० टक्के व २०१५-१६ ला ५.४३ टक्के इतक्या प्रमाणात वाढ झालेली दिसून येते. नंतर इ.सन २०१६-१७ साली पावसाच्या प्रमाणात घट झाल्यामुळे या पिकाच्या उत्पादनातही घट झालेली दिसून येते, ती ४.६० टक्के इतके झाले आहे. आणि इ.सन २०१७-१८ ला ५.८० टक्के तूर या पिकाचे उत्पादन या भागातील शेतकऱ्याचे झालेले आहे.

### निष्कर्ष (Conclusion):

राणीसावरगाव ग्रामीण वस्तीतील २० शेतकऱ्यांचे विविध पिकांचे उत्पादन पाच वर्षाच्या कालावधीतील मुग या पिकाचे कमीत कमी उत्पादन ०.८० टक्के आहे. तर जास्तीत जास्त १.४० टक्के आहे. त्यामध्ये घट होऊन ०.९१ टक्क्यापर्यंत आले आहे. तसेच सोयाबीन पिकांचे उत्पादन कमीत कमी १२.२८ टक्के आहे. व जास्तीत जास्त २४.८० टक्के आहे. कापूस या पिकाच्या उत्पादनात दिवसेंदिवस वाढ झालेली आहे. कापूस पिकाचे कमीत कमी उत्पादन १३.९२ टक्के आहे. जास्तीत जास्त उत्पादन ४०.०१ टक्के आहे. ज्वारी पिकाच्या उत्पादनात घट झालेली आहे. ज्वारी पिकाचे कमीत कमी उत्पादन २.४८ टक्के व जास्तीत जास्त उत्पादन ६.५० टक्के झाले आहे. तूर या पिकाचे कमीत कमी उत्पादन १.३० टक्के आहे व जास्तीत जास्त उत्पादन ५.८० टक्के आहे. तूर पिकाच्या उत्पादनात ४.६० टक्क्यापर्यंत घट झालेली आहे.

### संदर्भ (References):

१. परभणी जिल्हा - सामाजिक व आर्थिक समालोचन (२०१३-१४ ते २०१७-१८).
२ .तालुका कृषी अधिकारी कार्यालय, गंगाखेड.
३. Ali Mohamad (1978)-"Study in Agricultural Geography'' Rodesh publication, New Delhi.
४. www.parbhani.nic.in
५. http://mahades.maharashtra.gov.in

# जलसंसाधन व्यवस्थापन – काळाची गरज

प्रा.शेलार मोहन किसन

भूगोल विभाग

कला व वाणिज्य महाविद्यालय

राहू, ता.दौंड, जि.पुणे (महाराष्ट्र)

प्रा.डॉ. खाकरे राजेश्वर ज्ञानोबा

भूगोल विभाग प्रमुख

जयक्रांती कला व वाणिज्य महाविद्यालय

लातूर, जिल्हा-लातूर (महाराष्ट्र)

**सारांश :**

    पृथ्वीवर उपलब्ध असलेल्या विविध नैसर्गिक साधन संपत्ती पैकी पाणी ही महत्वाची नैसर्गिक साधन संपत्ती आहे. पाणी हा मानवाच्या जीवनाचा आधार असून गावे, तालुके, जिल्हा, राज्य, देश इ. समृद्धी पाण्याच्या साठ्यावर अवलंबून असते. मानवाच्या अन्न, वस्त्र, निवारा या मूलभूत गरजांमध्ये जल साधन संपदेला महत्वाचे स्थान आहे. प्रस्तुत शोध निबंधात जल साधन संपत्ती व्यवस्थापनाचा अभ्यास केला आहे. आधुनिक काळात जलव्यवस्थापन हा एक ज्वलंत प्रश्न असून भारतातील ५ लाख खेड्यांपैकी ७५% खेडेगावात उन्हाळा ऋतूत पिण्याच्या पाण्याची समस्या जाणवते. अलीकडे ४-५ वर्षांपासून पाणी समस्या हा गंभीर प्रश्न निर्माण झाला आहे. जगातील ६.८ अब्ज लोकसंख्येपैकी १.२ अब्ज लोक पाणी टंचाईचा सामना करीत आहेत. आगामी ३० वर्षात जगातील 1/3 लोकसंख्या ही पाण्याच्या शोधात असेल व भविष्यात पाण्यासाठी युद्ध होतील असा अंदाज युनिसेफ, जागतिक पाणी परिषद, तज्ञ व्यक्ती यांनी दिला आहे.

    भारतात वस्तूंचे उत्पादन वाढत असताना जीवनासाठी आवश्यक असणाऱ्या पाण्याची दरडोई उपलब्धता कमी–कमी होत आहे. १९४७ मध्ये प्रत्येक व्यक्तीमागे उपलब्ध असणारे ६ हजार घनमीटर पाणी आज २ हजार घन मीटर पर्यंत कमी झाले आहे. त्यामुळे जल साधन संपत्तीचे काळजीपुर्वक व्यवस्थापन करणे ही एक काळाची गरज बनली आहे.

    सदर शोध निबंधात पाण्याची उपलब्धता, पाण्याचे महत्व, वैशिष्ट्ये, जागतिक व राष्ट्रीय पातळीवर पाण्याची सध्य स्थिती, पाण्याचा वापर, पाणी व्यवस्थापनासाठी उपाय इ. विविध बाबींवर चर्चा केली आहे.

**बीज संज्ञा :** साधन संपदा, जलसाधन संपदा, जल व्यवस्थापन इ.

**प्रस्तावना :**

    निसर्गाने मानवाला जलसंपदा ही अमुल्य अशी देणगी बहाल केली आहे. पृथ्वीचा ७१% भाग (३६१ दशलक्ष चौ.कि.मी.) भाग जलभागांनी/महासागर–समुद्र यांनी व्यापला आहे. जगाची वाढती लोकसंख्या, महानगरे, औद्योगिकरण यामुळे पाणी टंचाई निर्माण होत आहे. पाण्याची उपलब्धता व त्यासाठी मोजावी लागणारी किंमत कमी असल्याने पाण्याच्या अतिरेकी वापर केला जातो. जनमाणसात पाणी बचतीची सवय जो पर्यंत होत नाही तोपर्यंत पाणी टंचाई समस्या सोडविणे कठीण आहे. पाणी व्यवस्थापनातून एखादे राष्ट्र किती प्रगती करु शकते याचे उत्तम उदाहरण म्हणजे ईस्त्राईल देश होय. आपणाकडे ईस्त्राईल सारखी अवर्षणग्रस्त परिस्थिती नसली तरी वाढते नागरी करण, औद्योगिकरण, लोकसंख्या वाढ, शेती करण्याच्या पद्धती यामुळे जल व्यवस्थापन करणे काळाची गरज वाटते.

**उद्दिष्ट्ये :**

१. जल साधन संपदेची उपलब्धता, सध्यस्थिती व महत्व यांचा आढावा घेणे.

२. जलसाधन संपदा व्यवस्थापनाच्या विविध समस्यांचा अभ्यास करणे.

३. जल व्यवस्थापनासाठी उपाय योजना सूचविणे.

**माहिती स्त्रोत व संशोधन पद्धती :**

    प्रस्तूत शोधनिबंधासाठी प्रामुख्याने द्वितीय माहिती स्त्रोताचा वापर केला आहे. ती माहिती संदर्भग्रंथ, मासिके, दैनिकवर्तमानपत्रे, सामाजिक आर्थिक, सामालोचन अहवाल इ. मधून मिळवली आहे. व या माहितीचा उपयोग करुन निष्कर्ष काढले आहेत.

**संकल्पना व व्याख्या :**

१. मानवाच्या कार्यक्षेत्रांशी संबधित असणाऱ्या सर्व जैविक व अजैविक घटकांना साधन संपदा असे हणतात.

२. जॅकी स्मिथ – मानवाला उपयोगी पडणारे पर्यावरणातील घटक म्हणजे सा. संपदा होय.

**जल साधन संपदा :**

    पाणी म्हणजे जल होय. इंग्रजी भाषेत त्याला **Water** असे म्हणतात **Water** हा इंग्रजी भाषेतील शब्द लॅटीन भाषेतील व्यॉरी शब्दापासून तयार झाला आहे. तर व्यॉरी हा लॅटीन शब्द वारी या संस्कृत शब्दापासून तयार झाला आहे. पाणी या शब्दासाठी जल, उदक, तिर्थ, जीवन, निर इ. समान अर्थाचे शब्द आहेत.

    २१ व्या शकतकात जल हे आर्थिक विकासाचे प्रमुख साधन बनले असून पाण्याशिवाय जीवन, प्रगती करता येत नाही. पाण्याचे जतन व संवर्धन करण्यासाठी त्याचे व्यवस्थापन करणे काळाची गरज आहे. पृथ्वीचा ७०.७८ % भाग पाण्याने व्यापला

असून महासागर, सरोवरे, तलाव, धरणे, कालवे, विहिरी, नद्या, हिमनद्या, ओढे इ. जलस्रोत आहेत. जलसंपदा ही पुनर्नवीकरणीय साधन संपदा असून जलचक्रांमुळे ती टिकून आहे.

## जल साधन संपदाचे प्रकार :

१. **भू-पृष्ठीय जल सा. संपदा** – भू-पृष्ठावरून वाहणाऱ्या पावसाच्या पाण्याला जलौध असे म्हणतात. भू-पृष्ठीय जल हे महासागर, सरोवरे, तलाव, नद्या, कालवे, विहिरी इ. स्वरुपात आढळते.

२. **भू-जल सा.संपदा–**

जमिनीच्या/भूमीच्या खोल अंतर्गत भागात आढळणाऱ्या जल साठ्यांना भूजल असे म्हणतात.

पावसाला ऋतूत ही पातळी वर तर उन्हाळा ऋतूत ती खोल जाते.

## पृथ्वीवरील जलसाधन संपदेची उपलब्धता :

पृथ्वीच्या एकूण ३१ कोटी चौ.कि.मी. क्षेत्रफळापैकी ६९.०७% जल व ३०.०३ % भूमी आहे अमेरिकन जलतज्ञ वुलमन यांच्या मते पृथ्वीवर जे जल उपलब्ध आहे. त्यापैकी ९७.५ % महासागरात २ % उत्तर व दक्षिण ध्रुवावर बर्फाच्या स्वरुपात तर ०.५ % पाणी शुद्ध व पिण्यासाठी योग्य आहे.

### तक्ता क्र.१ जग जल वितरण

| अ.क्र. | वितरण | शेकडा |
|--------|-------|-------|
| १ | सागरजल | ९७.४ % |
| २ | बर्फाच्छादित जल | १.९८% |
| ३ | भूमिगत जल | ०.६०% |
| ४ | नद्या, नाले | ०.००१% |
| ५ | प्राणी, वनस्पती, वातावरण | ०.००७% |
| ६ | मृदा, आर्द्रता | ०.००५% |
| ७ | तळी, सरोवरे | ०.००७% |
| | एकूण | १००% |

पृथ्वीच्या एकूण जलापैकी ९७.४ % जल हे खारे असून केवळ २.६ % पाणी गोड आहे. या गोड्या पाण्यापैकी १.९८ % पाणी बर्फाच्या स्वरुपात असून केवळ ०.६२ % पाणी सजीव सृष्टीला वेगवेगळ्या मार्गाने उपलब्ध होते.

जल हे पृथ्वीवरील पुनर्नवीकरणीय किंवा अविनाशी संपदा असून ही वाढती लोक संख्या, नागरीकरण, औद्योगिकरण, जल प्रदुषण यामुळे स्थानिक, प्रादेशिक व जागतिक स्तरावर जल व्यवस्थापन ही समस्या निर्माण झाली आहे.

### तक्ता क्र. २ देश व जलाचा विविध क्षेत्रातील वापर

| अ.क्र. | देश | विविध क्षेत्रातील जलवापर टक्केवारी | | | एकूण |
|--------|-----|------------|--------|-------------|------|
| | | शेती क्षेत्र | उद्योग | घरगुती वापर | |
| १ | भारत | ७३ | २१ | ६ | १०० |
| २ | अमेरिका | ३४ | ५७ | ९ | १०० |
| ३ | जपान | २९ | ६१ | १० | १०० |
| ४ | चीन | ६७ | २५ | ०८ | १०० |

भारतात सर्वात जास्त वापर हा शेतीसाठी असून नंतर उद्योग व घरगुती वापरासाठी वापरले जाते. जलाची उपलब्धता विचारात घेता पावसाच्या बाबतीत भारत हा श्रीमंत देश असून अमेरिका, कॅनडा या देशाच्या १.५ पट तर ऑस्ट्रेलियाच्या २.५ पट पाऊस भारतात पडतो. पाण्याच्या अतिवापर, साठवणूकीची कमी क्षमता, जल व्यवस्थापनाचा अभाव इ. कारणामुळे जल तुटवडा जाणवतो.

## जल साधन संपदेची वैशिष्ट्ये :

मानवी जीवनासाठी जल ही साधन संपदा अनमोल असून त्याची किंमत सोने, चांदी यापेक्षा ही अधिक आहे. सध्या पृथ्वीवर सर्वात उपयुक्त व विपुल अशी जल साधन संपदा आहे. जल साधन संपदेची काही महत्वपूर्ण वैशिष्ट्ये आहेत.

१. पृथ्वीवर २/३ भाग जल आहे.

२. मानवी शरीरात ७० % पाणी आढळते

३. फळे/भाजीपाला यात ९० % तर मांसा मध्ये ४०% पाणी असते.

४. पृथ्वीवर पाणी हा एकमेव असा घटक आहे की, तो द्रव घन व वायू अशा तीन रुपात आढळतो.

५. पाण्याची उष्णता साठवून ठेवण्याची क्षमता सर्व द्रव्य पदार्थांच्या तुलनेत अधिक आढळते.

६. जल गोठल्यानंतर त्यातील क्षार पदार्थ बाहेर टाकते.

जल हे वरील विविध वैशिष्ट्यांनी परिपूर्ण असल्यामुळे ते आर्थिक विकासाचे प्रमुख साधन बनले आहे. जल सा.संपदेची निर्मिती करणे अशक्य असून पाण्याचे जतन व संवर्धन करण्यासाठी त्याचे व्यवस्थापन करणे काळाची गरज आहे.

## जागतिक पातळीवर जल साधन संपदा सद्य: स्थिती :

१. पर्यावरण व त्यांच्या मते येत्या शतकात पृथ्वीचे तापमान २.५ ते ६ सेल्सिअस पर्यंत वाढणार असून त्यामुळे पाणी टंचाई अधिक जाणवेल.

२. जागतिक जल उपलब्धता फार विषम आढळते.

३. जागतिक पाणी परिषदेच्या मते सद्या जागतिक पातळीवर ६६०० घन मीटर पाणी उपलब्ध असून ते २०२५ अखेर ४८०० घनमीटर इतके कमी होईल.

४. सन १९९५ मध्ये जगातील ३५ % लोक पाणी टंचाईचा सामना करीत होते. सन २०२५ अखेर हे प्रमाण ५९ % पर्यंत वाढेल.

५. आज जलजन्य आजार व पाणी टंचाई यामुळे जगात दररोज १५ ते १८ हजार लोक मृत्यूमुखी पडतात.

६. जगातील एकूण आजारापैकी ८० % आजार व ३३ % मृत्यू हे दूषित जलामुळे घडून येतात.

७. जगातील गरीब व अविकसीत देशातील स्त्रियांचे १/3 आयुष्य पाणी भरण्यात खर्च होते.

८. जगात पाण्यामुळे संघर्ष/वाद निर्माण होत आहेत.

## भारतातील जल साधन संपदेची सद्य: स्थिती :

१. भारतात सर्व साधारण वर्षभरात ११७० मी.मी. पाऊस पडतो परंतु त्याचे प्रमाण एक सारखे नाही. उदा: पश्चिमेकडील वाळवंटात हे प्रमाण १०० मि.मि. तर ईशान्य भारतात १५००० मि.मी. आहे.

२. भारतात वाळवंटात वर्षभरात ५-७ दिवस, ईशान्य भारतात १२५-१४० दिवस तर इतत्र ८ ते ८० दिवस कमी अधिक प्रमाणात पाऊस पडतो.

३. भारताला दरवर्षी ४ हजार अब्ज घनमीटर पाणी मिळते.

४. भारतीय स्त्रीला आज ही शुद्ध पाणी मिळविण्यासाठी काही ठिकाणी सरासरी दररोज ४ कि.मी. पायपीट करावी लागते.

५. शुद्ध पाणी मिळत नाही म्हणून दरवर्षी ६ अब्ज लिटर पेक्षा अधिक बाटली बंद पाण्याची विक्री होते.

६. केवळ मुंबई शहरात वाहने धुण्यासाठी दररोज ५० लाख लिटर पाण्याचा उपव्यय केला जातो.

७. इस्त्राईल या देशात १० से.मी. इतका सरासरी पाऊस पडत असून भारततात ही सरासरी ५० सें.मी. आहे. इस्त्राईल धान्य उत्पादनात स्वंयपुर्ण तर भारत कुपोषण व धान्य तुटवडा ही समस्या जाणवते.

भारतीय शेती, पाण्याची उपलब्धता, विजेचे उत्पादन आणि एकूण अर्थ व्यवस्थेसाठी पर्जन्य हा महत्वाचा घटक आहे.

## भारतातील जल व्यवस्थापन समस्या :

जल व्यवस्थापनासाठी खालील समस्या जबाबदार आहेत.

१. **राजकीय दृष्टीकोन :–** जल व्यवस्थापनासाठी राजकीय उदासिनता प्रमुख्याने जबाबदार आहे. आज अनेक राज्यात पाणी वाटपा संदर्भात समस्या असून स्थानिक, प्रादेशिक जलवाद निर्माण झाले आहेत.

२. **पाण्याचे विषम वितरण :–** भारतात सर्व साधारण ११०० ते १४०० मी.मी. पाऊस जून ते सप्टेंबर या काळात कमी अधिक प्रमाणात पडतो. तर थरच्या वाळवंटात १० मी.मी. तर चेरापूंजी येथे १५०० मी.मी. पाऊस पडतो. त्यामुळे पाणी समस्या निर्माण होते.

३. **वाढती लोकसंख्या :–** भारताचा चीन नंतर लोकसंख्येच्या बाबतीत दुसरा क्रमांक लागतो. वाढत्या लोकसंख्ये बरोबर पाण्याचा वापर वाढतो. परंतु उपलब्ध पाण्याच्या टंचाईमुळे दरडोई कमी पाणी वापरावे लागते. उदा. अमेरिकेत दरडोई दररोज ५०० ते २००० लिटर तर जपान मध्ये दररोज ३०० ते ५०० लिटर तर भारतात हे प्रमाण ५० ते १०० लीटर आहे.

४. **नागरीकरणाचा वाढता वेग :** ग्रामीण भागापेक्षा नागरीभागात रोजगाराच्या जास्त संधी असल्यामुळे अधिक लोक शहराकडे स्थलांतर करतात. १९५१ तध्ये ग्रामीण भागात ८२ % तर शहरी भागात १८ % लोक राहत होते. २००१ मध्ये हे प्रमाण अनुक्रमे ६८ % व ३२% झाले.

५. **जंगलाचे कमी होणारे क्षेत्र :–** नागरी करणाच्या वाढत्या वेगामुळे औद्यगिक वसाहती, शेती, रस्ते, धरणे, रेल्वे इ.मुळे जंगल क्षेत्र कमी होत आहे.

६. **शेतीसाठी पाण्याचा वाढता वापर :–** भारत शेतीप्रधान देश असल्यामुळे जवळपास ७० % पाणी हे शेती साठी वापरले जाते. व एकूण लोकसंख्येपैकी ६८ % लोक शेतीवर अवलंबून आहेत.

७. **पाण्याचा औद्योगिक क्षेत्रासाठी वाढता वापर :–** शेतीनंतर पाणी वापरासाठी औद्यिगिक क्षेत्राचा क्रमांक लागतो. उत्पादन प्रक्रिया, स्वच्छता, इ.साठी पाणी वापरले जाते.

उदा: साखर उद्योग, लोहपोलाद, साबन उद्योग, चामडी इ.

८. **जनावरांसाठी पाणी वापर :–** जनावरांना जगण्यासाठी मोठया प्रमाणात पाणी लागते. प्रत्येक जनावरांची पाण्याची गरज वेग–वेगळी आहे. उदा: गाई, म्हशींना दररोज २० ते ४० लीटर पाणी लागते. तर भारताच्या जनावरांच्या संख्येत जगात दुसरा क्रमांक लागतो.

९. **स्थलांतर :–** महाराष्ट्रातून विशेषता विदर्भ, मराठवाड्यातील प्रमुख्याने लातूर, उस्मानाबाद, बीड, औरंगाबाद, जालना, परभणी इ.जिल्ह्यातून पाणी टंचाईच्या काळात हजारो लोक मुंबई, पुणे शहराकडे स्थलांतर करतात.

१०. **जल सिंचन व जलप्रदुषण :–** आधुनिक काळात शेतीसाठी पाण्याचा केला जाणारा अतिरिक्त वापर क्षारीकरणाची क्रिया रासायनिक खते, जंतुनाशके, किटकनाशके यांच्या वाढत्या वापरामुळे पाण्याची गुणवत्ता कमी होऊन प्रदुषणात वाढ झाली आहे.

११. **त्याज्य पदार्थांचे वाढते प्रमाण :–** सांडपाणी, मलमूत्र, प्लॅस्टिक, कारखान्यातील अपद्रव्ये इ.मुळे प्रदुषण वाढत आहे.

## जल साधन संपदेचे व्यवस्थापन :

उपलब्ध जल स्रोतांचा काळजी पुर्वक वापर करुन उपलब्ध जलसाठा आणि त्याचा दर्जा यांचे संवर्धन करणे म्हणजे जलव्यवस्थापन होय.

भारतातील पाणी टंचाई ही पाणी वापरण्याची चुकीची पद्धती, दूरदृष्टीचा अभाव इ.मुळे निर्माण झाली आहे. वेगवेगळ्या क्षेत्रात जल व्यवस्थापन गुणवत्तावाढीसाठी उपाय योजना येतील.

## १. घरगुती/वैयक्तिक स्तरावरील पाणी व्यवस्थापन :–

आपल्याकडे भौतिक सुविधांचा अतिरेकी वापर करुन पाण्याचा मोठ्या प्रमाणात अपव्यय केला जातो. वाहत्या नळाखाली कपडे धुणे, शॉवर खाली आंघोळ करणे, वाहत्या पाईपद्वारे गाडी धुणे, शौचालयात प्लॅशचा वापर यामुळे पाण्याची किमान ३ पट नासाडी होते.

## घरगुती व वैयक्तिक जल वापरताना खालील उपाययोजना करणे आवश्यक ठरते.

१. शॉवरचा वापर न करता आंघोळ करताना बादलीचा वापर करणे.

२. शौचालयात प्लॅशचा वापर न करता बादलीचा वापर करणे.

३. दात घासणे, दाढी करणे या साठी नळाचा वापर न करता मगात पाणी घेऊन त्याचा वापर करणे.

४. गळके नळ, पाईप यांची दुरुस्ती करणे.

५. वाहत्या नळाखाली कपडे न धुता बादलीचा वापर करणे.

६. गाडी धुणेसाठी वाहत्या नळाचा वापर न करता कपडा बादलीत बुडवून गाडी स्वच्छ करणे.

७. दात धुण्यासाठी नळाचा वापर न करता मगाचा वापर करणे

८. झाडांना व हिरवळीला पाणी सकाळी किंवा रात्री देणे यामुळे बाष्पीभवन कमी होते.

९. स्थानिक स्वराज्य संस्था, महानगर पालिका, क्षेत्रात पाणी वापरासाठी मीटर बसविणे.

१०. हॉटेल्स, रेस्टॉरंट, सिनेमागृह, शॉपिंग मॉल्स इ. सार्वजनिक ठिकाणी पिण्याच्या पाण्यासाठी छोटे ग्लास वापरणे तसेच वॉश बेसिनच्या जागेवर प्रेस बटन असलेल्या तोट्या बसविणे.

११. साठविलेले पाणी ओतून न देता त्याचा वापर करणे.

१२. साठवण टाकीतील पाणीपुरवठा टाकी भरताच तात्काळ बंद करणे.

१३. वृक्षांना पाणी न फवारता झाडांच्या मुळांना पाणी देणे.

१४. कपडे व भांडी धुण्यासाठी साबनाचा कमी वापर करणे

वरील प्रमाणे घरगुती उपाय योजना केल्यास एक व्यक्ती एका दिवसाला किमान १४५ लीटर तर एक कुटूंब १००० लीटर पाणी सहज वाचवू शकतो.

## कृषी जलव्यवस्थापन :

भारतात सर्वात जास्त पाणी वापर शेतीसाठी केला जातो. सुधारित जलसिंचनामुळे २०.३० % पाण्याची बचत होते. यासाठी खालील उपाययोजना करणे आवश्यक ठरते.

१. शेतीसाठी पिकांना पाणी देण्याचे शास्त्रीय ज्ञान शेतकऱ्यांना देणे.

२. शेतकऱ्यांनी ऊस, केली, संत्रे या जास्त पाणी लागणाऱ्या पिकांऐवजी कमी पाण्यावर येणारी नगदी पिके घेणे.

३. शेतीस पाणी देण्यासाठी परांपरागत पद्धतिचा वापर न करता ठिबक सिंचन, समतल चर, शेततळे इ. पद्धतींचा वापर करावा.

४. पावसाचा प्रत्येक थेंब जमिनीत मुरविण्यासाठी मृदासंधारण, जलसंधारण, पाणी आडवा पाणी जिरवा इ. उपक्रम राबविणे.

५. नवीन धरण प्रकल्प इ. मंजूरी देताना सामाजिक, आर्थिक पर्यावरणावर होणारा परिणाम इ. फायदा-तोटा विचारात घेऊन प्रकल्पंना मान्यता देणे.

६. लोक सहभागातून स्थानिक पातळीवर जल व्यवस्थापनाचे विविध उपक्रम हाती घेणे. उदा:. ग्रामपंचायत, नगरपालिका, सामाजिक संस्था इ.

७. विहिरी, बोरवेल इ. मधून पाण्याचा उपसा मर्यादित करणे किंवा उद्योगासाठी वापरणे

८. पाणलोट क्षेत्र व्यवस्थापन व पूर व्यवस्थापन यामुळे ही पाण्याची समस्या कमी होईल.
   वरील विविध उपाय योजल्यास जल व्यवस्थापन सहज शक्य होईल.


## निष्कर्ष व उपाय योजना :

१. भारतात जलसंपदा भरपूर असून ही जलसंवर्धन, नियोजन यांचा अभाव असल्यामुळे एकूण पडणाऱ्या पावसाच्या पाण्यापैकी १० % पाणीच केवळ वापरले जाते.

२. भारतातील पावसाचा कालखंड, वितरण व प्रमाण यात मोठी विषमता असल्याने संपुर्ण भूजलाचे संवर्धन व व्यवस्थापन करणे अशक्य आहे.

३. वर्षभरात पडणाऱ्या एकूण पावसाच्या पाण्यापैकी खेड्यात प्रत्यक्षात पुनर्भरणाचे सरासरी प्रमाण १३ % तर शहरी भागात हे प्रमाण ३ % इतके कमी आहे.

४. शुद्ध पाणी मिळत नाही म्हणून दरवर्षी ६ अब्ज लीटर पेक्षा अधिक बाटली बंद पाण्याची विक्री केली जाते. व दिवसेन दिवस हे प्रमाण वाढत आहे.

५. दरवर्षी कूपनलिका, विहिरी यांच्या वाढत्या प्रमाणामुळे भूजल पातळी खालावत आहे.

६. प्रत्येक गावात एक पाणी समिती स्थापन करुन दरवर्षी पावसाळ्या नंतर गावात किती पाणी उपलब्ध आहे. प्रत्येक कुटूंबाच्या वाट्याला किती घनमीटर पाणी उपलब्ध होऊ शकते व गावात वर्षभरात कोणती पिके घ्यायची याची जबाबदारी प्रत्येक कुटूंबावर सोपवावी.

७. शासनाची जलयुक्त शिवार अभियान ही योजना दुष्काळी गावांसाठी वरदान ठरत आहे.

८. नगरपालिका, नगरपरिषद, महानगरपालिका क्षेत्रात पाणी गळती, बेकायदा नळजोड, पाणी वापरासाठी मीटर पद्धतीचा वापर करणे, सांडपाण्याच्या प्रक्रिया करुन पुनर्वापर करणे आवश्यक असून पाण्याचे लेखापरीक्षण करणे आवश्यक आहे.

९. जलसाधन संपत्तीला भविष्यात सोन्यासारखी किंमत येणार असल्यामुळे तिचा वापर काटकसरीने करणे आवश्यक आहे.

१०. जलसाक्षरता व जनजागृती करणे आवश्यक आहे.

११. शासनाने शहरांची वाढती लोकसंख्या विचारात घेऊन शहरांसाठी स्वतंत्र धरणांची निर्मिती करावी

१२. राष्ट्रीय पेयजल योजनेचा अधिक विस्तार करणे.

१३. देवास पॅटर्न सर्व खेड्यापर्यंत पोहचविणे

१४. पाणी फाऊंडेशन, नाम या सारख्या सामाजिक काम करणाऱ्या संस्थाची संख्या वाढविणे.

## संदर्भ ग्रंथ :

१. *पर्यावरण शास्त्र – प्रा.डॉ.टी.एन.घोलप, निशिकांत प्रकाशन पुणे*

२. *पर्यावरणीय अध्ययन – प्रा.अरुण सवदी, कोळेकर, जोशी, निराली प्रकाशन पुणे*

३. *पर्यारणीय जाणीव जागृती – प्रा.डॉ.डी.एन. खैरनार, वर्षा प्रकाशन पुणे*

४. *योजना मासिक – जुलै २०१०, वर्ष ३७ अंक १२*

५. *योजना मासिक – जुलै २०१२ वर्ष ३९ अंक १२*

६. *लोकराज्य मासिक – ऑगस्ट २०११, ६३ अंक ५*

7. *Water shade management issues & policies for 21st century – K. Palani Swami and Suresh Kumar.*

8. *Water Environment in India – N.L.Gupta and Laxmi Pati Shukla, Roopa publication House Jaipur*

9. *Geography of Resource's – Dr. B.S. Negi Kedarnath Ramnath publication Delhi.*

# लातूर जिल्ह्यातील लोकसंख्या वितरणाचा चिकित्सक अभ्यास

**काळे मुकुंद भाऊसाहेब**
श्रीमती सुशीलादेवी देशमुख महिला,
महाविद्यालय, लातूर

**सूर्यवंशी स्नेहा सदाशिव**
श्रीमती सुशीलादेवी देशमुख महिला,
महाविद्यालय, लातूर

**प्रस्तावना:**

१९४७ साली असलेल्या सुमारे ३६ कोटी लोकसंख्येला कुटुंब नियोजन, लोकसंख्यावाढीमुळे उद्भवू शकणारे प्रश्न यांचे फारसे वारे लागलेले नव्हते. विशिष्ट राजकीय व भौगोलिक सिमांमध्ये असलेली मर्यादीत नैसर्गीक सुबत्ता व साधनसंपत्ती उपभोगणारी लोकसंख्या जास्तीत जास्त किती असू द्यावी हा विचार सामान्य माणसापर्यंत पोहचण्याचा तो काळच नव्हता असे म्हणावे लागेल. परिणमत: स्वातंत्र्य भारताबाबत निर्माण झालेला ताजाताजा आपलेपणा, कुटुंबव्यवस्था हे सामर्थ्य असल्याची सार्वत्रिक भूमिका, एकत्र कुटुंबपध्दती, मुलगाच व्हावा म्हणून प्रयत्नात राहण्याची प्रवृत्ती, तांत्रिक विकासाचा अभाव नोकरी व्यवसाय व कमी गरजा हे त्याकाळच्या समाजमनावर दूरगामी परिणाम करणारे घटक ठरतात.

लोकसंख्या हा आज भारतासमोरचा एक अतिशय महत्वाचा प्रश्न निर्माण झालेला आहे. या लोकसंख्येमुळे पाणीसाठे, वीज उत्पादन, शेतकी उत्पादन, रस्ते, प्रवासी वाहतुक, निवास व्यवस्था, शिक्षण, दरडोई उत्पन्न अशया सामाजिक व आर्थिक घटकावर फार मोठया प्रमाणात ताण पडत आहे. विशेष म्हणजे आजही समाजातील कित्येक थरांपर्यंत कुटुंब नियोजन हा विचार नीटसा पोचलेला नाही. आज भारतात सर्वांत स्वस्त काय असेल तर माणसाचे आयुष्य, असे वाटू लागले आहे. 'संकटाला संधी माना' असा एक सुविचार आपण वाचलेला असतो. पण लोकसंख्येला संधी मानणे हा विचार आपल्या मनाला पटणे अवघड आहे.

**उद्देश :**

१.  लातूर जिल्ह्यातील एकूण लोकसंख्या वितरणाचा अभ्यास करणे.
२.  लातूर जिल्ह्यातील तालुका निहाय लोकसंख्या वितरणाचा अभ्यास करणे.

**संशोधन पध्दती :**

प्रस्तुत शोधनिबंधासाठी प्राथमिक व व्दितीय स्वरुपाच्या माहितीचा वापर करुन वर्णनात्मक व विश्लेषणात्मक, संख्यात्मक संशोधन पध्दतीचा वापर करण्यात आला आहे.

**भौगोलिक स्थान व क्षेत्रफळ :**

लातूर जिल्ह्यांचा भौगोलिक विस्तार १७°५२' उत्तर ते १८°५०' उत्तर अक्षवृत्तीय दरम्यान तर रेखावृत्तीय विस्तार ७६°१८' पूर्व ते ७९°१२' पूर्व रेखावृत्ता दरम्यान आहे. राज्याच्या क्षेत्रफळापैकी २.३३% क्षेत्र लातूर जिल्ह्यात येते. सध्या लातूर जिल्ह्यात १० तालुक्याचा समावेश होतो. या १० तालुक्यांची दोन उपविभागात विभागणी करण्यात आली आहे. लातूर उपविभागामध्ये लातूर, औसा, रेणापूर, तर उदगीर उपविभागामध्ये उदगीर, देवणी, जळकोट, अहमदपूर, चाकूर, निलंगा, आणि शिरुर-अनंतपाळ या तालुक्यांचा समावेश होतो. लातूर जिल्ह्याची उत्तर-दक्षिण रुंदी १०९ कि.मी. असून पूर्व -पश्चिम लांबी १०६ कि. मी. आहे. लातूर जिल्ह्याच्या उत्तरेस परभणी जिल्हा, ईशान्येस नांदेड जिल्हा, पूर्व व आग्नेयेस कर्नाटक राज्यातील बिदर जिल्हा, दक्षिणेस व पश्चिमेस उस्मानाबाद जिल्हा तर वायव्येस बीड जिल्हा येतो. लातूर जिल्ह्याची समुद्रसपाटीपासूनची सरासरी उंची ६०० मी. ते ७०० मी. पर्यंत आहे.

**लातूर जिल्ह्यातीलएकूण लोकसंख्या: २००१ ते २०११:**

### लातूर जिल्हाएकूण लोकसंख्या: २००१-२०११

| अ.क्र. | वर्ष | २००१ | २०११ |
|---|---|---|---|
| ०१ | एकूण लोकसंख्या | २४८०२८५ | २४५४१९६ |
| ०२ | ग्रामीण लोकसंख्या | १५९००२४ | १८२९२१६ |
| ०३ | शहरी लोकसंख्या | ४९०२६१ | ६२४९८० |
| ०४ | एकूण पुरूष लोकसंख्या | १०७५२५७ | १२७३१४० |
| ०५ | ग्रामीण पुरूष लोकसंख्या | ८१९४१३ | ९४९७०७ |
| ०६ | शहरी पुरूष लोकसंख्या | २५५८४४ | ३२३४३३ |
| ०७ | एकूण स्त्री लोकसंख्या | १००५०२८ | ११८१०५६ |
| ०८ | ग्रामीण स्त्री लोकसंख्या | ७७०६११ | ८७९५०९ |
| ०९ | शहरी स्त्री लोकसंख्या | २३४४१७ | ३०१५४७ |

*स्त्रोत :- लातूर जिल्हा जनगणना पुस्तीका अहवाल २००१ ते २०११*

लातूर जिल्ह्यातील लोकसंख्येचा अभ्यास करत असताना २००१ व २०११ या दोन जनगणनेचा आढावा घेण्यात आलेला आहे. २००१ मध्ये एकूण लोकसंख्या २४८०२८५ इतकी आहे तर तीच २०११ मध्ये २४५४१९६ इतकी वाढलेली आहे. २००१ मध्ये एकूण ग्रामीण लोकसंख्या १५९००२४ इतकी आहे तर २०११ मध्ये १८२९२१६ इतकी दिसून येते. २००१ मध्ये एकूण शहरी लोकसंख्या ४९०२६१ इतकी आहे

तर तीच २०११ मध्ये ६२४९८० इतकी वाढलेली आहे. २००१ मध्ये एकूण पुरुष लोकसंख्या १०७५२५७ इतकी असून यापैकी ग्रामीण पुरुषांची संख्या ८१९४१३ एवढी आहे तर २०११ मध्ये १२७३१४० इतकी दिसून येते. यापैकी ग्रामीण पुरुषांची संख्या ९४९७०७ इतकी दिसून येते.

**लातूर जिल्हालोकसंख्याविवरण : २००१ - २०११**
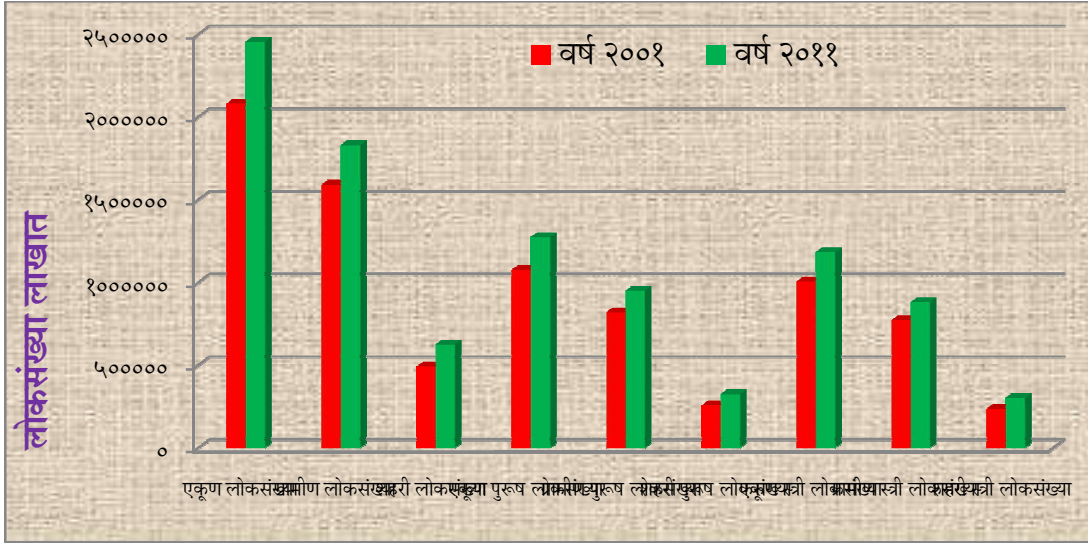


शहरी पुरुषांच्या लोकसंख्येचा विचार केला असता २००१ मध्ये २५५८४४ असून तीच २०११ मध्ये वाढून ३२३४३३ इतकी झालेली दिसून येते. २००१ मध्ये एकूण स्त्री लोकसंख्या १००५०२८ इतकी असून यापैकी ग्रामीण स्त्रीयांची संख्या ७७०६११ एवढी आहे तर २०११ मध्ये ११८१०५६ इतकी दिसून येते. यापैकी ग्रामीण स्त्रियांची संख्या ११८१०५६ इतकी दिसून येते. शहरी स्त्रियांच्या लोकसंख्येचा विचार केला असता २००१ मध्ये २३४४१७ असून तीच २०११ मध्ये वाढून ३०१५४७ इतकी झालेली दिसून येते. यावरुन असे दिसून येते की, २००१ च्या लोकसंख्येच्या तुलनेत २०११ च्या लोकसंख्येत मोठ्या प्रमाणात वाढ झालेली दिसून येते.

**लातूर जिल्ह्यातील तालुका निहाय लोकसंख्या वितरण: २००१ ते २०११**

अभ्यास क्षेत्रामध्ये २००१ साली एकूण लोकसंख्या २०८०२८५ एवढी होती. सारणी क्र. ३.२ नुसार तालुकानिहाय लोकसंख्येचा अभ्यास केला असता सर्वात जास्त लोकसंख्या लातूर ५४२४१४ इतकी आहे. तर सर्वात कमी लोकसंख्या शिरुर अनंतपाळ ७४०८१ तालुक्याची आहे. १०% पेक्षा कमी एकूण लोकसंख्या अहमदपूर, चाकूर, देवणी, जळकोट, रेणापूर व शिरुर अनंतपाळ तालुक्यात दिसून येते. १० ते १५% एकूण लोकसंख्या औसा निलंगा व उदगीर या तालुक्यात आढळते तर १५% पेक्षा जास्त एकूण लोकसंख्या लातूर या एकाच तालुक्यात आढळून येते.

**लातूर जिल्हा तालुकानिहाय लोकसंख्या वितरण : २००१ ते २०११**

| अ.क्र. | तालुका | २००१ | | २०११ | |
|---|---|---|---|---|---|
| | | लोकसंख्या | लोकसंख्या % मध्ये | लोकसंख्या | लोकसंख्या % मध्ये |
| ०१ | अहमदपूर | १९९०५३ | ९.११ | २३६१६८ | ९.६२ |
| ०२ | औसा | २८०२४० | १२.०७ | ३०९५७१ | १२.६१ |
| ०३ | चाकूर | १५७१३५ | ७.३० | १७७९५६ | ७.२५ |
| ०४ | देवणी | ८८३६२ | ४.१४ | ९७५९८ | ३.९७ |
| ०५ | जळकोट | ६९१९८ | ८.३३ | ८७२०१ | ३.५५ |
| ०६ | लातूर | ५४२४१४ | २४.२७ | ३८३६६६ | १५.६३ |
| ०७ | निलंगा | २८६०८९ | १३.११ | ३२५२५५ | १३.२५ |
| ०८ | रेणापूर | १२२१९२ | ५.५० | १४२१८७ | ५.७९ |
| ०९ | शिरुर अनंतपाळ | ७४०८१ | ३.४८ | ८३५२८ | ३.४० |
| १० | उदगीर | २६१५२१ | १२.६ | ३११०६६ | १२.६७ |
| | एकूण | २०८०२८५ | १०० | २४५४१९६ | १०० |

**स्रोत-** *लातूर जिल्हा जनगणना पुस्तीका अहवाल २००१ ते २०११*

अभ्यास क्षेत्रामध्ये २०११ साली एकूण लोकसंख्या २४५४१९६ एवढी होती. २०११ च्या लोकसंख्या जनगणनेनुसार तालुकानिहाय लोकसंख्येचा अभ्यास केला असता सर्वात जास्त लोकसंख्या लातूर ३८३६६६ इतकी आहे. तर सर्वात कमी लोकसंख्या शिरुर अनंतपाळ ८३५२८ तालुक्याची आहे. २०११ मधील एकूण लोकसंख्या वितरणाचे गट पाडले असता १०% पेक्षा कमी गटामध्ये अहमदपूर, चाकूर, देवणी, जळकोट, रेणापूर व शिरुर अनंतपाळ या तालुक्यांचा समावेश होतो. १० ते १५% एकूण लोकसंख्या औसा निलंगा व उदगीर या तालुक्यात आढळते तर १५% पेक्षा जास्त एकूण लोकसंख्या लातूर या एकाच तालुकयात आढळून येते.

**संदर्भ सूची :**

१. प्रा. अहिरराव अलीझाड (१९९३) : लोकसंख्या भूगोल, निराली प्रकाशन, पुणे
२. प्रा. शंकरराव शेटे, प्रा. सुरेश फुले, प्रा.ओमप्रकाश शहापुरकर (१९९८) : लोकसंख्या भूगोल, अभिजीत पब्लिकेशन्स, लातूर.
३. WWW. Latur nic. Com. website.
४. WWW.msamb. Com.website.

# लातूर जिल्ह्यातील डाळ उद्योगांचा भौगोलिक अभ्यास

**प्रा. डॉ. आर. एस. धनुश्वर**

मार्गदर्शक

भूगोल विभागप्रमुख

भाई किशनराव देशमुख महाविद्यालय,

चाकूर जि.लातूर

**गजानन पाटील**

संशोधक विद्यार्थी

महाराष्ट्र उदयगिरी महाविद्यालय,

उदगीर जि.लातूर

**प्रस्तावना :**

जगातील अन्य व्यवसायापेक्षा 'कृषी' हा व्यवसाय खूप प्राचीन आहे. कारण शेतीला नव अश्मयुगात सुरूवात झाली असे मानले जाते. नव अश्मयुगाचा काल इ.स. पूर्व 10,000 वर्षांचा मानला जातो तत्पुर्वी मानव रानटी अवस्थेत होता. हळूहळू वैदिककाळ, बौध्दकाळ, मध्ययुगीन काळ व हरितक्रांतीचा कालखंड या टप्प्याने कृषीचा विकास होत आलेला आहे.

वाढत्या लोकसंख्येबरोबरच आणि प्रगतीबरोबरचं डाळ व डाळ पिकांपासून मिळणाऱ्या पदार्थांची मागणी आणि महत्त्व दिवसेंदिवस वाढत आहे. डाळींमध्ये प्रथिने व कॅलरीज मोठयाप्रमाणात असतात त्यामुळे मानवी अहारात डाळीचे महत्त्व जास्त आहे. डाळवर्गीय पीकांमध्ये, तूर, हरभरा, मूग, उडीद, मसुर, वटाणा इ. डाळपीके महत्त्वाची आहेत. यामुळे डाळीचे मोठयाप्रमाणावर उत्पादन घेतले जाते. महाराष्ट्र हा डाळवर्गीय पिकांच्या उत्पादनाच्या बाबतीत एक महत्त्वपूर्ण राज्य म्हणून ओळखले जाते. प्रामुख्याने महाराष्ट्रात 1960-61 साली डाळीचे उत्पन्न व आजचे उत्पन्न यात खूप फरक पडलेला आहे. महाराष्ट्रातील डाळपीकांचे क्षेत्र हे मराठवाडयात सर्वाधिक असून कोकण या विभागात ते सर्वात कमी आहे. म्हणून डाळ या उद्योगाचे मराठवाडा, प.महाराष्ट्र व खानदेशात वितरण झालेले आहे. लातूर जिल्हयाच्या अर्थव्यवस्थेत कृषीचे महत्त्व लक्षात घेवून जिल्हयाच्या विकासामध्ये डाळ उत्पादन आणि डाळ उद्योगधंद्याचा अभ्यास करणे महत्त्वाचे ठरते.

**अभ्यास क्षेत्र :**

प्रस्तुत शोध प्रबंधासाठी मराठवाडा विभागातील लातूर जिल्हा निवडलेला आहे. भौगोलिकदृष्टया लातूर जिल्हा महाराष्ट्र राज्याच्या मध्यभागी येतो. लातूर जिल्हयाचा अक्षवृत्तीय विस्तार18$^0$05' ते 18$^0$07' उत्तर अक्षवृत्त व रेखावृत्तीय विस्तार 73$^0$25' ते 77$^0$25' पूर्व रेखावृत्तांच्या दरम्यान आहे. जिल्ह्याच्या उत्तर सीमेवर परभणी, हिंगोली तर पूर्वेस नांदेड, दक्षिणेस कर्नाटक राज्याची सीमा तर पश्चिमेस उस्मानाबाद जिल्हा, वायव्येस बीड जिल्हयाची सीमा आहे.

लातूर जिल्हयाचे एकुण क्षेत्रफळ 7157 चौ.कि.मी. आहे. जनगणना 2011 नुसार लातूर जिल्हयाची एकुण लोकसंख्या 24,55,543 इतकी आहे, प्रशासकीय सोयीच्या दृष्टीने लातूर जिल्ह्यात लातूर, उदगीर, अहमदपूर, शिरूर अनंतपाळ, देवणी, जळकोट, चाकुर, निलंगा, औसा असे एकुण दहा तालुक्यांचा समावेश होतो.

**उद्दिष्टे:**

1) लातूर जिल्ह्यातील डाळ उत्पादन आणि डाळ उद्योगधंद्याची प्रगती तपासणे.

2) लातूर जिल्ह्यातील डाळ उद्योगधंद्यासमोरील समस्या जाणून घेऊन उपाययोजना सूचविणे.

**संशोधन पद्धती:**

सदरील शोधनिबंध प्राथमिक व दुय्यम आकडेवारीवर आधारित आहे. प्राथमिक स्वरूपाची माहिती महाराष्ट्र शासन प्रकाशित माहिती आणि डाळ उद्योगाची मासिके यातून संकलित केली असून दुय्यम स्वरूपाची माहिती ही सामाजिक व आर्थिक समालोचन, जनगणना अहवाल, जिल्हा सांख्यिकीय विभाग व कृषी कार्यालयाकडून संकलित करून विश्लेषण करण्यात आले आहे.

**विषय विवेचन:**

लातूर जिल्हा हा कृषिप्रधान जिल्हा असून या जिल्ह्यात शेतीवर आधारित अनेक उद्योग चालतात. त्यात डाळ उद्योग हा सुद्धा एक महत्त्वाचा उद्योग आहे. कारण या उद्योगामुळे औद्योगिक क्षेत्रात लातूरची एक विशेष ओळख निर्माण झालेली आहे. लातूर जिल्हा हा डाळ उत्पादनात भारतात अग्रेसर आहे. या जिल्ह्यात एकूण दहा (लातूर, उदगीर, अहमदपूर, औसा, निलंगा, रेणापूर, शिरुर अनंतपाळ, देवणी, चाकूर, जळकोट) तालुके आहेत. या सर्वच तालुक्यात कमी-अधिक प्रमाणात डाळीचे उत्पादन होते.

लातूरमध्ये जवळपास सुमारे 70 डाळ मिल्स आहेत. डाळ मीलचे वर्गीकरण दोन प्रकारांत करता येते. 1) मोठ्या डाळ मिल्स व 2) मिनी डाळ मिल्स. हे दोन्ही प्रकार लातूर जिल्ह्यात स्थापन झालेले दिसून येतात. डाळ मिल उद्योग खरे तर लातूरसाठी खूपच पोषक असा व्यवसाय आहे. कारण लातूर जिल्हा हा कर्नाटक राज्याच्या सीमावर्ती भागात आहे. त्यामुळे कर्नाटक राज्यातून डाळवर्गीय पिकांचे मोठ्या प्रमाणात उत्पादन होते व ते उत्पादन लातूर, उदगीर या बाजारपेठेत सहज उपलब्ध होते. त्यामुळे लातूर व उदगीर या तालुक्यात डाळीचे उत्पादन मोठ्या प्रमाणात होते.

लातूर जिल्ह्यात आज सर्वत्र सर्वच तालुक्यात पंजाबराव देशमुख कृषी विद्यापीठाने तयार केलेली मिनी डाळ मशीन पहावयास मिळतात. अकोला येथील उत्पादक कंपनीकडून सुमारे 63 हजार रुपयांना मिनी डाळ मिल यंत्र खरेदी करता येते. त्यामुळे डाळ उद्योग हा उत्तम असा घरगुती लघुउद्योग बनला आहे. या उद्योगासाठी साधारणपणे कमी भांडवल, कमी मजूर लागतात. त्यामुळे घरच्या घरी विशेषत: बचत गटामार्फत किंवा अनेक शेतकरी एकत्रित येऊन हा मिनी डाळ उद्योग स्थापन करू शकतात. उदा. रेणापूर तालुक्यातील अगदी छोटेसे व अडवळणाचे गाव असलेले मौजे पाथरवाडी येथे ही मीनी डाळ उद्योग सुरू करण्यात आलेला आहे. त्यांच्याकडे ग्रेडर मशिन व पॉलिश मशीन अद्याप उपलब्ध नाही. तरीसुध्दा दर्जेदार उत्पादनामुळे ते त्यांच्या परिसरात प्रसिध्द झालेले आहेत. असे कितीतरी तरुण सध्या या उद्योगाकडे आकर्षित होऊन बेरोजगारीवर मात करताना दिसताहेत. म्हणून मिनी उद्योग हा अत्यंत फायदेमंद उद्योग बनत चाललेला दिसून येतो.

वेगवेगळ्या कडधान्यापासून आपणाला डाळ बनवता येते. उदा. तूर, मूग, हरभरा, उडीद, सोया, मसूर, चवळी इत्यादी. तुरीपासून डाळ तयार करत असताना ती भरडून घ्यावी लागते. नंतर त्यातील टरफले दूर करावी लागतात. त्यामुळे चांगल्या प्रतिची डाळ मिळते. तुरीच्या बाबतीत सहसा तीन प्रतीत उत्पादन होते. ग्रेड-1 याला फटका म्हणतात. ग्रेड-2 डाळीला सव्वा नंबर म्हणतात व ग्रेड-3 ला साधारण डाळ असे म्हणतात. त्यांची किंमत ही उतरत्या क्रमाने असते.

लातूर जिल्हा हा डाळ उत्पादनात अग्रेसर होता. परंतु अलिकडे या व्यवसायाला उतरती कळा लागत असल्याचे दिसून येते. लातूरात उद्योजकांना पोषक वातावरण नाही. तसेच उद्योजकांना प्रोत्साहन सुध्दा दिले जात नाही. लातूर शहरात तसेच इतर उदगीर व अहमदपूर तालुक्यात गेल्या अनेक वर्षांपासून डाळ उद्योग चालू आहेत. दरवर्षी या उद्योगात वाढ होत असली तरी ती वाढ समाधानकारक नाही. आजमितीस लातूरमध्ये सुमारे 70 कारखाने चालू आहेत व त्यातून दररोज 19 ते 20 हजार क्विंटल डाळ तयार होते. बँड्रनेमने लातूरची डाळ उत्तरेपासून दक्षिणेपर्यंत सर्वत्र प्रसिध्द आहे.

**योजना:**

डाळ उद्योगाला वेगवेगळ्या शासकीय योजनांद्वारे आर्थिक मदत मिळते. अशा योजना जिल्हा उद्योग केंद्र, खादी व ग्रामोद्योग मंडळाद्वारे राबविल्या जातात. यापैकी डाळ उद्योगाला बँक पतपुरवठा करतात. या उद्योगासाठी भांडवल कमी लागत असल्याने असे गृहउद्योग ग्रामीण भागात सहज स्थापन करता येतात. त्यामुळे ग्रामीण भागातच सहज कच्चा माल मिळतो व त्यामुळे वाहतुकीवरील खर्चही कमी होतो.

सूक्ष्म, लघु व मध्यम उपक्रमांच्या सर्वांगीण विकासासाठी औद्योगिक समूह विकासाची संकल्पना केंद्र शासनाने स्वाकारली आहे. यास अनुसरून केंद्र शासनाने औद्योगिक समूहांच्या विकासासाठी योजना जाहिर केल्या आहेत. उद्योग संचालनालय मुंबई द्वारा सदर औद्योगिक समूह विकास योजनांची राज्यात प्रभावी अंमलबजावणी होण्यासाठी औद्योगिक समूहांच्या विकासासाठी कार्यवाही करण्यात येत आहे.

केंद्र शासनाच्या सूक्ष्म, लघु व मध्यम (MSNE) मंत्रालयामार्फत सूक्ष्म व लघु उपक्रमांसाठी सुधारित सूक्ष्म व लघु उपक्रम समूह विकास योजना (MSECDP) 2010 मध्ये घोषित केली गेली आहे. सदर योजनेतून सूक्ष्म व लघु उपक्रमांकच्या सर्वांगीण विकास व वाढीकरिता क्षमतावृद्धी कार्यक्रम अंमलबजावणीसाठी तसेच सामायिक सुविधा केंद्रांतर्गत (सीएफसी) संशोधन व विकास केंद्र, पॅकेजिंग केंद्र चाचणी तसेच प्रशिक्षण केंद्र, सामाईक जलनिस्सारण केंद्र, सामाईक प्रक्रिया केंद्र इत्यादी बाबींचा समावेश होतो.

**समस्या / अडचणी:**

लातूर जिल्हा आंध्रप्रदेश व कर्नाटक राज्याच्या सीमेवर असल्याने आंध्र प्रदेश व कर्नाटकातून डाळवर्गीय धान्याची आवक मोठ्या प्रमाणात होते. त्यामुळे कच्च्या मालाची कमतरता भासत नाही. तरीही याभागात जिरायची शेतीचे प्रमाण अधिक आहे आणि जिरायती शेतीतूनच डाळवर्गीय पिकांचे उत्पादन मोठ्या प्रमाणात घेतले जाते. त्यामुळे मान्सून अनियमितपणा, बदलते हवामान, रोगराई इत्यादी घटकांचा प्रभाव या उद्योगधंद्यावर पडतो.

अलीकडे नैसर्गिक कारणांशिवाय इतर अनेक अडचणी या व्यवसायात दिसून येतात. उदा. हमालांनी पुकारलेले संप, रविवारी हमालांच्या सुट्टीमुळे कारखाने बंद राहतात. बदली हमाल कामावर येत नाहीत. जर मालकाने काही पर्यायी व्यवस्था केली तर तीही करु दिली जात नाही. त्यामुळे या सर्व गोष्टींचा फटका थेट बाजारपेठेला बसतो. वीजेचे भारनियमन ही सुध्दा एक गंभीर समस्या आहे. हमालीचे अधिक दर तसेच 50 कि.ग्रॅ. चे पोते बाजारपेठेत आणण्याची सक्ती यामुळे उत्पादन खर्चात वाढ होते. त्यामुळे आहे ते उद्योग चालविणे व नव्याने उद्योग सुरू करणे ही इच्छाच उद्योजकांना होत नाही. तसेच औद्योगिक वसाहतीत जागा मिळत नाही. जागेचे वाढलेले भाव, यामुळे मध्यमवर्गीय उद्योजक उद्योग सुरू करण्याबाबत उदासीन आहे.

**निष्कर्ष:**

कृषी आधारित डाळ उद्योग हा ग्रामीण अर्थव्यवस्थेला चालना देणारा उद्योग आहे. आज लातूरची डाळ मार्केट मागे पडत आहे आणि लातूरचा शेजारी असलेला सोलापूर जिल्हा डाळ उत्पादनात अग्रेसर बनत आहे. कारण सोलापूरमध्ये कच्च्या मालाची उपलब्धता, जागेची, पाण्याची, रेल्वे वाहतुक, उद्योजकांना दिले जाणारे प्रोत्साहन, हमालाचे अनुकूल धोरण यामुळे डाळ उत्पादनात अलिकडे सोलापूरने आघाडी घेतलेली आहे. या उद्योगामुळे शेतकरी, कामगार, भांडवलदार ह्या सर्वांचाच फायदा होतो. उद्योगाचे विकेंद्रीकरण होते. उद्योग ग्रामीण भागातही सुरू करता येतात. यामुळे स्थानिक बाजारपेठेचा विकास होतो.

**संदर्भ ग्रंथ:**

१) कृषी भूगोल - डॉ.सुरेश फुले
२) लातूर जिल्हा सामाजिक व आर्थिक समालोचन २०१५-१६
३) लातूर जिल्हा जनगणना अहवाल २०११
४) लातूर जिल्हा गॅझेटिअर
५) www.latur.ac.in

# लातूर व उस्मानाबाद जिल्ह्यातील साक्षरतेचा अभ्यास

**सुचिता बबनराव जाधव**
संशोधक विद्यार्थी
श्री. हावगी स्वामी महाविद्यालय,
उदगीर

**डॉ. जे. के. वाघमारे**
सहा. प्रा. भूगोल विभाग
भाई किशनराव देशमुख महाविद्यालय,
चाकूर

**प्रस्तावनाः**

साक्षरता हा लोकसंख्येचा महत्वाचा घटक आहे. साक्षरतेच्या पातळीचा लोकसंख्येच्या जननक्षमता, मर्त्यता, गतीमानता, व्यवसाय आणि आर्थिक विकास यावर परिणाम होतो. निरक्षरता हा मानवी विकासाला मिळालेला शाप आहे. साक्षरतेच्या संकल्पना स्थानपरत्वे बदलतात. भारतात साक्षरता म्हणजे, ज्या व्यक्तीला कोणतीही भाषा लिहिता आणि वाचता येते ती व्यक्ती साक्षर मानली जाते.

स्त्री व पुरूषामध्ये साक्षरतेचे प्रमाण व शिक्षणाची पातळी भिन्न आहे. ग्रामीण व नागरी भागात असलेली लोकसंख्या भिन्नता साक्षरतेच्या प्रमाणावर परिणाम करते. तसेच एखाद्या समाजात किंवा प्रदेशात साक्षरतेचे प्रमाण जास्त असेल तर जन्मदर कमी आढळून येतो. साक्षरतेमुळे अंधविश्वास व गरीबी दुर होण्याची शक्यता जास्त असते. साक्षरतेमुळे विश्वबंधुत्वाची भावना वाढीस लागण्यास मदत होते.

**अभ्यास क्षेत्र व अभ्यास विषयः**

लातूर जिल्ह्याचा अक्षवृत्तीय विस्तार १७° ५२' अक्षांश ते १८° ५०' उत्तर अक्षांश आहे. तर रेखावृत्तीय विस्तार ७६° १२' पूर्व रेखांश ते ७७° १८' पूर्व रेखांश आहे. उस्मानाबाद जिल्ह्याचा अक्षवृत्तीय विस्तार १७° ३५' उत्तर अक्षांश ते १८° ४०' उत्तर अक्षांश आहे. तर रेखावृत्तीय विस्तार ७५° १६' पूर्व रेखांश ते ७६° ४०' पूर्व रेखांश आहे. लातूर जिल्ह्याचे एकुण क्षेत्रफळ ७१५७ चौ. कि. मी. व उस्मानाबाद जिल्ह्याचे एकुण क्षेत्रफळ ७५१२ चौ. कि मी. आहे. लातूर जिल्ह्यात एकुण १० तालुके व उस्मानाबाद जिल्ह्यात एकुण ८ तालुके आहेत.

**उदेश:**

१. लातूर व उस्मानाबाद जिल्ह्यातील साक्षरतेचा अभ्यास करणे.
२. साक्षरतेचे महत्व जाणून घेणे.
३. साक्षरतेवर परिणाम करणाऱ्या घटकांचा अभ्यास करणे.
४. साक्षरतेचे बदलते स्वरूप अभ्यासणे.
५. लातूर व उस्मानाबाद जिल्ह्यातील तालुकानिहाय साक्षरतेचा अभ्यास करणे.

**अभ्यासपद्धतीः**

प्रस्तुत शोधनिबंधासाठी दुय्यम माहिती स्त्रोतांचा संदर्भग्रंथ म्हणून उपयोग करण्यात आला आहे. त्यामध्ये विविध लेखकांची संदर्भग्रंथ, वृत्तपत्रे, मासिके व इंटरनेटचा आधार घेण्यात आलेला आहे.

**साक्षरतेचे महत्वः**

चेस्टर बोल्सच्या मते, नैसर्गिक शक्तीचे नियंत्रण आणि नीतीला योग्य आकार देणे व एक व्यवस्थित न्यायपूर्ण समाजाची निर्मिती करण्यासाठी इ. सर्व घटकापेक्षा शिक्षण हे सर्वांत जास्त शक्तीशाली आहे. पण शिक्षणाची गुणात्मक आणि संख्यात्मक वाढ होणे आवश्यक आहे. साक्षरतेचे महत्व पुढीलप्रमाणे आहे.

१. साक्षरता एखादया देशाची सामाजिक आणि आर्थिक पातळी दर्शवित असते.
२. साक्षरतेमुळे एखादया समाजाच्या आधुनिकीकरणाबद्दल माहिती प्राप्त होत असते.
३. साक्षरतेमुळे विवाहाचे वय, जन्मदर व मृत्युदरावर परिणाम होत असतो.
४. साक्षरतेनुसारच स्थलांतर होत असते.
५. स्त्रियांच्या साक्षरतेचा परिणाम बालमृत्युदरावर होत असतो.
६. साक्षरतेच्या आधारावरच नियोजन आणि शैक्षणिक धोरण निश्चित केले जात असते.
७. साक्षरतेमुळे अंधविश्वास व गरीबी दूर होण्याची शक्यता जास्त असते.
८. साक्षरतेमुळे विश्वबंधुत्वाची भावना वाढीस लागण्यास मदत होते.
९. लोकशाही शासनप्रणाली टिकवण्यासाठी साक्षरता आवश्यक आहे.
१०. साक्षरतेच्या अभावामुळे देशातील लोकांत मानसिक वेगळेपणा वाढीस लागतो. आर्थिक दृष्टिने देश गरीब होत असतो.
११. साक्षरतेच्या अभावामुळे परंपरावादी, भाग्यवादी व निराशावादी विचारांची वाढ होत असते.
१२. शिक्षण हा एकच सर्वात महत्वाचा घटक आहे की त्यामुळे आर्थिक, सामाजिक, राजकीय व शास्त्रीय विकास शक्य होतो.
१३. जे.आर.रेले आणि तारा कानेटकर यांनी केलेल्या सर्वेक्षणानूसार ज्या महिला पदवी किंवा त्यापेक्षा जास्त शिक्षण घेतलेल्या आहेत. त्यांचे विवाहाचे वय निरक्षर महिलांच्या तुलनेत जास्त आढळून आलेले आहे. तसेच उच्च शिक्षण घेतलेल्या स्त्रियांमध्ये जन्मदर कमी आढळून आलेला आहे व अशा स्त्रिया कुटुंब नियोजनासारख्या कार्यक्रमाला जास्त प्रतिसाद देतात. तसेच माध्यमिक किंवा त्यापेक्षा जास्त शिक्षण घेतलेल्या मातामध्ये बालमृत्युदर कमी आढळून आला.

**साक्षरतेवर परिणाम करणारे घटक:**

जगात वेगवेगळया देशात साक्षरता ठरवण्यासाठी वेगवेगळे निकष वापरले जातात. यामुळे जागतिक पातळीवर साक्षरतेची तुलना करणे कठीण जाते. भारत १९५१ च्या जनगणनेनूसार अशा व्यक्तीला साक्षर म्हणून ओळखले जात होत की, ज्याचे वय ४ वर्षापेक्षा जास्त असून त्याला कमीत-कमी साधारण पास होणाऱ्याला साक्षर म्हटले जाते. संयुक्त राष्ट्र संघानूसार जो व्यक्ती आपल्या दैनंदिन जीवनात सर्वसाधारण कथन समजून घेवू शकतो. त्या बरोबरच लिहिण्याचे आणि वाचण्याची त्यांच्यात पात्रता असते. त्यास साक्षर असे म्हटले जाते.

अशा विविध देशांनी साक्षरतेच्या वेगवेगळया व्याख्या केलेल्या आहेत. साक्षरतेवर परिणाम करणारे घटक पुढीलप्रमाणे आहेत.

**१) अर्थव्यवस्थेचा प्रकार :**

अर्थव्यवस्थेचा परिणाम त्या देशातील साक्षरतेवर सर्वात जास्त पडत असतो. यामुळेच कृषीप्रधान अर्थव्यवस्था असलेल्या देशात साक्षरतेचे प्रमाण कमी आढळते. आणि उद्योगप्रधान अर्थव्यवस्था असलेल्या देशात साक्षरतेचं प्रमाण जास्त आढळून येते. अशाप्रकारे त्या देशात प्राथमिक व्यवसायात गुंतलेल्या लोकांचे प्रमाण जास्त असते. त्या देशात साक्षरतेचे प्रमाण कमी असते.

**२) शहरीकरणाचे प्रमाण :**

शहरीकरण ज्या देशात जितक्या जास्त प्रमाणात झाले आहे. तितक्याच प्रमाणात साक्षरता अधिक आढळून येते. याउलट ज्या देशात शहरीकरणाचे प्रमाण कमी असते. तेथे साक्षरता कमी आढळून येते. शहरांची अर्थव्यवस्था गावांच्या तुलनेत चांगली असते. शहरामध्ये रोजगाराच्या अनेक संधी उपलब्ध असतात. परंतु तेथे शक्यतो कुशल मजुरांचीच आवश्यकता असते. ग्रामीण भागात कुटुंब प्रमुखाला मदत करण्यासाठी लहान मुलेही काम करत असतात. पण शहरात मुलाकडून काम करुन घेणे हा गुन्हा मानला जातो. त्यामुळे मुलांना शिक्षणासाठी वेळ मिळतो व त्यामुळे साक्षरता प्रमाण वाढते.

**३) राहणीमानाचा दर्जा :**

ज्या कुटुंबाचा राहणीमानाचा दर्जा उच्च असतो. त्या कुटुंबात मुलांचे शिक्षण हे आवश्यक मानले जाते. किंवा त्यांच्या शिक्षणाकडे जास्त लक्ष दिले जाते. म्हणून अशा कुटुंबात साक्षरता जास्त आढळून येते. याउलट ज्या कुटुंबाचा राहणीमानाचा दर्जा निकृष्ट आहे. तेथे साक्षरतेचे प्रमाण कमी असते.

**४) जातीय संरचना :**

ज्या समाजात जातीय संरचनेमध्ये विविधता आढळून येते. तेथे वेगवेगळया वर्गात शैक्षणिक संस्था काढण्याची निरोगी स्पर्धा लागलेली असते. कारण त्या जातीशी संबंधित असलेल्या लोकांत शिक्षणाचा प्रसार होऊ शकतो व यामुळे साक्षरतेचे प्रमाण वाढते.

**५) समाजातील स्त्रियांचा दर्जा :**

शहरामध्ये अनेक प्रकारच्या शिक्षण संस्था उपलब्ध असल्यामुळे शिक्षण घेण्यासाठी फारशी अडचण येत नाही. याउलट ग्रामीण भागात शिक्षणाच्या सुविधा कमी असतात. शिक्षणसंस्था कमी असून त्या दूर दूर अंतरावर असतात. यामुळे कित्येक मुली शिक्षणापासून वंचित राहतात व याचा परिणाम साक्षरतेवर होत असतो.

**६) वाहतूक आणि संदेशवहन साधनांचा विकास :**

विकसनशील देशात वाहतूक आणि संदेशवहन साधनाचा विकास झाल्यामुळे ग्रामीण भागाचे एकाएकी वातावरण समाप्त झाले आहे व ग्रामीण भागातील मुले पण शिक्षणासाठी शहरात ये-जा करु लागले आहेत. या कारणामुळेच उच्च शिक्षण प्राप्त करण्यासाठी अनेक मुले परदेशात पण जात आहेत.

**७) तांत्रिक विकासाची पातळी :**

ज्या देशात जितक्या जास्त प्रमाणात तांत्रिक विकास झाला आहे.त्या देशात उच्च शिक्षण घेणाऱ्या लोकांची संख्या आणि साक्षरतेचे प्रमाण जास्त आहे. तांत्रिक विकासाच्या दृष्टिने मागासलेल्या देशात उच्च शिक्षण घेणाऱ्या लोकांचे प्रमाण हे कमी असून साक्षरता दरही कमी आहे.

**८) शासकीय धोरण :**

साक्षरतेचा दर उंचावण्यामध्ये शासकीय धोरण महत्वाची भुमिका बजावत असते. अनिवार्य शिक्षण, निःशुल्क शिक्षण, प्रौढ शिक्षण अशा प्रकारच्या सरकारी धोरणामुळे साक्षरतेचे प्रमाण वाढत असते. १५ ते ३५ वर्ष वय असणाऱ्या लोकांसाठी प्रौढ शिक्षणाचे धोरण अवलंबून पौढ लोकांना साक्षर बनवण्याचा प्रयत्न केला जात आहे. त्यामुळे साक्षरता दर वाढतो.

**विषय विवेचनः**

**१. लातूर जिल्ह्यातील साक्षरताः**

इ. सन. २०११ च्या जनगणनेनुसार तक्ता क्र. १.१ मध्ये लातूर जिल्ह्यातील तालुकानिहाय एकूण साक्षरता दर्शवली आहे. त्यामध्ये लातूर जिल्ह्यातील लातूर तालुक्यात सर्वात जास्त साक्षरतेचे प्रमाण आढळते.

इ. सन. २०११ च्या जनगणनेनुसार तक्ता क्र. १.१ मध्ये व आलेखामध्ये तालुकानिहाय एकूण साक्षरता दर्शविली आहे. त्यामध्ये लातूर जिल्ह्यातील लातूर तालुक्यात सर्वात जास्त साक्षरतेचे प्रमाण आढळते. तर सर्वात कमी एकूण साक्षरता जळकोट तालुक्यात आढळते.

लातूर तालुक्यात सर्वाधिक साक्षरता म्हणजे ८२.१४ टक्के एवढी आहे. तर जळकोट तालुक्यात सर्वात कमी म्हणजे ७५.८६ टक्के एवढी आहे.

<div align="center">**तक्ता क्र. १.१ लातूर जिल्हाः तालुकानिहाय एकुण साक्षरता २०११**</div>

| अ. क्र. | तालुका | एकुण साक्षरता |
|---------|--------|----------------|
| १. | लातूर | ८२.१४ |
| २. | रेणापूर | ७६.२७ |
| ३. | अहमदपूर | ७८.७३ |
| ४. | जळकोट | ७५.८६ |
| ५. | चाकूर | ७७.८४ |
| ६. | शिरूर अनंतपाळ | ७७.७६ |
| ७. | औसा | ७६.७७ |
| ८. | निलंगा | ७६.६४ |
| ९. | देवणी | ७६.३७ |
| १०. | उदगीर | ८१.१८ |

<div align="right">*स्त्रोतः लातूर जिल्हा आर्थिक व सामाजिक समालोचन २०१२*</div>



लातूर जिल्हाः तालुकानिहाय साक्षरता २०११
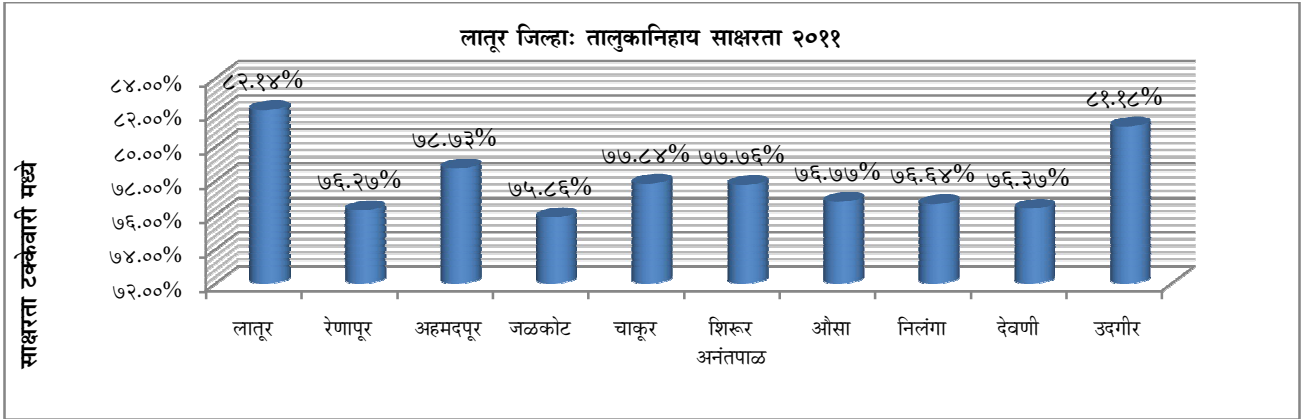
**२. उस्मानाबाद जिल्ह्यातील साक्षरताः**

<div align="center">**तक्ता क्र. १.२ उस्मानाबाद जिल्हाः तालुकानिहाय एकुण साक्षरता २०११**</div>

| अ. क्र. | तालुके | एकुण साक्षरता |
|---------|--------|----------------|
| १. | परंडा | ७५.३३ |
| २. | भूम | ७६.११ |
| ३. | वाशी | ७८.१४ |
| ४. | कळंब | ८०.५६ |
| ५. | उस्मानाबाद | ८८.८९ |
| ६. | तुळजापूर | ७७.४६ |
| ७. | लोहारा | ७६.६८ |
| ८. | उमरगा | ७७.७५ |

<div align="right">*स्त्रोतः उस्मानाबाद जिल्हाः आर्थिक व सामाजिक समालोचन २०१३*</div>



उस्मानाबाद जिल्हाः तालुकानिहाय एकुण साक्षरता २०११
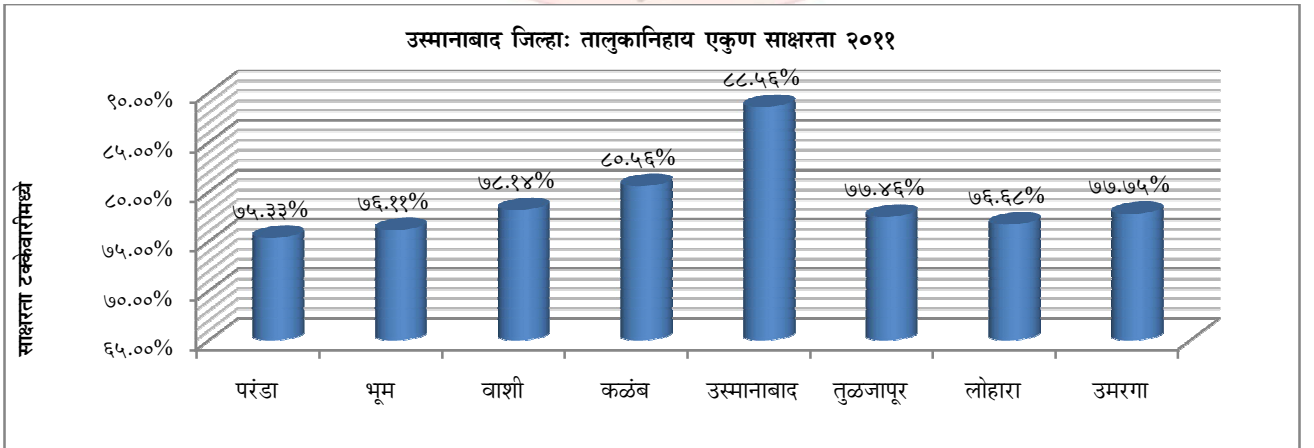
इ. सन. २०११ च्या जनगणनेनूसार तक्ता ४.२ मध्ये तालुकानिहाय एकुण साक्षरता दर्शिवली आहे. त्यामध्ये उस्मानाबाद जिल्ह्यातील उस्मानाबाद सर्वात जास्त साक्षरतेचे प्रमाण आढळते तर सर्वात कमी एकुण साक्षरता परंडा तालुक्यात आढळते.

उस्मानाबाद तालुक्यात सर्वाधिक साक्षरता म्हणजे ८८.८९ टक्के एवढी आहे. तर परंडा तालुक्यात सर्वात कमी म्हणजे ७५.३३ टक्के एवढी आहे.

लातूर व उस्मानाबाद जिल्ह्यातील लातूर व उस्मानाबाद तालुक्यात साक्षरतेचे प्रमाण सर्वाधिक आहे. कारण हे दोन्ही तालुके जिल्ह्याची ठिकाणे आहेत. यामुळे येथे शैक्षणिक विकास मोठ्या प्रमाणात झाला आहे. त्यामुळे तेथे साक्षरता सर्वाधिक आढळते.

## निष्कर्ष:

१. साक्षरता हा जिल्ह्याच्या विकासाचा कणा आहे.

२. लातूर व उस्मानाबाद जिल्ह्यातील लातूर व उस्मानाबाद तालुक्यात साक्षरतेचे प्रमाण सर्वाधिक आढळते.

३. लातूर जिल्ह्यातील लातूर तालुक्यापेक्षा उस्मानाबाद जिल्ह्यातील उस्मानाबाद तालुक्यामध्ये साक्षरता जास्त आढळते.

४. लातूर जिल्ह्यातील जळकोट तालुक्यात व उस्मानाबाद जिल्ह्यातील परंडा तालुक्यात साक्षरता कमी आढळते.

## उपाययोजना:

१. जिल्ह्यामध्ये शाळेच्या वेळामध्ये वाहतुक साधनांची उपलब्धता करून देण्यात यावी. त्यामुळे जास्तीत जास्त मुल-मुली शिक्षण घेतील व साक्षरतेचे प्रमाण वाढेल.

२. जिल्ह्यामध्ये ज्या भागात लोकवस्तीजवळ शाळा नसतील तेथे शाळा सुरू कराव्यात.

३. शासनाने शिक्षणासाठी विशेष सोयी-सुविधा उपलब्ध करून दिल्या पाहिजेत.

## संदर्भग्रंथ:

१. *लोकसंख्या भूगोल:* डॉ. फुले, डॉ. शेटे, डॉ. शहपूरकर

२. *जिल्हा सामाजिक व आर्थिक समाचेलन*

३. *www.google.com*

# भूगोलातील संशोधन पध्दतीत सुदूरसंवेदन तंत्राचा वापर

**प्रा. श्रध्दा विभूते**

सहाय्यक प्राध्यापिका

भूगोल विभाग

महाराष्ट्र उदयगिरी महाविद्यालय, उदगीर जि.लातूर

**कु. प्रियंका रंगवाळ**

एम.ए. प्रथम वर्ष

भूगोल विभाग

महाराष्ट्र उदयगिरी महाविद्यालय, उदगीर जि.लातूर

**सारांश :**

सुदूर संवेदन हे मानवी हस्तक्षेप न होता पृथ्वीवरील विविध वैशिष्ट्यांचे दूर अंतरावरुन अचूकपणे माहिती गोळा करण्याबाबतचे तंत्र आहे. पृथ्वीवरील विस्तृक्षेत्रातील तसेच दुर्गम भागातील माहिती बदलत्या स्थळी प्रत्यक्ष न जाता दूरुन मिळवता येते. काळ व वेळेनुसार भौगोलिक व पर्यावरणीय क्षेत्रातील बदलांचा अभ्यास करणे सुदूरसंवेदनामुळे अधिक सोयीचे झाले आहे.

वलीकरण व प्रस्तरभंगामुळे स्थूल व सूक्ष्म भू-वैशिष्ट्यांचा अभ्यास भूकंप, ज्वालामुखी, वणवा, महापूर व वादळे यांसारख्या नैसर्गिक आपत्ती घडताना व घडल्यानंतर या बाबतचे कोठे ? कसे ? काय ? अशा प्रश्नांचे स्पष्टीकरण आपणाला उपग्रहाद्वारे मिळालेल्या प्रतिमांवरुन सहजपणे मिळू शकते एवढेच नव्हे तर, घनदाट जंगलातील वृक्षांच्या जाती, प्रजाती, वनाखालील क्षेत्र, भूमिउपयोजन पिकपरिस्थिती, भू-पृष्टावरील व भू-पृष्टांतर्गत खनिजे पाण्याचा साठा धरणातील पाणी साठी, धरणाची उंची, खोली व पाणी साठवण क्षमता एखादया क्षेत्रातील कारखानदारी, शहरीकरणामुळे झालेले प्रदूषण, गाळाचे, वाळूचे, नदीचे पात्र बदल, वाहने, वाळवंटीकरण, वन्य प्राण्यांचे सर्वेक्षण, जीवपुरातत्व या संबंधी माहिती मिळवण्यासाठी सुदूर संवेदनाचा अवलंब केला जात आहे. म्हणून आम्ही प्रस्तुत शोधनिबंधात सुदूर संवेदन प्रतिमा व त्याचा वापर भूगोलशास्त्रातील संशोधन पध्दतीत कसे केले जाते या विषयी शोध घेणार आहोत.

**प्रस्तावना :**

प्रस्तुत शोध निबंधामध्ये भूगोल शास्त्रातील संशोधन पध्दतीत सुदूर संवेदन तंत्राचा वापर विविध क्षेत्रात कशा पध्दतीने होतो याचा विचार करण्यात आला आहे. भूगोल शास्त्रातील संशोधन पध्दती अनेक प्रकारच्या आहेत. सध्याच्या विज्ञान व तंत्रज्ञानाच्या युगात भूगोलातील संशोधन पध्दतींना फार मोठे महत्व प्राप्त झाले आहे. भू-माहितीशास्त्र (Geo-informatics) व उपग्रहीय सर्वेक्षण (Satellite Survey) यात भूगोल शास्त्रीय संशोधनास महत्वाचे स्थान आहे. भूगोलातील आधुनिक अभ्यासात भुगोल तज्ञांनी स्वतःची अशी एक संशोधन पध्दती तयार करण्याची प्रयत्न चालू केले आहेत, यात मुख्य भर हा क्षेत्र अभ्यास (Field Work), निरीक्षणे, मोजमापे, भूपृष्ठ सर्वेक्षणे, हवाई छायाचित्रांचे व उपग्रह प्रतिमांचे वाचन - वर्तन - विश्लेषन, जी.आय.एस. (GIS) व (GPS) चा वापर यावर आहे. यांच्या जोडीला संख्यिकी विश्लेषण पध्दतीचा वापरही वाढतो आहे.

वरील सर्व भूगोलशास्त्रातील संशोधन पध्दती महत्वाच्या आहेत. त्याच प्रमाणे सुदूर संवेदन प्रतिमा ही पध्दत देखील खूप महत्वाची आहे.

**उद्दिष्टये :**
1) सुदूर संवेदन तंत्राची माहिती अभ्यासणे.
2) सुदूर संवेदन तंत्राचा भूगोलातील संशोधन पध्दतीतील महत्व अभ्यासणे.
3) सुदूर संवेदन तंत्राचा विविध क्षेत्रांतील उपयोग अभ्यासणे.

**व्याख्या / संकल्पना / (Definition and Basic Concepts in Remote Sensing)**

1) कोणत्याही घटकाच्या किंवा वस्तूच्या प्रत्यक्ष संपर्कात न येता संबंधीची माहिती मिळवणे, संकलित करणे व त्याचे वर्णन या तंत्रास सर्वसामान्यपणे सुदूर संवेदन (Remote Sensing) असे म्हणतात.

2) भूपृष्टावरील वस्तू किंवा प्रदेशांचे व त्याच्या सभावेती घडणाऱ्या नैसर्गिक क्रिया व विविध घटनांसंबंधी विशिष्ट साधनांच्या साहयाने दूरुन माहिती मिळवून तीचे विश्लेषण करण्याचे तंत्र म्हणजे सुदूर संवेदन तंत्र होय.

हवाई छायाचित्रण सुदूर संवेदनाचे मूळ स्वरुप आहे अजूनही सुदूर संवेदनाचा हाच प्रकार जास्त प्रचलित आहे. पृथ्वीवरील भूमी उपयोजन नकाशे, भूपृष्ठ मापन, ग्रामीण व शहरी वसाहतीचे नकाशे, वन संपदेचे नकाशे, मृदा नकाशे, राष्ट्रीय मानचित्र, भूजल सर्वेक्षण, खाणकाम उद्योग व ऐतिहासिक स्थळांचे मानचित्र, भूजल सर्वेक्षण मोठया प्रकल्पाचे सर्वेक्षण, सैनिकी सर्वेक्षण व आपत्ती व्यवस्थापन त्याच प्रमाणे तेल व खनिज साठयांचे शोधन प्रामुख्याने हवाई छायाचित्रणामुळेच होवू शकले. विद्युत चुंबकीय वर्णपटाच्या दृष्टय विभागाचा हवाई छायाचित्रणात उपयोग केला गेला. या वर्णपटाच्या इतर तरंगलांबी विभागाचा (Spectral regions) असाच उपयोग करुन घेता येईल या कल्पनेतूनच सुदूर संवेदन तंत्राचा विकास होत गेला. 1960 च्या दरम्यान औष्णिक अवरक्त (Thermal infrared ) व सुक्ष्म तरंग (Micro Wave) विभागाचाही उपयोग या तंत्रात हावू लागला. मानवरहीत उपग्रहांचा प्रयोग ही याच काळात यशस्वी झाला आणि पृथ्वीभूपृष्टाच्या अनेकविध प्रतिमा घेणे शक्य होवू लागले.

आधुनिक उपग्रह सुदूर संवेदन तंत्र अधिक प्रगत आहे. आजचे उपग्रह तंत्रज्ञान पुढील कारणामुळे जास्त उपयुक्त ठरते आहे.

1) संपूर्ण विद्युत चुंबकीय उर्जा / वर्ण पटाचा जास्तीत जास्त उपयोग.
2) अधिक प्रगत, अचूक व दर्जेदार संवेदकांचा (Sensors) वापर.
3) आवकाशिक (Spatial) माहितीपेक्षा वर्णपटलीय (Sensors) माहिती मिळण्यावर जास्त भर.
4) प्रतिमा प्रक्रिया व प्रतिमावर्धक (Image processing and image enhancement) यात प्रगती.
5) प्रतिमांचे संगणकीय वाचन व वर्णन.

वरील सर्व कारणांमुळे सुदूर संवेदनाची कोणतीही यंत्रणा वापर करुन कोणत्याही तरंगलांबी प्रदेशात मिळवलेले दृश्य चित्र म्हणजे सुदूर संवेदन प्रतिमा असे म्हणता येवू शकते.

**सुदूर संवेदन तंत्राचा आधार :-** विद्युत चुंबकीय उर्जेचे गुणधर्म हा सुदूर संवेदन तंत्राचा आधार आहे. सर्व पदार्थ विद्युत चुंबकीय उर्जा उत्सर्जित करीत आहात. त्यास ही उर्जा सुर्यापासून तयार होते. सुर्यापासून येणाऱ्या विद्युत चुंबकीय उर्जा लहरी या विविध प्रकारच्या व विविध गुणधर्माच्या असतात. सुदूर संवेदन तंत्रामुळे माहिती ही प्रत्यक्ष प्रतिमा (हवाई छायाचित्र) व अप्रत्यक्ष प्रतिमा (उपग्रह) या स्वरुपात दूर अंतरावरुन उपलब्ध होत असते. यासाठी पूढील दोन प्रमुख घटकांचा उपयोग केला जातो.

A) **सौर उर्जा :-** विद्युत चुंबकीय लहरीच्या (Electromagnetic wave ) स्वरुपात सौर उर्जा पृथ्वी कडे येथे या विविध लांबीच्या लहरी विविध गुणधर्म व वारंवारीतेच्या असतात. त्यातील फक्त प्रकाश किरणे किंवा दृश्य लहरी डोळयांना दिसत असतात. त्यापासूनच सौर वर्णपट (Electromagnetic Spectrum) बनतो. पर्यावरणातील विविध बाबीवर यांची परस्पर क्रिया घडते व त्यानूसार उर्जेचे परिवर्तन उत्सर्जन होते व संवेदकामार्फत याची नोंद होऊन प्रतिमा बनते.

B) **संवेदक :-** भू-पृष्ठावरील विविध नैसर्गिक मानवी व सांस्कृतिक घटकांची दुरुन नोंद घेऊन प्रतिमा किंवा इमेजरी तयार करण्याच्या साधनास संवेदक असे म्हणतात.

**संवेदकाचे प्रकार :**

1) **कॅमेरा :-** कॅमेरा हा महत्वाचा संवेदक असून तो यांत्रिक संवेदक आहे. आकाशातून विमानाचा प्लॅटफॉर्म म्हणून याचा उपयोग करुन त्याद्वारे भू-पृष्टाची हवाई छायाचित्र घेता येतात.

**कॅमेऱ्याचे प्रकार :**

A) **सामान्य कोन कॅमेरा (Normal angle camera) :-**
या कॅमेऱ्यातील भिंगाची नाभीय लांबी 200 ते 300 मि.मि. असते आणि भिंग 70 अंश च्या कोनात समाविष्ट होणाऱ्या प्रदेशाचे चित्रण करु शकते. या कॅमेऱ्यांनी घेतलेल्या हवाई छायाचित्रांची समतलमिती (Planimetry) उच्च अचूकतेची असते.

B) **विस्तृत कोन कॅमेरा (Wide angle camera)**
या कॅमेऱ्यातील भिंग 70 अंश ते 100 अंश च्या कोनात समाविष्ट होणाऱ्या प्रदेशाचे चित्रण करु शकते. भिंगाची नाभिय लांबी 100 ते 150 मि.मि. असते. या कॅमेऱ्याने घेतलेल्या छायाचित्रात विविध ठिकाणांची उंचीची मोजमापे जास्त बिनचुक येतात.

C) **अतीविस्तृत कोन कॅमेरा (Superwide angle camera)**
यात 100 अंशापेक्षा जास्त कोनात समाविष्ट प्रदेशाचे चित्रण होऊ शकते. भिंगाची नाभिय लांबी 45 ते 90 मि.मि. असते. उंचीदर्शक मोजमापे, खूपच नेमकी व अचूक येतात.

2) **रडार (Radar) :-** रडार हा क्रियाशील संवेदक आहे. त्यात उर्जेचा वापर केला जातो.

3) **स्कॅनर (Scanner) :-** अकाशातील उर्जा उंची वरील कृत्रिम उपग्रहात स्कॅनर हा संवेदक बसलेला असतो. संवेदकाच्या उपयोगानूसार त्याचे व्यापारी संवेदक व लष्करी संवेदक असे प्रकार पडतात.

**प्लॅटफॉर्म :** पृथ्वीकडून विविध घटकांद्वारे मिळालेल्या सौर उर्जेचे संवेदकाकडे परावर्तन व उत्सर्जन होत असते या संवेदकांना आकाशातून वाहून नेण्यासाठी प्लॅटफॉर्मची गरज असते.

1) **प्लॅटफॉर्मची कार्य :-**     1) संवेदकास आधार देणे
        2) संवेदकास वाहून देणे
        3) संवेदकाच्या कार्यास उत्पर राहणे.

**प्लॅटफॉर्मचे प्रकार :**

a) **जमिनीवरील प्लॅटफॉर्म :-** काही प्लॅटफॉर्म हे जमिनीवरच स्थिर असतात व जमीनीपासून उंच ठिकाणी स्थिर असतात त्यास जमिनीवरील प्लॅटफॉर्म असे म्हणतात. उदा. टॉवर्स

b) **आकाशातील प्लॅटफॉर्म :-** भू-पृष्टापासून कमी उंचीवर असणाऱ्या प्लॅटफॉर्मचा समावेश या मध्ये होतो.
उदा : हवाई फुगे, पतंग, पक्षी, विमान, हेलिकॉप्टर इत्यादी

c) **अंतरिक्षातील प्लॅटफॉर्म :-** भू-पृष्टापासून अतिशय जास्त उंचीवर आकाशात उसलेल्या प्लॅटफॉर्मना अंतरीक्षातील प्लॅटफॉर्म म्हणतात.
उदा : रॉकेट, अवकाशयान, कृत्रिम उपग्रह, स्कायलॅब, स्पेस सेटल इत्यादीचा समोवश होतो.

1) **कृत्रिम उपग्रह :**
कृत्रिम उपग्रह हे भू-पृष्टापासून 300 कि.मी. पासून 3500 कि.मी. पर्यंत स्थिर असल्याने एका वेळी आधिक विस्तृत भागाची प्रतिमा उपग्रहाद्वारे मिळते. शिवाय हवाई छायाचित्रात न येणाऱ्या घटकांची माहिती अशा उपग्रहाकडून मिळते.

2) **अवकाशयान :-** संपूर्ण पृथ्वी प्रदक्षिणा करुन पृथ्वी माहिती अवकाशयानाद्वारे दिली जाते.

**सुदूर संवेदनाचा विविध क्षेत्रातील उपयोग :**
सुदूर संवेदनाचा विविध विषय क्षेत्रात विविध बाबीसाठी उपयोग केला जातो. उपयोगाचे क्षेत्र वाढतच चालले आहेत. उपाययोजनाचे क्षेत्र व त्यातील उपयोग पूढील प्रमाणे दिसून येतील.

1) **शेती :-** पिकाखालील क्षेत्र व उत्पादनाचा अंदाज घेणे, पिकावरील रोग ओळखणे, अवर्षण स्थिती विश्लेषण करता येते.

2) **वनरक्षणशास्त्र :-** वनस्पतीच्या जाती ओळखणे , जंगलतोड व जंगल लागवडी चे विश्लेषण , नियोजन रोगाचा प्रसार करणे, वणव्याचे क्षेत्र ओळखणे इत्यादी.

3) **भूमी उपयोजन विश्लेषण :-** भूमी उपययोजनाचे विश्लेषण करणे, नियोजन करणे, शेती क्षेत्रातील शहरांचे अतीक्रमण पाहणे इत्यादी.

4) **जलसंपत्ती** :- नदीतील प्रवाह पाहणे, भूजलाचे स्त्रोत अभ्यासणे , पूरक्षेत्राचे विश्लेषण करणे इत्यादी.

5) **भूगर्भशास्त्र व खनिजे :-** खडकांची संरचना प्रकार ओळखणे, तेल, नैसर्गिक वायू व इतर खनिज शोधने इत्यादी.

6) **भूरूपशास्त्र** :- उतार बाह्यशक्तीचा कार्याचा परिणाम पाहणे, नदी मार्गावरील बदल ओळखणे.

7) **अभियांत्रिकी** :- रास्ते , विमानतळ, धरणाचे स्थान अभ्यासणे , कालव्याच्या मार्गाची आखणी , पाणी झिरपण्याचे क्षेत्र ओळखणे इत्यादी.

8) **मृदा** :- मृदा प्रकार ओळखणे , गुणवत्तेनुसार वर्गीकरण करणे.

9) **नकाशाशास्त्र** :- सांख्यिकी नकाशे, भौगोलिक माहिती प्रणालीतील नकाशे तयार करणे इत्यादी.

10) **नगर नियोजन** :- नगर क्षेत्र , करमणूक क्षेत्र , नगर भू-उपायोजन वर्गीकरण लोकसंख्याचा अंदाज किंवा आकृती बंध लक्षात घेणे.

11) **सागरशास्त्र** :- किणारपट्टीवरील क्षरण, संचयन, लाटांची व सागरी प्रवाहाची हालचाल , मासेमारी क्षेत्र , प्लॅक्टन वनस्पती क्षेत्र, प्रवाळ, खडक, खनिज तेलांची साठे इत्यादी.

12) **पर्यावरण** :- प्रदूषित क्षेत्र ओळखणे, पर्यावरण संतुलनचा अभ्यास इ.

13) **पूराणवस्तूशास्त्र** :- पुरातन केंद्र, प्राचीन नदयांचे मार्ग, प्राचीन मानवी वस्तीस्थान अभ्यासणे.

14) **वातावरण व हवेचा अंदाज** :- ढग, सागरी प्रवाहाची हालचाल, सागरपृष्ठ तापमान, वादळे, हवामानावर परिणाम करणारे घटक अभ्यासणे इत्यादी.

15) **लष्करासाठी** :- लष्करी दृष्टीकोनातून भूमिस्वरुप साधन संपत्ती वस्ती, उद्योग क्षेत्र इत्यादी माहिती  मिळवणे टेहाळणी, हेरगिरी करण्यासाठी इत्यादी.

   अशा रितीने विविध क्षेत्रात उपयोग केला जात आहे.

**ग्रामीण क्षेत्रातील विकासात सुदूरसंवेदन तंत्राची अवश्यकता :-**

1) ग्रामीण क्षेत्रात उपग्रह प्रतिमांचे विविध समस्यांचे समाधान करण्यासाठी प्रभावी साधन ठरत आहे. ज्यामध्ये शेती जलसिंचन, वनीकरण, भूविज्ञान, एकात्मिक ग्रामीण विकास, मृदा व जल संधारण, पंचायत प्रशासन या सारखे विभिन्न क्षेत्रात सुदूर संवेदन डाटाचे योगदान महत्व पूर्ण ठरत आहे.

2) सुदूर संवेदन तंत्राच्या माध्यमातून उपयुक्त सुचना व मानचित्र तयार केले जात असून त्याचा पयोग प्रशासकीय निर्णयामध्ये होत आहे.

3) नविन तंत्रज्ञान व उच्च रेसोल्यूशन उपग्रह निर्मितीमुळे आता ग्रामीण स्तरावर भू-नकाशे, जलवितरण (वॉटर शेड) कार्य योजना, शहरी विस्तार, मूलभूत सूविधा याचे आकलन होणयकरिता उपयुक्त ठरत आहे.

4) शेतीयोग्य जमिनीचे नकाशे, विविध पिकांचे नकाशे, क्षेत्रफळ, पडीक जमीन, जलयुक्त क्षेत्र इत्यादी. भूमीचे ग्राम स्तरावरील माहिती व त्यांचे उचित व्यवस्थापन यासाठी सुदूर संवेदन तंत्राची अवश्यकता उपयूक्त ठरते.

**निष्कर्ष :**

1) सुदूर संवेदन तंत्राचा वापर विविध विज्ञान व विद्याशाखेतून केला जात आहे.

2) सुदूर संवेदन तंत्र तसे खर्चीक पण तसे तंतोतंत व व्यवस्थित माहिती देणारे आणि वेळ वाचविणारे तंत्र आहे.

3) अगदी सुक्ष्म बदल देखील उपग्रहाकडील प्रतिमांद्वारे निर्देशीत केले जाते.

4) भूगर्भशास्त्रिय व मृदा प्रकारचे नकाशे, जीव पुरातत्व, वन्य प्राण्यांचे सर्वेक्षण, वाळवंटीकरण, नागरीकरण, दाट वस्ती, या सारखी व असंख्य प्रकारची माहिती उपग्रहाकडील प्रतिमांद्वारे मिळविता येतो.

5) सुदूर संवेदन तंत्राच्या द्वारे मिळविलेल्या माहितीचे संकलन संगणकाद्वारे केले जाते.

6) सुदूर संवेदन तंत्र प्रणालीच्या साहयाने ग्रामीण मागासलेल्या क्षेत्राचा विकास करण्यासाठी उपयोग सांगितला जातो.

7) भूगोल शास्त्रातील संशोधन पध्दतीत सुदूर संवेदन तंत्राचा वापर होतोच पण त्याच बरोबर इतर विद्याशाखेत सुध्दा याचा उपयोग महत्वाचा ठरतो. म्हणून सुदूर संवेदन तंत्राचा भूगोलातील संशोधन पध्दतीत अनन्य साधारण असे महत्व आहे.

**संदर्भ ग्रंथ :**

   1) भूगोलशास्त्रातील संशोधन पध्दती : डॉ. श्रीकांत कार्लेकर, डॉ. मोहन काळे.
   2) भौगोलिक विचारधारा : (Geographical Thought) : डॉ. बी.जी. वेळापूरकर, डॉ. के.बी. कणकुरे, डॉ. एच.बी. राठोड प्रा.व्ही.आर. उगाडे.
   3) प्रात्यक्षिक भूगोल (Practical Geography) डॉ.डी.वाय. अहिरराव प्रा.इ.के. करंजखेले.
   4) भौगोलिक माहिती प्रणाली : (GIS) (Geographical information System) - डॉ. श्रीकांत कार्लेकर
   5) सुदूर - संवेदन (Remote sensing) : डॉ. श्रीकांत कार्लेकर

# मानवी आरोग्य व पर्यावरण

**डॉ. ए. के. हांगे**

भुगोल विभाग

शिवाजी महाविद्यालय, रेणापूर

**प्रा. जी. आर. झाडके**

भुगोल विभाग

वसुंधरा महाविद्यालय, घाटनांदूर

**प्रस्तावना :**

पर्यावरण म्हणजे मानवाच्या सभोवतालची परिस्थीती असा आपण अर्थ लावतो. मानवाला जगण्यासाठी पर्यावरण हा अत्यंत महत्वाचा घटक मानला जातो. ज्या भागात पर्यावरण मानवाला अनुकूल आहे अशा भागातच मानव वस्ती करुन राहतो आणि अशा भागातच त्याचा विकास हाते. ज्या भागात पर्यावरण रोगीट आहे मानवाच्या शरीरासाठी उपयोगी नसते अशा भागात मानवी वस्तीचा विकास होत नाही. म्हणून मानवाच्या आरोग्याच्या दृष्टीने त्या भागातील पर्यावरण हे स्वच्छ असले पाहिजे. अलिकडे वाढत्या शहरीकरणामुळे पर्यावरणावर मोठा दुष्परिणामझाल्याचे दिसूनय येते. या दुषीतपर्यावरणाचा परिणाम मानवी आरोग्यावर घातक ठरत आहे.

भारताच्या संदर्भात 2011 च्या जनगणनेनुसार 30.16 टक्के लोकसंख्या शहरामध्ये राहेते तर प्रक्षेपीत अंदाजानुसार 2030 पर्यंत ती 25 कोटी होईल. असा अंदाज आहे भारतातील दिल्ली, मुंबई या शहराचा झपाट्याने विकास होऊन शहरीकरणाचा वेगही वाढला. 2013 मध्ये जी 45 टक्के होण्याची शक्यता होती तर 2030 मध्ये ती 58 टक्के होण्याची शक्यता आहे भारतातील महानगरांची संख्या ही काही देशातील एकूण लोकसंख्येपैकी आहे. लोकसंख्या वाढीचा व शहरीकरणाचा आर्थिक परिणामाबाबत चर्चा करता वर्ष 2030 पर्यंत 70 टक्के राष्ट्रीय उत्पन्न शहरातून येण्याचा अंदाज व्यक्त केला आहे.

शहरीकरणाचे फायदे जसे आहेत तसेच त्याचे दुष्परिणामही अलीकडे जाणवू लागले आहेत आणि म्हणूनच या शोधनिबंधातून शहरीकरणाच्या दुष्परिणामाबाबत प्रकाश टाकला आहे.

जगात 2008 मध्ये निम्म्याहुन अधिक जग शहरी बनले या शहरांची निर्मिती व वृध्दी मुख्यतः लोकसंख्येची वृध्दी व शहरातील आर्थिक क्रियाचा विकासामुळे झालो शहराचा विकास मुख्यत तेथील नैसर्गिक साधनसंपत्ती व प्रदेशातील सांस्कृतिक विकास या आधारावर नगरे विकसीत होत गेली 1950 मध्ये जगाच्या एकूण लोकसंख्येपैकी सरासरी 30 टक्के लोकसंख्या शहरी होती तर 2050 मध्ये मध्ये शहरीकरणाची हीच सरासरी पातळी 66 टक्क्यावर पोहचेल. अशा अंदाज वर्तविण्यात येतो. जगातील शहरी लोकसंख्या मध्ये सुमारे 250 कोटीची भर पडेल असे चित्र मांडले जाते.

**अभ्यास पध्दती :**

शोधनिबंधासाठी द्विवीय स्तरावरील प्रकाशीत पुस्तके व सांख्यिकी जनगणनेच्या पुस्तीकांमधून सुंदर अंर्तजाल व इंटरनेट्च्या माध्यमातून उपलब्ध माहितीच्या आधारे शोध विकास लिहीला आहे.

**शहरीकरणाचा पर्यावरणावर होणारा प्रभाव:**

**1) घनकचरा:**

शहरामधून घरातून निघणारा जैवीक व अजैविक कचरा, दवाखान्यातून निघणारा कचरा हा शहराचा बाहेर साठवला जातो. प्लास्टीक, इ घनकचरा याची महानगराच्या दुतर्फाढिग लागलेले दिसतात व नियोजना अभावी सर्वत्र दुर्गंधीपसरते व त्यातून विषारी वायू बाहेर पडतात.

**2) पाणी:**

वाढते उद्योगधंदे व औद्योगिकरणामध्ये वापरले जाणारे पाणी, तसेच घरगुती वापरातून बाहेर पडणारे पाणी हे नदीनाल्यामध्ये सोडले जाते त्यामुळे जलस्रोत हे प्रदूषीतहोतात.

**3) वायु प्रदूषण**

औद्योगिक शहरामधून वातारणात बाहेर पडणारे दुषीत वायू तसेच विविध वाहनाच्या साधनाद्वारे, खाणकाम उद्योगाच्या विकासात, इमारती बांधकाम, बाहेर पडणारी धुळ इ मुळे वायू प्रदूषण होते. उदा- दिल्ली, कोलकत्ता, चेन्नई, अहमदाबाद, गोरखपुर इ. औद्योगीक शहरात प्रदुषणवाढले. शहरामधून अलीकडे पर्यावरणीय वायु प्रदुषणनिर्माण होऊन जागतीक उष्मा वृध्दी होते.

**3) सामाजिक परिणाम:**

शहरामध्ये नौकरी – धंदे करीता येणारेलोक कमी जागेच्या वस्त्यांमधूनदाटभने निवास करतात. व सेवा सुविधांच्याअभावामुळे ह्या वस्त्या गलीच्छ असतात. येथे राहणारा वर्ग हा अशिक्षीत असतो. शहरी जीवनाची घटक यामुळे वाममार्गाने पैसा मिळविण्याचा स्वप्न डोळ्यासमोर असल्याने गुन्हेगारी व वाई ट कामाकडे वळतात. त्यामुळे शहरातून गुन्हेगारी वाढते. अशा प्रकारे शहरीकरणाचा पर्यावरणावर विविध क्षेत्रावर प्रभाव पडताना दिसतो.

**शहरीकरणाचा मानवी आरोग्यावर पडणारा प्रभाव:**

1) रोगमूलक सुक्ष्म जंतू – जलवाहिन्यातून अनेक प्रकारचे सुक्ष्म जंतू विषाणू वाहत येतात. ह्या दुषित पाण्याचा योग्य प्रक्रिया न झाल्यास पाणी प्रदूषित होवून संसर्गजन्य रोग फैलावतात.

2) बंदिस्त जागा – घरे, कारखाने, चित्रपटगृहे, कार्यालये, अवकाशयाने इ. बंद जागेत विषारी होवून तेथे हवेचे प्रदूषण होते ज्याचा प्रभाव मानवी आरोग्यावर होतो. एकंदरीत नागरीकरणांमुळे शहरामधून अनेक आरोग्याविषयक समस्या पहायला मिळतात.

3) वाहतुकीच्या साधनांमूळे निरनिराळे आवाज तसेच पत्रे, कारखाने, भोंगे, स्कुटर, विमान व अन्य कारणांमूळे रोगावर होत असतो त्यामुळे मानसिक ताण हृदयविकार, श्रवणद्रियांचे बधिर होतात गोंगाट सतत राहिल्यास चिंता, मनोशक्तीत बदल तसेच उच्च रक्तदाब, मळमळणे, डोके दुखी दमा इ विकार होतात.

**निष्कर्ष:**

नागरीकरणावर संपूर्ण नियंत्रण आणून राज्याला हवे तसे आहे तसेच नागरीकरण करणे, सृदढ, सुरक्षित संस्करात सुंदर, शहराची हवा स्वच्छ असावी, पाणी शुध्द असावे. शहर निसर्गाशी जबाबदारी वागणारे असावे. नागरीकांना पोट भरण्याची विवंचना तर नसावीच. नगर महानगराची वाढ थांबवून शहरापासून दुरकाही अंतराव अशाच प्रकारची छोटी शहरे निर्माण करावी. अलीकडे स्मार्ट सिटी ही योजना सरकार राबविताना दिसते. शहरात राहणाऱ्या नागरीकांना दंडात्मक कार्यवाही करुन शहर स्वच्छ ठेवण्याच्या संदर्भात महापालिकांनी योजना राबवावी.

**संदर्भग्रंथ**

1) अभय टिळक – स्मार्टपणा काम कामाचा
2) एडक भरूचा – पर्यावरणशास्त्र
3) नागरी समाज – भारताचा भूगोल
4) पर्यावरण भूगोल – डॉ. वराट, डॉ. बोरुडे

# चाकूर तालुक्यातील लोकसंख्येच्या घनतेचा भौगोलिक अभ्यास

**प्रा.डॉ. एन. के. वाघमारे**
सहाय्यक प्राध्यापक व संशोधक मार्गदर्शक
भूगोल विभाग प्रमुख,
इंदिरा गांधी महाविद्यालय,सिडको, नांदेड

**श्री. बी. ए. मोठेराव**
संशोधक विद्यार्थी,
भूशास्त्र संकुल, स्वा.रा.ती.म. विद्यापीठ, नांदेड

**सरां"I :**

प्रस्तुत शोधनिबंधामध्ये चाकूर तालुक्यातील लोकसंख्येच्या घनतेचा 2001 ते 2011 मधील घनतेचा अभ्यास केलेला आहे. या 10 वर्षात चाकूर तालुक्यातील मंडळनिहाय घनतेमध्ये वाढ कशा प्रकारे झाली आहे. चाकूर तालुक्याची लोकसंख्या घनता 2001 च्या जनगणनेनुसार 229 एवढी होती. तर 2011 च्या जनगणनेनुसार 260 एवढी आहे. मंडळ निहाय याचा अभ्यास या शोध निबंधात केलेला आहे.

**बिज संज्ञा :** चाकूर तालुक्यातील लोकसंख्या घनता

**प्रस्तावना :**

कोणत्याही देशाचा विकास हा त्या देशाच्या आर्थिक, सामाजिक आणि सांस्कृतिक विकासात लोकसंख्येची भूमिका महत्त्वाची असते. लोकसंख्येच्या प्रमाणावर त्या प्रदेशाची परिस्थिती अवलंबून असते. लोकसंख्येची घनता, स्त्री–पुरुष प्रमाण, साक्षरता, लिंग–गुणोत्तर, मृत्युदर, जन्मदर यांचा आढावा घेतल्यास असे लक्षात येते की, सर्वच दृष्टीकोणातून लोकसंख्येला महत्त्वाचे स्थान आहे. वरील लोकसंख्येच्या अंगातील वाढती असताना ही लोकसंख्येच्या समस्या निर्मितीस कारणीभूत ठरत असते. तेव्हा उद्भवणा–या समस्या लक्षात घेता, देशातील लोकसंख्येची अद्यावत माहिती घेणे अवश्यक असते.

लोकसंख्येच्या अद्यावत सांख्यिकीय माहितीच्या आधारे लोकसंख्येच्या असलेल्या संभाव्य समस्यांचा आढावा व भविष्यातील लोकसंख्येचे अचूक नियोजन करणे शक्य होते. लोकसंख्येची घनता हा घटक लोकसंख्येच्या अभ्यासामध्ये अतिशय महत्वपूर्ण असून लोकसंख्येची घनता म्हणजे दर चौ.किमी. ला वास्तव्य करणा–या लोकांची संख्या होय. लोकसंख्येच्या घनतेमुळे कोणत्या प्रदेशामध्ये किती लोकवास्तव्य करतात याचा अभ्यास या शोध निबंधाद्वारे करण्यात झाला आहे. आपल्या देशामध्ये लोकसंख्येची घनता विषम प्रमाणात पाहवयास मिळते. तसेच महाराष्ट्र राज्यात पण लोकसंख्येची घनता ही वेगवेगळ्या प्रदेशात विषम आहे. चाकूर सारख्या मागास तालुक्यामध्ये लोकसंख्या घनता खुप विषम आहे. याचा परिणाम समाज व्यवस्थेवर होताना दिसतो.

**अभ्यास क्षेत्र :**

लातूर जिल्ह्याचे स्थान महाराष्ट्र राज्याच्या आग्नेय दिशेत आहे. जिल्ह्याचा अक्षवृत्तीय विस्तार $18^0 5'$ उत्तर ते $18^0 10'$ उत्तर असून रेखावृत्तीय विस्तार $73^0 25'$ पूर्व ते $77^0 25'$ आहे. या जिल्ह्यातील चाकूर तालुका अभ्यासासाठी निवडलेला आहे.

तालुक्याच्या अक्षवृत्तीय विस्तार $18^0 30'$ ते $18^0 5'$ उत्तर असुन रेखावृत्तीय विस्तार $76^0 52'$ पूर्व ते $76^0 85'$ पूर्व आहे. तालुक्याच्या पूर्वेस उदगीर व उत्तरेस अहमदपूर तर पश्चिमेस रेणापूर व लातूर आणि दक्षिणेस शिरुर अनंतपाळ हे तालुके आहेत. चाकूर तालुक्याचे क्षेत्रफळ 686 चौ.किमी. असुन तालुक्यामध्ये एकूण 05 महसूल मंडळे आहेत. चाकूर तालुका पूर्णतः बालाघाट डोंगर रांगेतील पठारी प्रदेशाने व्यापलेला आहे. बालाघाट डोंगररांगेमध्ये उत्तर भाग उंचवट्याचा (डोंगराळ) व दक्षिण भाग सपाट (पठारी) असे दोन भाग पडलेले आहेत. तालुक्याची समुद्र सपाटी पासून उंची 435 ते 639 मीटर आहे. घरणी, तिरु, इ. नद्या आहेत. हवामान उष्ण व कोरड्या स्वपाचे असुन कमीत कमी तापमान $15^0$ से ते जास्तीत जास्त तापमान 39. $6^0$ से एवढे आहे. 2001 च्या जनगणनेनुसार चाकूर तालुक्याची लोकसंख्या 1,57,135 तर 2011 च्या जनगणने नुसार तालुक्याची लोकसंख्या 1,78,089 एवढी आहे. व घनता 2001 सालानुसार 229 व 2011 सालानुसार 260 दर चौ.किमी. आहे. सादर तर प्रमाण 78 टक्के आहे.



चाकूर तालुका स्थानदर्शक नकाशा
Location Map

नकाशा क्र. 1

**उद्दिष्टे :**

1. चाकूर तालुक्यातील लोकसंख्या घनतेतील बदल अभ्यासणे.
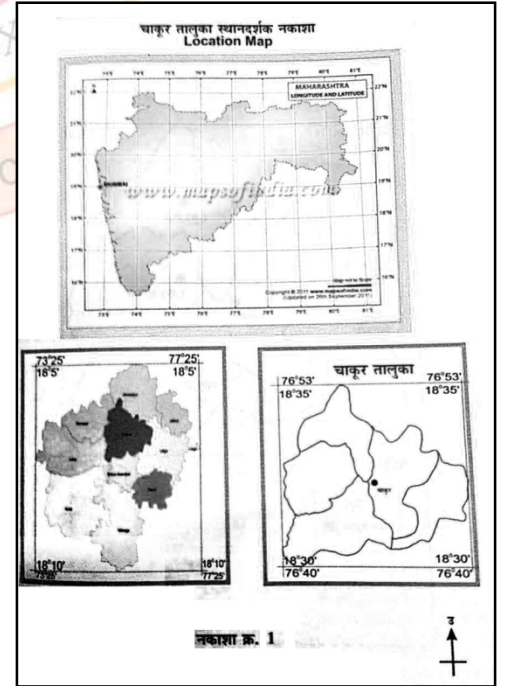
2. चाकूर तालुक्यातील घनतेच्या वितरणाचा अभ्यास करणे.

## सं"गोधन पध्दती :

प्रस्तुत शोध निबंध हा द्वितीयक माहितीवर आधारित आहे. माहिती संकलन करण्यासाठी द्वितीयक माहिती स्त्रोतांचा उपयोग केला आहे. ही माहिती जिल्हा जनगणना पुस्तीका, जिल्हा आर्थिक व सामाजिक समालोचन, गॅझोटिअर भारत व महाराष्ट्र सरकारचे जनगणना अहवाल, इंटरनेटद्वारे माहिती संकलित करण्यात आली आहे.

या शोधनिबंधामध्ये लोकसंख्येची घनता काढण्यासाठी घनतेच्या सुत्राचा वापर केला आहे. तसेच आकडेवारीचे सादरीकरण करण्यासाठी विविध नकाशा शास्त्रीय पध्दतीचा अवलंब केलेला आहे.

## लोकसंख्या घनता सूत्र :

$$\text{लोकसंख्या घनता} = \frac{\text{एकूण लोकसंख्या}}{\text{एकूण क्षेत्रफळ}}$$

## विशय विवेच :

गणितीय घनता काढण्यासाठी एकूण लोकसंख्येला एकूण क्षेत्रफळाने भागून आलेले उत्तर गणितीय घनता दर्शविते. खालिल सारणीमध्ये 2001 ते 2011 या कालावधीत चाकूर तालुका मंडळनिहाय गणितीय घनता दर्शविण्यात आलेली आहे. (सारणी – 1)

### सारणी क्र. 1: चाकूर तालुका मंडळनिहाय लोकसंख्या गणितीय घनता – (2001–2011)

| अ.क्र. | मंडळाचे नाव | लो. गणितीय घनता (दर चौ.कि.मी.) | | लोकसंख्या घनतेतील फरक |
|---|---|---|---|---|
| | | 2001 | 2011 | |
| 1 | चाकूर | 288 | 330 | 43 |
| 2 | नळेगाव | 326 | 359 | 33 |
| 3 | वडवळ (ना.) | 164 | 184 | 20 |
| 4 | झरी (बु.) | 206 | 230 | 24 |
| 5 | शेळगाव | 190 | 226 | 36 |

*स्त्रोत : जिल्हा जनगणना अहवाल, लातूर जिल्हा, लातूर (2001–2011)*
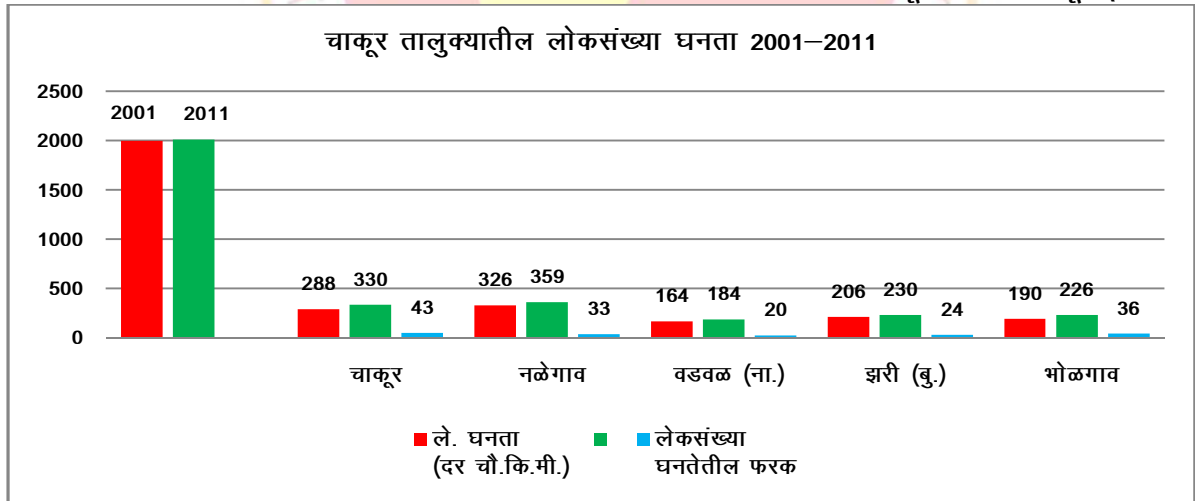


तक्ता क्र. 1 व आकृती क्र. 2 मध्ये चाकूर तालुक्यातील लोकसंख्येतील घनतेमध्ये 2001 ते 2011 पर्यंत कश्या प्रकारे बदल होत गेलेले आहे. ते दर्शविण्यात आलेले आहे. वरील सारणीचं अवलोकन करता असे लक्षात येते की, 2001 ते 2011 या जनगणनांनुसार तालुक्यातील सर्वाधिक लोकसंख्येची गणितीय घनता नळेगाव मंडळ आहे. ती 2001 मध्ये 326 व 2011 मध्ये 359 इतकी आहे. म्हणजेच 2001 ते 2011 या दशकामध्ये घनतेमध्ये 33 ने वाढ झाल्याचे दिसते. लोकसंख्येच्या घनतेत वाढ होण्याचा वेग हा नळेगाव मंडळाचाच जात आहे. नळेगाव मंडळाचे भौगोलिक स्थान अतिशय अनुकूल आहे. नळेगाव मंडळ हे घरणी नदिच्या खो–यात आहे. त्यामुळे नळेगाव मंडळातील जास्तीत जास्त क्षेत्र कृषी योग्य आणि काळी कसदार मृदा असलेले आहे. नळेगाव मंडळातून घरणी वाहते. त्यामुळे या नदिवर मोठा प्रकल्प उभारलेला आहे. त्यामुळे नळेगाव मंडळातील कृषीसाठी एक मोठा जलसिंचनाचा स्त्रोत उपलब्ध झाल्याने आणि नळेगाव एक मोठी बाजार पेठ असल्याने अनेक लहान मोठे उद्योग व्यवसाय चालतात नळेगाव मंडळ विविध वाहतूक मार्गांनी जिल्ह्याच्या विविध भागांशी जोडलेल्या नळेगाव मंडळाचे तालुक्यातील सर्वाधिक लोकसंख्येचे केंद्रीकरण झालेले आहे. व होत आहे. त्यामुळे लोकसंख्येच्या विविध घनता व घनतेत वाढ होण्याचा सर्वाधिक वेग नळेगाव मंडळाचाच आहे. 2001 – 2011 या जनगणनेनुसार तालुक्यामध्ये सर्वात कमी लोकसंख्येची घनता (164) व (184) वडवळ (ना.) मंडळाची आहे. वडवळ (ना.) मंडळात

तालुक्यातील काही भाग उंचीचा म्हणजे डोंगराळ भू–भागात असल्याने कमी खोलीला मृदा आणि कृषीसाठी फारशी उपयुक्त नसलेल्या मृदा कृषीयोग्य जमिनीचे प्रमाण इतर मंडळाच्या तुलनेत कमी आहे. कृषीसाठी अत्यावश्यक असलेले जलसिंचनाचे स्त्रोत या मंडळात उपलब्ध नसल्याने आणि रोजगार निर्मितीसाठी उद्योग व्यवसाय वडवळ (ना.) मंडळात नाहीत. म्हणजे वडवळ (ना.) मंडळाचा आर्थिक विकास झालेला नाही. या मंडळामध्ये भौगोलिक घटक प्रतिकूल असल्याने मंडळाचा आर्थिक व सांस्कृतिक विकास झालेला नाही. त्यामुळे या भागातील विविध घनता कमी आहेत. तसेच लोकसंख्या घनतेत वाढ होण्याचा वेगही कमी आहे.

या शिवाय चाकूर तालुक्यातील इतर मंडळाच्या लोकसंख्या घनतेचा विचार करता सन 2001 मध्ये चाकूर तालुक्याच्या सरासरी घनतेपेक्षा (206) जास्त घनता चाकूर (288), झरी (बु.) (206), या दोन मंडळाची आहे. सरासरी घनतेपेक्षा कमी घनता शेळगाव (190) व वडवळ (ना.) (164) या दोन मंडळाची आहे. तसेच 2011 मध्ये तालुक्याच्या सरासरी घनतेपेक्षा (259) जास्त घनता चाकूर (330) आणि नळेगाव (359) या दोन मंडळाची आहे. तर सरासरी घनतेपेक्षा कमी घनता झरी (बु.) (230), शेळगाव (226) व वडवळ (ना.) व शेळगाव मंडळाची लोकसंख्या घनता नळेगाव मंडळापेक्षा कमी आहे. या दोन मंडळात कृषी योग्य जमिन कमी आहे व जास्त डोंगराळ भाग आहे. जलसिंचनाच्या सुविधांचा अभाव रोजगार निर्मिती कमी हे दोन मंडळे मागास आहे. त्यामुळे या दोन मंडळाची घनता विरळ आहे. तर चाकूर व झरी (बु.) हे दोन मंडळ नळेगाव नंतर जास्त घनता असलेले मंडळे आहेत. या मंडळात कृषी योग्य जमिन तसेच जलसिंचनाच्या सुविधा जास्त आहेत. या मंडळात लहान व्यवसाय, नागरिकरणात वाढ होत आहे. त्यामुळे लोकसंख्येची घनता दाट स्वरुपाची आहे. म्हणजे तालुक्याच्या घनतेवर व वितरणवर प्रामुख्याने भौगोलिक व आर्थिक घटकांचा परिणाम झाल्याचे दिसते.

नकाशा क्र. 2 मध्ये दाखविल्याप्रमाणे चाकूर व नळेगाव मंडळामध्ये सर्वाधिक क्षमता घनता पहावयास मिळते तर झरी (बु.) व शेळगाव मंडळामध्ये मध्यम स्वरुपाची घनता आढळते.

चाकूर तालुक्यातील लोकसंख्येच्या घनतेवर भौगोलिक घटकांचा कसा परिणाम झाला आहे. या शोधनिबंधारुन स्पष्ट होते. आणि सर्वात कमी घनता वडवळ (ना.) मंडळामध्ये आढळने वरील नकाशाचा विचार केला असता चाकूर, नळेगाव या मंडळात बाजारपेठ, दळणवळण, जलसिंचन यामुळे लोकसंख्या घनता जास्त आहे. तर शेळगाव व झरी (बु.) या मंडळात कमी घनता आहे. कारण या भागात शेती विकास, शाळा, जलसिंचन इ. कारणाने मध्यम स्वरुपाची घनता आढळते.



चाकूर तालुका
लोकसंख्या घनता (2001-2011)

सूची
कमी घनता
मध्यम घनता
जास्त घनता

किमी 2  1  0  2  4  6  8 किमी

नकाशा क्र. 2

वडवळ (ना.) या मंडळात जलसिंचन, शैक्षणिक सुविधा, बेराजगारी, शेतीचा विकास झालेला नाही यामुळे या मंडळात लोक कामाच्या शोधात मुंबई, पुणे, हैद्राबाद इ. भागात स्थलांतरीकरण आहे. त्यामुळे लोकसंख्या घनता कमी आढळते.

**निष्कर्ष :**

चाकूर तालुक्यामध्ये लोकसंख्येची घनता व वितरण असमान स्वरुपाचे आहे. चाकूर तालुक्यामध्ये सर्वाधिक लोकसंख्येची गणितीय घनता नळेगाव मंडळामध्ये आहे. नळेगाव मंडळामध्ये कृषीसाठी काळी कसदार जमिन व जलसिंचनाची सुविधा आहे. तसेच आरोग्य, शिक्षण, मनोरंजन, वाहतुक, प्रशासकीय, दळणवळण व इतर सर्व प्रकारच्या सुविधा उपलब्ध आहेत. तसेच तेथे जय जवान जय किसान साखर कारखाना आहे. सद्या तो आजारी आहे. रोजगारांची उपलब्धता या मंडळात असल्याने येथे घनता जास्त आढळते. नळेगाव हे चाकूर तालुक्यातील लातूर–उदगीर मार्गावरील एक महत्त्वाचे शहर आहे. त्यामुळे या शहराचा दिवसेंनदिवस होणारा विकास हा लोकसंख्या घनता वाढीसाठी कारणीभूत ठरत आहे. तसेच चाकूर, शेळगाव, झरी (बु.) या मंडळात कृषी योग्य जमीन, सेवा सुविधा, वाहतुक व दळणवळण यामुळे या मंडळाच्या लोकसंख्येच्या घनतेत वाढ होत आहे. तर वडवळ (ना.) मंडळाची लोकसंख्येची घनता कमी आहे. कारण हे मंडळ डोंगराळ व कृषी योग्य जमिन नाही.
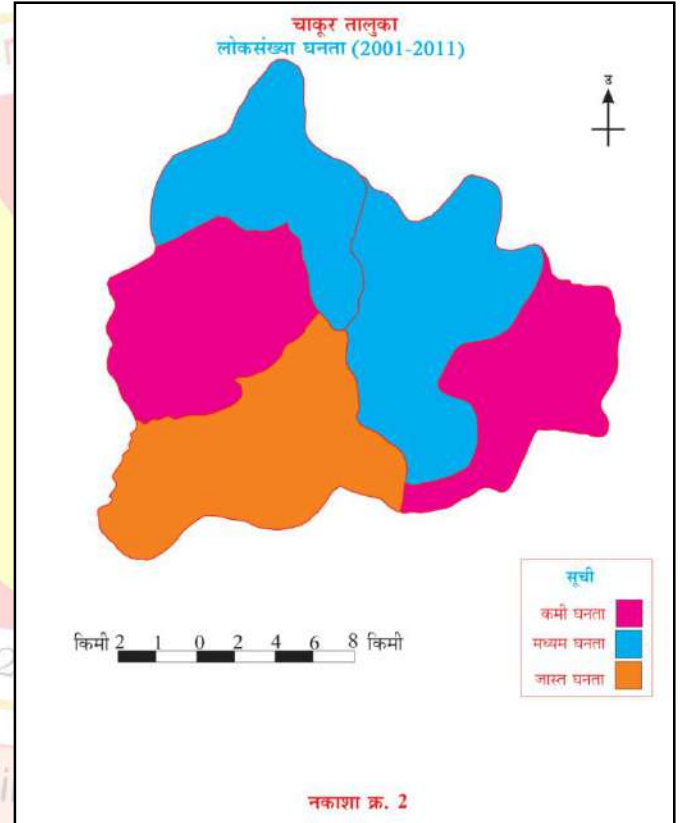
जलसिंचनाच्या सोई उपलब्ध नाहीत पुरेशा प्रमाणावर वाहतूक व दळणवळणाच्या सोयी उपलब्ध नसल्याने या मंडळाचा विकास झालेला नाही. त्यामुळे हे मंडळ विरळ लोकसंख्येच्या घनतेच्या विभागात येतो. चाकूर तालुक्यातील लोकसंख्येच्या विविध घनतेतील विषमता दूर करण्यासाठी वडवळ (ना.), शेळगाव, झरी (बु.) या कमी घनता असलेल्या प्रदेशामध्ये कृषीचा विकास करणे गरजेचे आहे. त्यासाठी शेतक–यांना जास्तीत जास्त सवलती देणे व जलसिंचनाच्या सोयी उपलब्ध करुन देणे. कृषीवर अधारित इतर उद्योगांची स्थापना करणे. आणि रोजगाराच्या संधी उपलब्ध करुन देणे व या विभागातून रोजगारासाठी होणारे बाह्य स्थलांतर थांबविणे फार गरजेचे आहे. म्हणजेच तालुक्यातील विविध मंडळाच्या विकासातील असमतोल दूर करण्यात आला. तर निश्चितपणे लोकसंख्येच्या वितरणातील असमतोलही कमी होईल.

संदर्भ ग्रंथ :

1.  *लातूर जिल्हा आर्थिक सामाजिक समालोचन.*
2.  *लातूर जिल्हा गॅझेटिअर (महाराष्ट्र शासन, मुंबई, 1967).*
3.  *लोकसंख्या भूगोल – प्रा. डॉ. शेटे, डॉ. फुले, डॉ. शहापूरकर, अभिजित पब्लिकेशन, लातूर.*
4.  *डॉ. आर.सी. चंदना Geography of Population, कल्याणी पब्लिशर्स, नवी दिल्ली.*
5.  *Census of India District Censusers Handbook, Latur District. 2001 to 2011.*
6.  *WWW.latur.nic.in.*
7.  *WWW.censusindia.Gov.in/2011*

# लातूर जिल्ह्यातील मुस्लिम समाजाची तालुकानिहाय साक्षरता : एक भौगोलिक विश्लेषण

**आतार जे. एफ.**
संशोधक
महात्मा फुले मा. व उच्च माध्यमिक विद्यालय,
अहमदपूर जि.लातूर

**डॉ. एन. जी. माळी**
सहमार्गदर्शक
अध्यक्ष, भूगोल अभ्यास मंडळ   रु
स्वा.रा.ती.म.वि. नांदेड

**डॉ. झोडगे एस. बी.**
मार्गदर्शक
ा.प्राध्यापक, भूगोल विभागप्रमुख
छत्रपती शिवाजी महाविद्यालय, सातारा

## प्रस्तावना :

एखाद्या प्रदेशातील विकास पहावयाचा असेल तर त्या प्रदेशातील, देशातील नैसर्गिक साधनसंपत्ती, साधनसंपत्तीचा उपयोग, देशातील लोकसंख्या, लोकसंख्येची घनता, वयोमान, लिंगरचना, लिंग गुणोत्तर, साक्षरता व इतर बऱ्याच घटकांचा विचार करावा लागतो. राष्ट्राचा विकास हा त्या देशातील लोकसंख्या व साक्षरता यावर बऱ्याच प्रमाणात अवलंबून असतो. समाजात काही लोक साक्षर असतात तर काही लोक निरक्षर असतात. आपल्या देशात व्यक्तीस लिहिता-वाचता येत असेल तर तिला साक्षर समजले जाते. हीच व्याख्या वेगवेगळ्या देशात वेगवेगळ्या स्वरूपात असू शकते. साक्षरतेचे शेकडा प्रमाण हे त्या प्रदेशातील लोकसंख्येच्या गुणवत्तेवर प्रकाश टाकते. साक्षरता हा घटक सामाजिक-आर्थिक प्रगतीचा निर्देशक समजला जातो. साक्षरतेचे प्रमाण अधिक असेल तर देश सामाजिक व आर्थिकदृष्ट्या प्रगत होतो. साक्षरतेमुळे सुसंस्कृत व प्रगतीशील समाज निर्माण होतो. असे म्हणले जाते की, 'वाचाल तर वाचाल' देशाचा विकास घडवून आणण्यासाठी शिक्षण ही अत्यंत महत्त्वाची गरज आहे.

## अभ्यास क्षेत्र :

महाराष्ट्र राज्यातील लातूर जिल्हा हा विकसित जिल्हा असून पूर्वीच्या उस्मानाबाद जिल्ह्याचे विभाजन होऊन १६ ऑगस्ट १९८२ रोजी लातूर जिल्ह्याची स्वतंत्र निर्मिती झाली. लातूर जिल्ह्याचा अक्षवृत्तीय विस्तार १७°५२' पूर्व ते १८°५०' अक्षांश व ७६°१२' ते ७७°१७' रेखावृत्तीय विस्तार आहे. जिल्ह्याचे सन २०११ च्या जनगणनेनुसार क्षेत्रफळ ७१५७ चौ.कि.मी. असून महाराष्ट्राच्या क्षेत्रफळाच्या २.३२ टक्के क्षेत्र जिल्ह्याने व्यापले आहे. जिल्ह्यात १० तालुके व तीन महसूल उपविभाग आहेत. त्यात लातूर, रेणापूर, औसा, उदगीर, अहमदपूर, चाकूर, निलंगा, जळकोट, देवणी आणि शिरुर अनंतपाळ हे तालुके आहेत.



## उद्दिष्ट्य :

लातूर जिल्ह्यातील मुस्लीम समाजाच्या साक्षरतेचा तालुकानिहाय अभ्यास करणे हा प्रमुख उद्देश समोर ठेवून सदरील शोधनिबंध तयार करण्यात आला आहे.

## अभ्यास पद्धती:

प्रस्तुत शोधनिबंधात लातूर जिल्ह्यातील मुस्लिम समाजाच्या लोकसंख्येची व्यावसायिक रचना अभ्यासण्याकरिता प्राथमिक व द्वितीय स्वरूपाची माहिती मिळविली आहे. यासाठी संदर्भ ग्रंथ, जिल्हा सामाजिक व आर्थिक समालोचन, इंटरनेट इत्यादी माध्यमातून लोकसंख्या वितरण अभ्यासले आहे. लातूर जिल्ह्यातील मुस्लिम समाजाची तालुकानिहाय साक्षरता अभ्यासण्यासाठी खालील सूत्राचा वापर करण्यात आला आहे.

$$\text{साक्षरता दर प्रतिशत} = \frac{\text{साक्षर लोक}}{\text{एकूण लोकसंख्या}} \times १००$$

## विश्लेषण :

लातूर जिल्ह्यातील मुस्लिम समाजात सामाजिक, आर्थिक आणि शैक्षणिक विकासाच्या संदर्भात असमानता दिसून येते. समाजात उच्च शिक्षणाचे प्रमाण अत्यल्प असून गळतीचे प्रमाण जास्त आहे. अधिकतर मुस्लिम समाजाचे लोक हे व्यवसाय, मजुरी, भाजीपाला विक्री, लघू उद्योग करीत असल्याचे आढळून येते. पुरुषांच्या तुलनेत मुस्लिम समाजात महिला शिक्षणाबाबत उदासीनता दिसून येते. मुस्लिम समाजात आर्थिक मागासलेपणा दिसून येतो. त्यामुळे समाजाचा विकास खुंटला असल्याचे दिसते.

<div align="center">
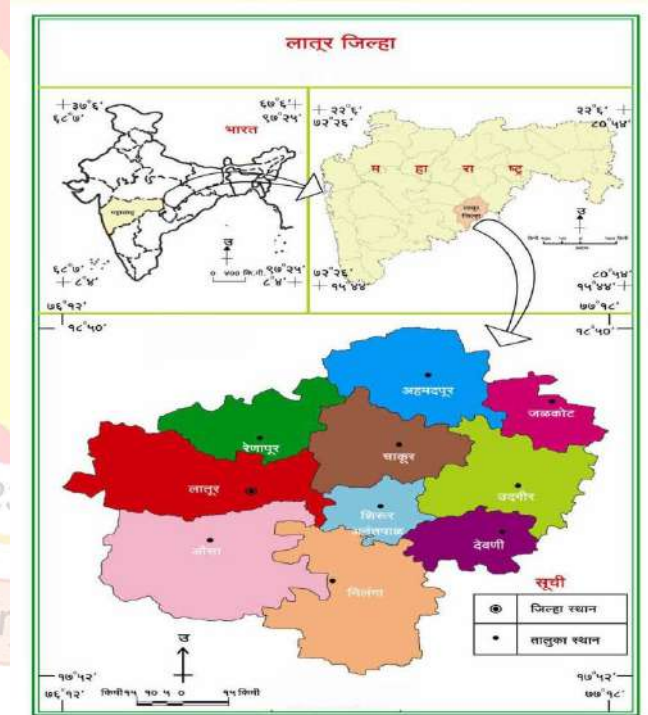
**तक्ता क्र.१: लातूर जिल्ह्यातील मुस्लिम समाजाची तालुकानिहाय साक्षरता**

</div>

| अ. क्र. | तालुके | | जिल्ह्याची एकूण लोकसंख्या | पुरुष | स्त्रिया | एकूण साक्षर पु+स्त्री | ग्रामीण साक्षरता | | | शहरी साक्षरता | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | पुरुष | स्त्रिया | एकूण | पुरुष | स्त्रिया | एकूण |
| १ | लातूर | | ११६२५० | ५९८२५ | ५६४२५ | १००% | २४०२५ | २२०८३ | ४६१०८ | ३५०८५ | ३४०५९ | ७०१४४ (७९) |
| | | साक्षर | ९३१९८ (८०.१७%) | ४६६६४ (७८) | ४०६२६ (७२%) | ८०.१७% | १६५७८ (६९%) | १४७९५ (६७%) | ३१३७३ (६८%) | २८५०७ (७९%) | २५४४ (७५%) | ५४०५१ (७७%) |
| | | निरक्षर | २३०५२ (१९.८३%) | १३१६१ (२२%) | १५७९९ (२८%) | १९.८३% | ७४४७ (३१%) | ७२८८ (३३%) | १४७३५ (३२%) | ७५७८ (२१%) | ८५१५ (२५%) | १६००१ (२३%) |
| २ | अहमदपूर | | ३५४२५ | १८१२५ | १७३०० | १००% | १००२५ | ९२०० | १९२२५ | ८३०० | ७९०० | १६२०० |
| | | साक्षर | २६०५८ (७४%) | १३७७५ (७६%) | १२२८३ (७१%) | ७४% | ६८१७ (६८%) | ९०७२ (६६%) | १३०७३ (६८%) | ६१४२ (७४%) | ५५०९ (७१%) | ११६२६ (७३%) |
| | | निरक्षर | ९३६७ (२६%) | ४३५० (२४%) | ५०१७ (२९%) | २६% | ३२०८ (३२%) | ३१२८ (३४%) | ५१५२ (३२%) | २१५८ (२६%) | २२९१ (२९%) | ४३७४ (२७%) |
| ३ | उदगीर | | ५२८८१ | २७८४० | २५४७१ | १००% | ८६२५ | ८०२५ | १६६५० | १८८६५ | १७३६६ | ३६२३१ |
| | | साक्षर | ४१२४७ (७८%) | २१६५४ (७९%) | १८८८९ (७४%) | ७७.९६% | ५०३७ (७०%) | ५४५७ (६८%) | १११५६ (६७%) | १३३९४ (७१%) | ११९८३ (६९%) | २७१७३ (७५%) |
| | | निरक्षर | ११६३३ (२२%) | ५७५६ (२१%) | ६६२२ (२६%) | २३% | २५८८ (३०%) | २५६८ (३२%) | ५४९५ (३३%) | ५४७१ (२९%) | ५३८४ (३८%) | १०५८ (२५%) |
| ४ | निलंगा | | ४८७८८ | २५१०३ | २३६८५ | १०० | १३३२१ | १२४४९ | २५७८० | ११८०० | ११२०८ | २३००८ |
| | | साक्षर | ३५६१५ (७३%) | १८५७६ (७४%) | १६५८० (७०%) | ७२.१०% | ९३२५ (७०%) | ८३४१ (६७%) | १७०१५ (६६%) | ८३७८ (७१%) | ७६२१ (६८%) | १५९७६ (६९%) |
| | | निरक्षर | १३१७३ (२७%) | ६५२७ (२६%) | ७१०६ (३०%) | २७.९०% | ३९९६ (३०%) | ४१०८ (३३%) | ८७६५ (३४%) | ३४२२ (२९%) | ३५८७ (३२%) | ७१३३ (३१%) |
| ५ | औसा | | ४९५३१ | २५२६५ | २४२६६ | १०० | १२३६० | ११५३९ | २३८९९ | १३३२५ | १२०३० | २५६३२ |
| | | साक्षर | ३६६५३ (७४%) | १८९४८ (७५%) | १७२२९ (७१%) | ७४.१०%) | ८५२८ (६९%) | ७६५ (६६%) | १४५३४ (६५%) | ९७२७ (७५%) | ८४२१ (७०%) | १८१९९ (७१%) |
| | | निरक्षर | १२८७८ (२६%) | ६३१६ (२५%) | ७०३७ (२९%) | २५.९०% | ३८३२ (३१%) | ३९२३ (३४%) | ८३६५ (३५%) | ३५९८ (२७%) | ३६०९ (३०%) | ७४३३ (२९%) |
| ६ | चाकूर | | २३५७० | १२२०३ | ११३६७ | १०० | - | - | - | - | - | - |
| | | साक्षर | १६२६३ (६९%) | ८५४२ (७०%) | ७७३० (६८%) | ७१% | - | - | - | - | - | - |
| | | निरक्षर | ७३०६ (३१%) | ३६६१ (३०%) | ३६३७ (३२%) | २९% | - | - | - | - | - | - |
| ७ | रेणापूर | | १२२१९ | ६२१० | ६००९ | १०० | - | - | - | - | - | - |
| | | साक्षर | ८३०९ (६८%) | ४२८४ (६९%) | ४०२६ (६७%) | ६९% | - | - | - | - | - | - |
| | | निरक्षर | ३९१० (३२%) | ११९२६ (३१%) | १९८३ (३३%) | ३१% | - | - | - | - | - | - |
| ८ | शिरुर अनंतपाळ | | ८९०८ | ४५८२ | ४३२३ | १०० | - | - | - | - | - | - |
| | | साक्षर | ५८७९ (६६%) | ३०७२ (६७%) | २८०७ (६५%) | ६७% | - | - | - | - | - | - |
| | | निरक्षर | ३०२९ (३४%) | १५१२ (३३%) | १५१३ (३५%) | ३३% | - | - | - | - | - | - |
| ९ | जळकोट | | ९६११ | ४९३० | ४६८१ | १०० | - | - | - | - | - | - |
| | | साक्षर | ६२४७ (६५%) | ३२०४ (६५%) | २९४९ (६३%) | ६४% | - | - | - | - | - | - |
| | | निरक्षर | ३३६४ (३५%) | १७२६ (३५%) | १७३२ (३७%) | ३६% | - | - | - | - | - | - |
| १० | देवणी | | १२६०३ | ६५०१ | ६१०२ | १०० | - | - | - | - | - | - |
| | | साक्षर | ८०६६ (६४%) | ४१६१ (६४%) | ३८४४ (६३%) | ६५% | - | - | - | - | - | - |
| | | निरक्षर | ४५३७ (३६%) | २३४० (३६%) | २२५८ (३७%) | ३५% | - | - | - | - | - | - |

<div align="right">

**स्त्रोत :** *संशोधकाने संकलित केलेल्या अधिकृत माहितीवर आधारित*

</div>

**निष्कर्ष :**

लातूर जिल्ह्यातील मुस्लिम समाजाच्या साक्षरतेचा तालुकानिहाय अभ्यास केला असता खालील निष्कर्ष पुढे येतात.

१) सन २०११ मध्ये लातूर जिल्ह्याची एकूण लोकसंख्या ही ३८२४९७ असून त्यामध्ये १९६६५५ तर स्त्री लोकसंख्या ही १८५८४२ इतकी होती.

२) लातूर जिल्ह्यातील मुस्लिम समाजामध्ये ग्रामीण भागापेक्षा शहरी भागात स्त्री व पुरुषांचे साक्षरता प्रमाण जास्त आहे तर स्त्रियांपेक्षा पुरुषांचे प्रमाण अधिक आहे. मात्र हळूहळू साक्षरतेचे प्रमाण वाढत आहे हे आकडेवारीवरुन लक्षात येते.

३) लातूर जिल्ह्यातील लातूर, औसा, उदगीर, अहमदपूर या तालुक्यात मुस्लिम समाजाच्या साक्षरतेचे प्रमाण अधिक आहे तर जळकोट, देवणी, रेणापूर, निलंगा, शिरुर अनंतपाळ, चाकूर या तालुक्यात साक्षरतेचे प्रमाण कमी आहे.

४) लातूर जिल्ह्यातील मुस्लिम समाजामध्ये ग्रामीण भागात साक्षरतेचे प्रमाण कमी असण्याचे कारण शिक्षणाचा अभाव, अज्ञान, धार्मिक रुढी परंपरा, गरिबी, लहानपणी व्यवसाय करण्याचे प्रमाण, जनजागृतीचा अभाव, शिक्षणाबाबतची उदासीनता अशी अनेक कारणे दिसून येतात.

५) लातूर जिल्ह्यातील ग्रामीण भागातील मुस्लिम समाजातील लोक शहरी भागात स्थलांतर करतात. यामध्ये उदगीर, औसा, लातूर, अहमदपूर या तालुक्यात शिक्षण, रोजगार, आरोग्य, व्यवसाय, धार्मिक कार्य व इतर अनेक कारणेमुळे मुस्लिम समाजाच्या लोकसंख्येचे स्थलांतर घडून येते. परिणामी शिक्षण घेण्यामध्ये अडथळे येतात.

**संदर्भ :**

*१) आतार जमील फतरू, 'उदगीर शहरातील मुस्लिम समाजाच्या लोकसंख्येचा अभ्यास ', अप्रकाशित एम.फिल. लघुशोध प्रबंध, स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड, २००९*

*२) डॉ.घोलप सी.एस., लोकसंख्या भूगोल, निशिकांत प्रकाशन, पुणे*

*३) डॉ.वसंत व इतर, लोकसंख्या भूगोल, मेहता पब्लिशिंग हाऊस, पुणे*

*४) लातूर जिल्हा आर्थिक व सामाजिक समालोचन, २००१ ते २०११*

*५) भारतीय जनगणना अहवाल*

*६) www.laturnic.in*

## अनुसूचित जातीव जमातीच्या लिंगगुणोत्तराचा भौगोलिक अभ्यास (0 ते 6 वयोगटातील) जि. परभणी

डॉ. शशिकांत एस.तोलमारे
मार्गदर्शक
स्वामी योगानंद महाविद्यालय,
वसमत, ता.वसमत, जि. हिंगोली.

शोभा देविदासराव भोसले
संशोधक
ज्ञानोपासक महाविद्यालय, परभणी.
संशोधन केंद्र, हावगीस्वामी महाविद्यालय, उदगीर.

प्रस्तावना :

लोकसंख्या भूगोलात लोकसंख्येच्या संरचनेचा अभ्यास केला जातो. लोकसंख्या हाघटक परिवर्तनशील वगतीशील आहे.त्यामुळे लोकसंख्या भूगोलाचे स्वरुपही परिवर्तनशील वगतीशील आहे.जन्म, मृत्यू, स्थलांतर, लोकसंख्या वाढ, लिंगगुणोत्तर, वयोगट इत्यादी लोकसंख्या विषयक घटकगतीशीलव परिवर्तनशील आहे.काळानुसारवठिकाणानुसार ती बदलणारी आहेत.लोकसंख्या भूगोलात लोकसंख्येवर परिणाम करणारेसांस्कृतिकव प्राकृतिक घटक यांच्या स्वरुपाच्या बदलांचा अभ्यास केला जातो.लोकसंख्या विषयक घटकावर भौगोलिक, आर्थिक, सामाजिक, राजकीय जैवीकघटकांचा कसा परिणाम होतो याचा शास्त्रशुध्द अभ्यास लोकसंख्या भूगोलात केला जातो.लोकसंख्या भूगोलातील लोकसंख्या संरचनेलाही अधिक महत्व आहे.त्यातील लिंगगुणोत्तराचा अभ्यास आपण परभणी जिल्ह्यातील अनुसूचित जातीव अनुसूचित जमातीच्या संदर्भात पाहणार आहोत.

प्रदेशाच्या लोकसंख्येत स्त्री - पुरुषाचे प्रमाण कसे आहेहे पाहणे म्हणजेच लिंगगुणोत्तर होय. स्त्रीव पुरुषाचे प्रमाणे नेहमी गुणात्तराच्या स्वरुपात सांगितले जाते. यास लिंगगुणोत्तर असे म्हणतात.

सन 2011 च्या जनगणनेनुसार भारताचे लिंगगुणोत्तर 940, महाराष्ट्राचे 946 व परभणी जिल्ह्याचे 940 एवढे आहे.

1) अभ्यास क्षेत्र :

परभणी जिल्ह्याचा विस्तार 18.45 उत्तर ते 20.01 उत्तर अक्षांश आणि 16ः13 पूर्व ते 77ः26 पूर्व रेखांश या भौगोलिक पट्ट्यामध्ये वसलेला आहे.जिल्ह्याच्या उत्तरेसहिंगोलीजिल्हा पूर्वेस नांदेड पश्चिमेस बीड व जालनाव दक्षिणेसलातूरव बीड हेजिल्हे आहेत. परभणी जिल्ह्याचे एकुण क्षेत्रफळ 6214 चौ.की.मी. आहे.

2) अभ्यासाची उद्दीष्टये :

1) परभणी जिल्ह्यातील अनुसूचित जातीव जमातीचे तालुकानिहाय लिंगगुणोत्तर अभ्यासणे.

3) अभ्यास पध्दती :

प्रस्तुत शोधनिबंधात परभणी जिल्ह्यातील एस.सी. , एस. टी.लोकसंख्येचे लिंगगुणोत्तर अभ्यासण्याकरिता द्वितीय स्वरुपाची माहिती मिळवली आहे.त्यात भारतीय जनगणना 2011 चा समावेश आहेव फिशर यांच्या सुत्राचा वापर करुनलिंगगुणोत्तर काढण्यात आलेला आहे.

लिंगगुणोत्तर = एखाद्या प्रदेशातील विशिष्ट काळातील

$$\frac{एकुण\ स्त्रियांची\ संख्या \times 100}{त्याच\ प्रदेशातील\ त्याच\ काळातील\ एकुण\ पुरुषांची\ संख्या}$$

प्रस्तुत शोधनिबंधात परभणी जिल्ह्यातील लोकसंख्येचे भौगोलिक विवरण अभ्यासण्याकरिता द्वितीय तथ्याचा आधारघेतला.त्यात भारतीय जनगणना 2011 चा समावेश आहे.

लिंगरचनेवर परिणाम करणारेघटक :

नवजात बालकाचेलिंगगुणोत्तर, स्थलांतरिताचेलिंगगुणोत्तर, मृत व्यक्तीचे लिंगगुणोत्तर, दुष्काळातीललिंगगुणोत्तर, सामाजिक दृष्टीकोन, शहरीव ग्रामीण घटकलिंगगुणोत्तरावर परिणाम करतात.

परभणी जिल्ह्यातील अनुसूचित जातीचे तालुकानिहाय लिंगगुणोत्तर :-

परभणी जिल्ह्यात नऊ तालुके आहेत.प्रत्येक तालुक्यात लिंगगुणोत्तरात तफावत आढळते.सर्वात जास्तगुणोत्तरसेलू, पाथरी, मानवत वजिंतूर तालुक्यात आढळते.सर्वात कमी अनुसूचित जातीचे (एस.सी.)लिंगगुणोत्तर पालम, गंगाखेड, पुर्णा, सोनपेठ व परभणी या तालुक्यात आढळते

परभणी जिल्ह्यातील तालुकानिहाय अनुसूचित जातीचे (एस.सी.)लिंगगुणोत्तरखालील प्रमाणे.

| अ. क्र. | तालुका विभाग | लिंगगुणोत्तर प्रमाण (एस. सी.) (1000पुरुषामागे) |
|---|---|---|
| 01 | सेलू | 1026 |
| 02 | जिंतूर | 962 |
| 03 | परभणी | 953 |
| 04 | मानवत | 968 |
| 05 | पाथरी | 979 |
| 06 | सोनपेठ | 964 |
| 07 | गंगाखेड | 938 |
| 08 | पालम | 932 |
| 09 | पुर्णा | 944 |

संदर्भ :- आर्थिक, सामाजिक समालोचन, परभणी 2011.

2011 च्या जनगणनेनुसार परभणी जिल्हयाचे अनुसूचित जातीचेलिंगगुणोत्तर 953 आहे. परभणी जिल्हयातील (एस.सी.)च्या लिंगगुणोत्तराचा तालुकानिहाय अभ्यास केल्यास सर्वात जास्तलिंगगुणोत्तरसेलू तालुक्याचे आहे (1026) तरसर्वात कमी पालम या तालुक्याचे लिंगगुणोत्तर आहे (932).

परभणी जिल्हयाचे तालुकानिहाय अनुसूचित जमातीचे (एस.टी.)लिंगगुणोत्तर

| अ. क्र. | तालुका विभाग | लिंगगुणोत्तर प्रमाण (एस. सी.) (1000पुरुषामागे) |
|---------|--------------|------------------------------------------------|
| 01 | सेलू | 931 |
| 02 | जिंतूर | 981 |
| 03 | परभणी | 944 |
| 04 | मानवत | 975 |
| 05 | पाथरी | 961 |
| 06 | सोनपेठ | 1036 |
| 07 | गंगाखेड | 947 |
| 08 | पालम | 965 |
| 09 | पुर्णा | 947 |

संदर्भ :- आर्थिक, सामाजिक समालोचन, परभणी 2011.

2011 च्या जनगणनेनुसार परभणी जिल्हयातील अनुसूचित जमातीचे लिंगगुणोत्तर 944 आहे.परभणी जिल्हयातील (एस.टी.)च्या लिंगगुणोत्तराचा तालुकानिहाय अभ्यास केल्यास सर्वात जास्तलिंगगुणोत्तर सोनपेठ तालुक्याचे (1036) एवढे आहे.तरसर्वात कमी लिंगगुणोत्तरसेलू तालुक्याचे आहे (931).

**निष्कर्ष :**

परभणी जिल्हयातील तालुकानिहाय अनुसूचित जातीव जमातीचे लिंगगुणोत्तर पाहता.परभणी तालुक्याचे लिंगगुणोत्तर पाहता अनुसूचित जातीचे 953 आहे तर अनुसूचित जमातीचे 944 एवढे आहे.म्हणजेच परभणी तालुक्याचे (एस.सी.)लिंगगुणोत्तर 9 ने जास्त आहे. यात आणखीवाढ होणे आवश्यक आहे. या तालुक्यातील लिंगगुणोत्तराच्या फरकावर तेथीलसाक्षरता, लोकजागृती, अंधश्रध्दा, रुढी परंपरा, प्रशासकीय जागरुकता, शासनाचे नियोजन या सर्वघटकांचा परिणाम झालेला आढळतो.

**संदर्भ ग्रंथ :**

1) महाराष्ट्र राज्य गॅझेटिअर - परभणी जिल्हा.
2) आर्थिक - सामाजिक समालोचन - 2011
3) सौ. कानेटकरव कुलकर्णी लोकसंख्या भूगोल निराली प्रकाशन (1989), पुणे.
4) डॉ. घोलप टि. एस. लोकसंख्या भूगोल निशिकांत प्रकाशन पुणे.
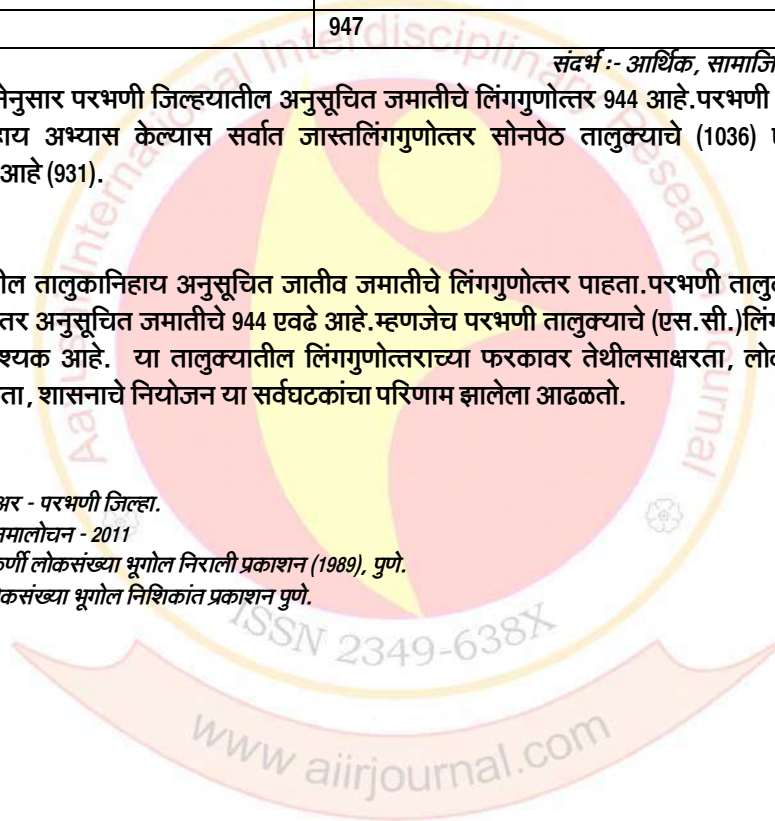
# करडखेड शिवमंदीर पर्यटन स्थळाचा भौगोलिक अभ्यास

**प्रा. चव्हाण जे.बी.**

वै.धुंडा महाराज देगलूरकर,
महाविद्यालय, देगलूर

**प्रा. सौ. राठोड मिना बन्सी**

वै. धुंडा महाराज देगलूरकर
महाविद्यालय, देगलूर

**प्रा. राठोड बी. आर. कै.**

बापूसाहेब पाटिल ग्रामीण
महाविद्यालय, हनेगाव

**प्रस्तावना :**

आज जगामध्ये पर्यटन व्यवसाय हा स्वतंत्र मानला जात आहे. पर्यटन व्यवसाय विस्तार करणारी शाखा म्हणून पर्यटन भूगोलाकडे पाहिले जाते. भारतासारख्या देशात पर्यटन हा समृध्द होत आहे. महाराष्ट्र राज्य हे विविधतेने नटलेले राज्य म्हणून ओळखले जाते. या ठिकाणी अनेक भौगोलिक, ऐतिहासिक व धार्मिक पर्यटन स्थळे आहेत. म्हणून स्थानिक पातळीवर पर्यटनाचा अभ्यास करणे महत्वाचे आहे. त्यामुळे संशोधनाच्या अभ्यासाला महाराष्ट्रातील नांदेड जिल्ह्यात ' देगलूर तालुक्यातील करखेड पर्यटन स्थळाचा भौगोलिक अभ्यास ' असा संशोधनाचा विषय निवडला आहे.

**अभ्यास क्षेत्र :**

देगलूर तालूका हा नांदेड जिल्ह्याच्या दक्षिणेस आहे. देगलूर तालूक्याचा आक्षवृत्तीय व रेखावृत्तीय विस्तार १८ ˚ २९' ते ७७ ˚ , ३४' पुर्व रेखावृत्त असा आहे. देगलूर या तालूक्याला तेलंगना व कर्नाटक अशा दोन राज्याच्या सिमा आहेत. तर नांदेड जिल्ह्यातील मुखेड व बिलोली तालुक्याच्या सिमा लागतात. देगलूर तालुक्याची समुद्रसपाटीपासूनची उंची सरासरी १२२० फिट आढळते. देगलूर तालुक्यातील १०६ खेड्यामधील लोकजीवन बहुतांशी कृषी व्यावसाऱ्यावरच अवलंबून आहे.

देगलूर तालुक्यात ' करखेड नावाचे एक गाव असून हे गाव देगलूर-बिदर ' रस्त्यावर देगलूर पासून ११ कि. मी. अंतरावर आहे. ' करडि ' म्हणजे ' अस्वल ' व ' कल्लू ' म्हणजे ' खडक ' या शब्दातून या स्थळनामाची उत्पत्ती झाली आहे. कल्याणीच्या चालुक्या काळात हे गाव नांदेड जिल्ह्यातील गोदावरी किंवा पावक नावाच्या मांडलिक राजघराण्याच्या राजधानीचे ठिकाण आणि एक हजार गावांचा समावेश असलेल्या सहस्र मंडलाचे मुख्य ठिकाण होते. या ठिकाणी कल्याणीच्या चालुक्य काळातील ९ शिलालेख मिळाले आहेत. हे शिलालेख इ.स. १०७९, इस. १०८८, इ.स. ११०२, इ.स. १११३ आणि इ.स. ११३३ या वर्षात कोरलेले आहेत. म्हणून करडखेड शिवमंदीर (चालुक्यकालीन) पर्यटन स्थळ अभ्यास क्षेत्राची निवड केली आहे.

चालुक्य काळात येथे मोठ्या प्रमाणात मंदिरे बांधण्यात आली. त्यामुळे हे गाव मंदिराचे नगर म्हणून प्रसिध्द होते. ही मंदिरे चालुक्या राजे आणि त्यांचे मांडलिक असलेल्या वन्हीकुलातील राजांनी बांधली. वन्हीकुलातील कर्क राजाने येथे त्यांच्या पुर्वजांच्या नावांनी अनेक मंदिरे बांधली. या सर्व मंदिरांची माहिती आणि या मंदिरांना दिलेल्या दानाची माहिती येथील शिलालेखात दिली आहे.

करडखेड येथे (शिवमंदिर) महामंडलेश्वर कर्क याने सोयेश्वर (सोमनाथ), ढोरेश्वर, कलीचोरेश्वर आणि भैरवदेव इत्यादी शिवमंदिरे आहेत. चालुक्य सम्राट भूलोकमल्ल सोमेश्वर तिसरा यांच्या कारकिर्दीत महामडलेश्वर एम्मरस्साने ज्ञानेश्वर पंडितासमक्ष स्वयंभू सोमनाथ मंदिरास या परिसरातील तीन गावे दान दिली होती. इ.स. १०७९ मध्ये वन्हीकुलातील प्रसिध्द राजा दुसरा कलिचोरस आणि त्याची राणी महामंडलेश्वरी रेब्बालदेवी यांनी येथील कलीचोरेश्वर मंदिरावर इ.स. १०८८ मध्ये सुवर्ण चदविल्याचा उल्लेख येथील शिलालेखात आहे.

करडखेड हे एक कालमुख शैवपंथाचे एक पीठ आहे. मांडलीकाची राजधानी, प्रशासकीय मुख्य ठाणे, शैक्षणिक, भौगोलिक प्रसिध्द पर्यटन क्षेत्र आहे. करडखेड सोमनाथ, ढोरेश्वर कालाचोरेश्वर व प्रसन्न भैरवदेव ही सर्व प्राचीन मंदिरे उद्ध्वस्त स्वरुपात आढळतात. या मंदिरातील मुर्तिशिल्प, स्तंभ व स्तंभशीर्ष, दगडी शिळा आणि पुरातत्वीय अवशेष गावात विखुरलेल्या स्थितीत पाहावयास मिळतात. पण चालुक्यकालीन एक शिवमंदिर आहे. हे मंदिर पूर्वाभिमुख असून त्यास दक्षिण व उत्तरेस लहानलहान दरवाजे आहेत. गर्भगृहे, अंतराळ व सभामंडप असे या मंदिराचे विधान आहे. मंदिराची पुर्व-पश्चिम लांबी ५५ फूट व दक्षिण -उत्तर रुंदी २६ फूट आहे. सभामंडपाची पूर्व — पश्चिम लांबी ३१.०६ फूट आहे तर दक्षिण-उत्तर रुंदी २६ फूट आहे. सभामंडपास २० स्तंभाचा आधार आहे. हे मंदिर एक केंद्र म्हणून येत्या काळात विकसीत होईल, अशी आशा वाटते.

**अभ्यासाची उद्दिष्टे:**

१. दुर्लक्षित करडखेड शिवमंदिर पर्यटन स्थळाची माहिती करुन घेणे.

२. पर्यटन स्थळातील सुंदर नर्तिका व त्याच्या भाव मुद्रातील श्रृंगार, शिल्पकला उत्तम भारतीय संस्कृतीचा ठेवा पूढे आणणे.

३. पर्यटन स्थळातील दगडातून देव साकारण्याच्या मानसाच्या कला सामर्थ्यांची ओळख करुन घेण्यासाठी.

**शिफारशी :**

१. पुरातत्व खात्यातर्फे सदरील क्षेत्राचा सर्वांगीन विकास केला जावा.

२. करखेड (शिवमंदिर) परिसरातील भौगोलिक माहिती अधि प्रमाणात प्रकाशित करावी.

३. करडखेड (शिवमंदिर) हे एक पर्यटन स्थ म्हणून विकसित केले जावे.

४. पर्यटन स्थळी रात्रा महोत्सव आयोजीत करणे.

५. येथील शिल्पकृतीची कला जोपासली जावी.

**निष्कर्ष :**

१. करडखेड (शिवमंदिर) हे एक महत्वपूर्ण ऐतिहासिक व भौगोलिक पर्यअन स्थळ आहे.

२. सदरील स्थळ ग्रामिण भागातील असल्यामुळे दुर्लक्षीत राहिले असावे.

**संदर्भ सुची :**

१. नांदेड जिल्ह्यातील लेणी आणि किल्ले – डॉ. विजया साखरे, डॉ. अनिल कठारे, उल्फा पब्लिकेशन्स, नांदेड.

२. पर्यटन मार्गदर्शिका - समर्थ उद्योग प्रकाशन .

३. पर्यटन भूगोल- डॉ. एस.बी. शिंदे - फडके प्रकाशन.

४. सामाजिक व आर्थिक समालोचन – नांदेड जिल्हा – २०११.

# कृषि में जैव उर्वरक की भूमिका : एक अध्ययन

प्रा. कांबळे डी. एस.
भूगोल विभाग
जवाहर कला, विज्ञान व वाणिज्य
महाविद्यालय, अणदूर

डॉ. ओ. व्ही. शहापूरकर
भूगोल विभाग प्रमुख
राजर्षी शाहू महाविद्यालय, लातूर
(स्वायत्त)

**सारांश:**

जैव उर्वरको के इस्तेमाल से फसल की उपज और भूमि की उपजाऊ शक्ति पर अपेक्षित प्रभाव पडता है और वातावरण प्रदूषित नही होता है ।एक अनुमान के अनुसार फलीदार फसलों में राईजाबियम जैव अर्वरक के इस्तेमला से विभिन्न स्थितियों मे २० से १२० किलोग्रॅम नाइट्रोजन प्रति हेक्टर भूमि में अवशेष तौर पर उपलब्ध होता है ।

**प्रस्तावना :**

जैव उर्वरक जीवित उर्वरक है जिसमे सूक्ष्मजीव है । जो भूमि मे वायुमण्डलीय नायट्रोजन एवं स्वतंत्र नायट्रोजन का स्थिरीकरण करते है । इनमे बैक्टीरीया, कवक, नीलहरित शैवाल, अजोला, जल फर्न आदि प्रमुख है । इस खाद में विशेष प्रकार के जीवाणु होते है । जो दलहनी पौधों की जड ग्रंथियो में वायुमण्डल से नाइट्रोजन तत्व लेकर समेट लेते है या फिर भूमि से अनुलनशीला और स्थायी तत्व फास्फोरस को धुलनशील बनाकर उनकी उपलब्धता को बढा देते है तथा कई पौधें वृध्द हारमोन्स के उत्पादन की गति बढाने में सक्षम होते है ।

**इतिहास :**

जैव उर्वरक के वाणिज्य इतिहास की शुरूआत सन १८९५ से हुई जब दो वैज्ञानिको श्री नोब और श्री हिल्टवर के सहयोग से नत्रजन उत्पाद राइजोबियम कल्चर के रूप मे शुरू हुआ । इसके पश्चात एजोटोबैअर तथा नील हरित शैवाल तथा अन्य सूक्ष जीवो की खोज हुई । एजोसप्रिलम तथा वेसिकुलर अर्बस्कूलर माइकोराइजा अभी हाल की खोज है ।

भारत में सर्वप्रथम लेग्यूम राइजोंबियम सहजीविता का अध्ययन हमारे वैज्ञानिक श्री एन बी जोशी ने किया । इसका सर्व प्रथम वाणिज्यक उत्पादन सन १६५६ मे शुरू हुआ । भारत की ६ वी पंचवार्षीय योजना के दौरान कृषि मंत्रालय ने जैव उर्वरक के उपयोग तथा विकास के लिए राष्ट्रीय परियोजना के माध्यम से वास्तविक रूप से इसको बढ़ावा देने तथा लोगो मे

उद्येश्य :- जैव उर्वरक का कृषि मे उत्पादन मे तीव्र वृध्दि और हरित क्रान्ति की सफलता मे प्रधान भूमिका निभाना ! मृदा स्वास्थ्य को सुधारने के लिए जैव उर्वरक का कृषि में उपयोग करना ।

**शोध प्रविधि :**

प्रस्तुत शोध विषयपूर्ण रू से द्विवतीयक सम्कों पर आधारित है । जिसका संकलन मासिक-पत्रिकाओं संदर्भ ग्रंथ से किया गया है।

**विषय विश्लेषण :**

कृषि उत्पादन में तीव्र वृध्दि और हरित क्रान्ति की सफलता में रासायनिक उर्वरक की प्रधान भूमिका रही है । जिससे विश्व की बढ़ती जनसंख्या को भोजन की आपूर्ति हो सकी है और भारत जैसे विकसनशील देशों का खाद्यान्न के उत्पादन में आत्मनिर्भरता प्राप्त हुई है परंतु रासायनिक उर्वरक न केवल मँहग होते है, बल्कि ये खनिज तेल और कोयला आदि प्राकृतिक संसाधनो से प्राप्त किये जाते है । साथ ही ये भूमि के दीर्घकालीन उपजाउफपन को हानि पहूँचा सकते है । तथा जल एवं मृदा प्रदूषण के कारण भी ठहराये जाति है ।

अतः उर्वरक के रूप मे ऐसे सूक्ष्म जीवों के प्रयोग दिया जा रहा है, जो भूमि में पोषक तत्वों की वृध्दि करते है तथा पर्यावरण को कोई नही पहूँचात है । इन्ही जैव उर्वरक कहा जाता है । ये मुख्यतः जीवाणुओं , रसायनो, जीवाणुओं एवं फंगस से प्राप्त किये जाते है । कुछ प्रमुख जैव उर्वरक निम्नलिखित है ।

**१) राइजो नियम**

राइजोनियम एक मुख्य जैव उर्वरक है ।यह लेग्यूमिनस पौधों ( जैस टमाटर ) नामक सहजीवी जीवाणु से तैयार किया जाता है । जीवाणु दलहनी फसलों मे पोधों की जडों में मूलरोगों के द्वारा प्रवेश कर जाते है और कार्टेक्स में ग्रंथियां बना लेते है इन इन ग्रंथियों मे उपस्थित राइजोनियम नाइद्राजन का भूमि मे स्थिरीकरण करते है ।

राइजोनियम जीवाणु खाद का उपयोग मुख्यारूपसे दलहनी उड़द , मूंग, चना, सोयाबीन, मूंगफली मटर आदि में किया जाता है । फलीदार फसलो की प्रारंभिक अवस्था में डाली गई २० से २५ किलो प्रति हैक्टेयर नत्रजन उर्वरक की मात्रा की छोडकर फसल का लगभग पूर्ण नत्रजन पोषण इस जीवाणू द्वारा प्रदान किया जाता है । दलहनी फसलों में इस जैव उर्वरक के इस्तेमाल से लगभग ५० किलोग्राम प्रति हैक्टरयर नाइट्रोजन का स्थिरीकरणे होता है ।

**२) ऐजोला :**

यह तीव्रगति से बएने वाली फर्न है जो पानी पर तैरती हुई मिलती हे इसका उपयोग जैव उर्वरक के रूप में करते है इसके उपयोग से भूमि की उर्वरा शक्ति बढती है । ऐजोला धान की फसल के लिए उपयोगी है । यह आम्लीयता-शुष्कता एवं बीमारियों की प्रतिरोधकता को सहन कर सकती है । ऐजोला का रंब गहरा लाल या कत्थई होता है । धान के खेतों मे यह अकसर दिखाई देती है ।

**३) इजोस्पिरिलम :**

यह भी एक नाइट्रोजन स्थिरीकारक है ब्राजील की कुछ घासों और मक्का की जड़ो मे मिलता है । या जोडों पर हल्के से लगा होता है । इन फसलों द्वारा लगभग ६० प्रतिशत भूमि में उर्वरकों का उपयोग पूरी तरह से नही होता है । क्योंकि इस भूमि में प्रकृति में मृतजीवी जीवाणु पाये जाते है । विभिन्न शोध परिणामों से यह ज्ञात हुआ है की धान की रोपाई से पहले एजोस्पिरियम और पी.एस.बी.के. घोल से ध्यान की जडो को निवेशित करना मृदा निवेशन की अपेक्षा अधिक लाभप्रद है ।

**४) स्वतंत्र जीवाणू :**

कुछ जीवाणू जैसे - एजोबेक्टर, बेसिलस, पोलीमिक्स, जो स्वतंत्र रहते है, भी, गेहँ, चावल , फल आदि को फसलों को पोषक पदार्थ उपलब्ध कराते है।

**५) माइकोरिजा :**

यह एक फंगस है जो कुछ बीज वाले पोधों की जडों पर मिलता है । यह दो प्रकार का होता है - एक्टोमाईकोरिजी एवं एक्टोमाईकोरिजी ।

**६) नील हरित शैवाल :**

नील हरित शैवाल जैव उर्वरक प्राकृतिक ढंग से नायट्रोजन प्राप्ति का मुख्य साधन है । जो वायुमंडल से नायट्रोजन लेकर भूमि मे संचयित करता है । धान की खेत का वातावरण नील-हरित शैवाल वृध्दि हेतु उपयुक्त होता है । इसकी प्रयोग से प्रति हेक्टर लगभग २-४ क्विंटल धान की उपज होती है, जिससे लगभग रूपये १४०० प्रति हैक्टर का लाभ होता है । साथही ३० किलोग्राम रासायनिक नायट्रोजन बचतसे रूपये २३० की बचत होती है । इससे विभिन्न प्रकार के अमीनों अम्ल वृध्दि नियंत्रक एवं विटामिन बी-१२ भी मिलते है । नील-हरित शैवाल काफी सस्ता है एवं इसे कृषक स्वयं तैयार कर सकते है । आधुनिक कृषि में इन जैव उर्वरकों की लोकप्रियता बढ़ रही है ।

**जैवउर्वरको को लाभ :**

१) ये सूखे व कुछ मृदाजिवित रोगों से फसल का बचाव करते है ।

२) ये मृदा को जैविक रूपसे सक्रिय बनात है ।

३) ये फसल की पैदावरको २०-३० प्रतिशत  बढ़ाते है ।

४) ये मृदा की प्राकृतिक उत्पादकता को संरक्षित करते है ।

**सावधानियों :**

१) पैकेट पर लिखे निर्देशों का पालन करे ।

२) जीवाणू खाद्य को पैकेट पर लिखी फसल के लिए ही ंतिम तिथि से पूर्व उपयोग मे लाना चाहिए ।

३) जीवाणू खाद को रासायनिक उर्वरकों एवं दवा के साथ मिलना नही चाहिए ।

४) जीवाणू  खाद को गर्मी तथा धूप से बचाकर  रखें एवं इसका भण्डारण ठंडे स्थान पर करना चाहिए ।

**निष्कर्ष :**

मृदा स्वास्थ्य का सुधारने के लिए पर्यावरण प्रदूषण को रोकने के लिए जैविक खेती आज के समय की मुख्य आवश्यकता है ।   कम लागत, आधिक बाजार भाव व अधिक भण्डारण क्षमता इससे मुख्य फाटाऐ है । जैव उर्वरक खेती मं उत्पादन की गति को बढ़ाने के लिए सक्षम माना जाता है ।

**संदर्भ ग्रंथ :**

१) *कृषिभूगोल – डॉ.सुरेश फुले विद्याभारती प्रकाशन औरंगाबाद*

२) *कृषिभूगोल – डॉ-विठ्ठल घारपुरे  पिंपहापूरे प्रकाशन नागपूर*

३) *कृषिभूगोल – आर.सी तिवारी प्रयोग पुस्तक भवन इलाहाबाद*

४) *www.google. co.in*

# लातूर जिले के इथेनॉल उत्पाद का भौगोलिक अध्ययन

प्रा. डॉ. दशरथ भिसे

भूगोल विभाग,

कै. व्यंकटराव देशमुख महाविद्यालय,

बाभळगाव, ता. जि. लातूर

प्रा. डॉ. राजेश खाकरे

भूगोल विभागप्रमुख

जयक्रांती वरिष्ठ महाविद्यालय, लातूर

**सारांश:**

इथेनॉल जैसे जैवइंधन का उपयोग परदेश में बड़ी मात्रा में हो रहा है। चीन, यूएसए और ब्राजील में इथेनॉल के ऊपर चलनेवाले वाहनों के इंजिन निर्माण किए गए हैं, इसीलिए ये देश पेट्रोल कम आयात करते हैं। उनकी विदेशी मुद्रा की बचत हो जाती है; मगर भारत में इथेनॉल की संभाव्यता बहुत जादा होकर भी इथेनॉल का निर्माण कम होता है। इस कारण भारत की विदेशी मुद्रा विकास के ऊपर खर्च न होकर पेट्रोल के आयात पर होती है। इथेनॉल का आर्थिक एवं पर्यावरणीय दृष्टि से महत्व अधिक है। इथेनॉल की निर्माण प्रक्रिया भी बहुत सहज है। इसी कारण भारत के हर गाँव में इथेनॉल का प्लांट लगवा सकते हैं। अध्ययन क्षेत्र लातुर जिला से मर्यादित है। लातूर जिला मराठवाड़ा प्रदेश में गन्नाप्रधान जिला है। अन्य फसल भी अच्छी आती है। इस कारण इथेनॉल निर्माण की संभाव्यता बहुत जादा है। तकरीबन २,३०,४०,००० लीटर इथेनॉल हर साल लातुर जिले में बन सकता है और उतनीही जरूरत है। इसीलिए सरकार ने भी नई पॉलिसी बनाकर इथेनॉल का निर्माण और उपयोग हेतु बढ़ावा दिया है। प्रस्तुत अध्ययन प्राथमिक और द्वितीयक स्रोत से डाटा संकलन करके और एक मे. टन गन्ना या फसल में साधारण ९० लीटर इथेनॉल बन सकता है। यह सूत्र मानकर संभाव्यता निकाल ली है। प्रस्तुत अध्ययन छात्र, संशोधक, तंत्रज्ञ, किसान और इथेनॉल प्लांट बनाने वाले उद्योगपतियों को उपयुक्त होगा, ऐसी मेरी आशा है।

**प्रस्तावना :**

इथेनॉल जैसे जैवइंधन का उपयोग परदेस में बड़ी मात्रा में हो रहा है। विशेष तौर पर देखा जाय तो चीन, यूएसए और ब्राजील में इथेनॉल के ऊपर चलनेवाले वाहनों के इंजिन का जानबूझकर निर्माण किया गया है। ब्राजील में ८५ फीसदी तक इथेनॉल का उपयोग वाहनों के इंजिन में हो रहा है। इसीलिए उनकी विदेशी मुद्रा की बचत हो रही है और ये मुद्रा देश के विकास में जुड़ रही है। मगर भारत से इथेनॉल निर्माण की संभाव्यता बहुत जादा है, फिर भी इथेनॉल का निर्माण बहुत कम हो रहा है। इसीलिए सरकार ने इथेनॉल निर्माण के लिए और उपयोग के लिए लोगों को प्रेरित करने की आवश्यकता है। क्योंकि दिन–ब–दिन खनिज इंधर के भंडार कम होने लगे हैं। पेट्रोल के दर बढ़ रहे हैं और पर्यावरण का असमतोल हो रहा है। इसके अलावा भारत में खनिज इंधन के भंडार भी बहुत कम हैं। भारत की जितनी आवश्यकता है, उससे बहुत ही कम खनिज भंडार भारत में हैं। इस कारण से खनिज इंधन के लिए खनिज सम्पन्न देशों के ऊपर निर्भर रहना पड़ता है और विकास के ऊपर खर्चा होनेवाला पैसा खनिज इंधन के लिए देना पड़ता है। इससे देश का विकास थमता जा रहा है।

भारत प्रमुख गन्ना उत्पादक देश है। इसीलिए भारत में तकरीबन हर साल ३० करोड़ मे. टन से जादा गन्ना उत्पाद होता है और ३ करोड़ २० लाख टन शक्कर निर्माण होती है। मात्र अपने देश के लिए सिर्फ २ करोड़ २० लाख टन शक्कर की ही जरूरत है। याने अनावश्यक जादा शक्कर हम निर्माण कर रहे हैं और अंतर्राष्ट्रीय बाजार में शक्कर के दर भारत से कम हैं। निर्यात अनुदान देकर शक्कर की निर्यात करनीपड़ती है। इसीलिए अनावश्यक जादा १ करोड़ टन शक्कर को लगने वाला गन्ना १० करोड़ टन है। उसका शक्कर के बजाय इथेनॉल निर्माण किया गया तो देश की तरक्की हो जाएगी तथा पर्यावरण का असमतोल भी कम हो जाएगा।

गन्ने की फसल सालभर की है। पानी भी बहुत लगता है। आने वाले समय में पानी का दुर्भिक्ष्य होने वाला है। ऐसा माना जो भी अन्य फसल याने मक्का, खाद्यान्न, फल, सब्जियाँ, राई, जानवरों का खुराक, वेस्टेज फूड, उनका वेस्टेज मटेरियल का कच्चा माल बनाकर भी इथेनॉल का निर्माण किया जा सकता है। यूएसए में मक्का से इथेनॉल बना रहे हैं और ब्राजील में बहुत–सी शुगर फैक्टरियाँ इथेनॉल की फैक्टरियाँ बन गई हैं।

**अध्ययन क्षेत्र :**

अनुसंधान के विषय को लेकर कहा जाए तो वह लातुर जिले तक मर्यादित होते हुए लातुर जिला महाराष्ट्र राज्य के ३५ जिलों में से एक रहा है। उसके ६ प्रशासकीय विभागों में मराठवाड़ा विभाग आ जाता है। लातूर जिले का स्थान महाराष्ट्र राज्य में आग्नेय की ओर होकर अक्षरेखा विस्तार १७˚५२' उत्तर से १८˚५०' उत्तर तथा रेखांश देशान्तर विस्तार ७६˚१२' पूर्व से ७७˚१८' पूर्व है। लातुर जिले का भौगोलिक क्षेत्र ७,३७२ चौकिमी रहकर २००१ की जनगणना में २०,७८,२३७ जनसंख्या रही है। इस जनसंख्या की घनता

हर चौकिमी को २८४.५३ है। लातुर जिले की प्राकृतिक स्थिति में बालाघाट यह पठारी प्रदेश और नदीवादी का प्रदेश ऐसी उसकी स्थिति रही है। इनमें मांजरा, तावरजा, तेरणा, मन्याड़, घरणी और बोरी आदि नदियाँ आ जाती हैं। जिले का वातावरण दमट, उष्ण और सूखा रहता है। यहाँ की जमीन मध्यम रूप उपजाऊ जमीन और रेगूर, पूरी काली है।

## अध्ययन का उद्देश्य :

१. अध्ययन क्षेत्र में इथेनॉल निर्माण की संभावना का अध्ययन करना और इथेनॉल के छोटे–छोटे प्लांट खड़ा करने के बारे में सोचना।

२. आर्थिक एवं पर्यावरणीय दृष्टि से इथेनॉल की उपयोगिता का अध्ययन करना।

३. इथेनॉल का भौगोलिक अध्ययन करना।

## जानकारी स्रोत और अध्ययन पद्धति :

जानकारी चयन के लिए प्राथमिक और द्वितीयक पद्धतियों का उपयोग किया है।

A) प्राथमिक स्रोत : किसान, इथेनॉल प्लांट और शुगर फैक्टरी को प्रत्यक्ष तळीवरीं करके मौखिकी और मुलाकात करके इथेनॉल के बारे में जानकारी ली है।

B) द्वितीयक स्रोत : शक्कर उद्योग के वर्षी विवरण, शुगर डायरी, शुगर इंडिया, ईयर बुक, गन्ना विशेषांक, संदर्भसूची और मासिक आदि।

अध्ययन क्षेत्र में इथेनॉल निर्माण की संभावना का अध्ययन करने के लिए १ मे. टन गन्ना और अन्य फसल में कितना लीटर इथेनॉल का निर्माण हो सकता है, इसका अध्ययन किया और ऐसा समज में आया कि, १ मे. टन गन्ना और अन्य फसल से साधारण ९० लीटर इथेनॉल का निर्माण हो सकता है, इस सूत्र से अध्ययन क्षेत्र में कितना मे. टन गन्ना और अन्य फसल का उत्पादन है, इसका अध्ययन किया और इनमें से सिर्फ १० प्रतिशत गन्ना और अन्य फसल से कितना इथेनॉल बन सकता है, इसकी संभाव्यता निकाली।

## इथेनॉल की संज्ञा :

इथेनॉल एक प्रसिद्ध अल्कोहल है। इसे एथिल अल्कोहल, ग्रेन अल्कोहल, प्युअर अल्कोहल, हैड्रोऑक्सिथेन, ड्रिंकिंग अल्कोहल, एथिल हैड्रेट इतने बहुत सारे नाम से जाना जाता है। उनका आण्विक सूत्र है $C_2H_6O$, इनकी दिखावट Colorless Clear-Liquid है उनका घनत्व ०.७८९ $g/cm^3$, liquid है।

१) रेक्टिफाईड स्पिरीट : अल्कोहल और पानी के ९५ : ५ मिश्रण को रेक्टिफाइड स्पिरीट कहते हैं।

२) एक्स्ट्रा न्यूट्रल अल्कोहल : रेक्टिफाईड स्पिरिट को अतिशुद्ध करके मद्यपेय में उपयोग करते हैं, तब उसको एक्स्ट्रा न्यूट्रल कहते हैं।

३) डिनेचर्ड स्पिरीट : अल्कोहोल में जब पिरिडीन, मिथेनॉल अथवा अन्य रसायन मिलाकर अल्कोहल को पीने अयोग्य बनाते हैं, तब उनको डिनेचर्ड स्पिरीट कहते हैं।

४) इथेनॉल इंधन : कुछ रासायनिक अभिक्रिया करके अल्कोहल से पूरा पानी निकाल दिया जाता है। इसमें अल्कोहल अंश ९९.९ प्रतिशत या १०० प्रतिशत रहता है, इस अल्कोहल को अनहायड्रूस अल्कोहल अथवा ॲबसोल्यूट अल्कोहल अथवा इथेनॉल इंधन कहते हैं। उसका उपयोग पेट्रोल या डीजल में मिलाकर किया जाता है।

## निर्माण प्रक्रिया :

इथेनॉल उत्पादन प्रक्रिया एक प्राकृतिक प्रक्रिया है जो ऑक्सिजन युक्त कार्बानिक यौगिकों के कार्बोहायड्रेट के किण्वन (Fermentation) के माध्यम से बनता है। फसल स्टार्च, शर्करा और सेलूलोज युक्त कार्बोहाइड्रेट बनाते हैं। एक बार सरल शर्करा (Simple sugar) बन जाती है, तब खमीर (Yeast) के साथ शुगर मिला कर पुनर्प्रक्रिया की जाती है और इस प्रक्रिया में कार्बन डाय आक्साइड और अल्कोहोल को अलग (expel) किया जाता है। किण्वन (Fermentation) की प्रक्रिया पूरी होने के बाद इथेनॉल से पानी निकाल दिया जाता है। पानी निकालने के लिए फ्रैक्शनेशन (Fractionation) की प्रक्रिया करनी पड़ती है। इस प्रक्रिया में छिद्रित प्लेटों या पैक डिब्बों की एक श्रृंखला का उपयोग किया जाता है। जब गर्म पानी और अल्कोहल की वाष्प फ्रैक्शनेशन की प्रत्येक स्टेप से पूर्ण हो जाती है, तब मजबूत (Stronger) अल्कोहल वाष्प बनता है और अल्कोहल वाष्प

उपकरण के ऊपरी सतह पर एकत्रित होने लगती है। जिसे Water condense द्वारा ठण्डा करके शुद्ध इथेनॉल मिलाया जाता है, जो ९०% शुद्ध होता है।

## इथेनॉल की उपयोगिता :

इथेनॉल की उपयोगिता सिर्फ मोटार का इंधन से सीमित नहीं है। इसके अलावा उद्योग में इथेनॉल का उपयोग जादा मात्रा में किया जाता है। पालिश, क्लोरोफार्म, कृत्रिम रंग, पारदर्शक साबुन, वार्निश, दवाओं के घोल तथा निष्कर्ष, ईथर, फल की सुगंधों का निष्कर्ष और अन्य रासायनिक यौगिक बनाने में इथेनॉल का उपयोग बड़ी मात्रा में किया जाता है। इसके अलावा भी घावों को धोने में जीवाणूनाशक के रूप में, पीने के लिए विभिन्न मदिराओं के रूप में तथा प्रयोगशाला में घोलक के रूप में इथेनॉल का उपयोग किया जाता है। पीने के औषधियों में भी इथेनॉल डाला जाता है। मरे हुए जीवों को जादा समय तक संरक्षित रखने के लिए, रेआन ऐसिटेट उद्योग में, स्पिरिट लैंप और स्टोव में और सबसे महत्वपूर्ण मोटार में ईंधन के रूप में जादा इस्तेमाल हो रहा है।

यूएसए (अमेरिका) में ८० प्रतिशत वाहनों में १० प्रतिशत इथेनॉल मिश्रित पेट्रोल का उपयोग किया जाता है और यहाँ इथेनॉल का निर्माण मक्के से किया जाता है। भारत सरकार ने २००३ में राष्ट्रीय जैव ईंधन नीति का बुनियाद रखी और इस नीति के अनुसयार पेट्रोल, डीजल में इथेनॉल मिलाने के बारे में निर्णय हुआ और ५ प्रतिशत पेट्रोल, डीजल में मिलाने का तय हो गया। २०१७ तक २०% तक बढत करने के बारे में निर्णय हो गया था, लेकिन सही तरीके से लागू नहीं हुआ। लेकिन भारत में आज कुछ जगह पर १० प्रतिशत इथेनॉल का इस्तेमाल पेट्रोल और डीजल में हो रहा है। यह १० प्रतिशत मिश्रित पेट्रोल को E10 ऐसा लिखा जाता है। इसका मतलब ९० प्रतिशत साधारण पेट्रोल और १० प्रतिशत इथेनॉल ऐसा है। कई देश में २० प्रतिशत से भी जादा इथेनॉल का उपयोग पेट्रोल में हो रहा है। ब्राजील में ८५ प्रतिशत इथेनॉल और १५ प्रतिशत पेट्रोल पर चलने वाले मोटार इंजिन का निर्माण किया है।

## अध्ययन क्षेत्र में इथेनॉल निर्माण की संभावना :

भारत सरकार ने सन् २००३ में ५ प्रतिशत इथेनॉल पेट्रोल में मिलाने की अनुमति दी है। पेट्रोल में ५ प्रतिशत इथेनॉल ईमानदारी से मिलाया तो भी लगभग १३५ करोड़ लीटर इथेनॉल की आवश्यकता थी और सन् २०१७ तक २० प्रतिशत तक करने की योजना थी, तो लगभग ५९४ करोड़ लीटर इथेनॉल की आवश्यकता थी। इसमें ऐसा लगता है कि, पेट्रोल में इथेनॉल मिलाने के समर्थन में सरकार जी-तोड़ कोशिश कर रही है। इथेनॉल की कीमत भी ३८/- रु. से ४०.८५/- रु. लीटर की है। और पेट्रोलियम कंपनियों को १० प्रतिशत इथेनॉल मिलाने की सक्ती की गई है। तो उन कंपनियों को इथेनॉल खरीदनाही होगा। महाराष्ट्र में एक साल के लिए लगभग १० प्रतिशत के हिसाब से १५ करोड़ लीटर इथेनॉल की आवश्यकता है और महाराष्ट्र में इथेनॉल निर्माण की संभाव्यता ९० करोड़ लीटर की है।

अध्ययन क्षेत्र लातुर जिले तक मर्यादित है। लातुर जिला महाराष्ट्र में गन्ने के उत्पाद में अग्रेसर है। मराठवाडा प्रदेश में सबसे ज्यादा उत्पाद क्षमता लातुर जिले की है। इसीलिए लातुर जिले की इथेनॉल निर्माण की संभाव्यता अधिक है। खाद्यान्न, फल और सब्जियाँ भी अधिक उत्पादित होती हैं। इसीलिए इथेनॉल की संभाव्यता अधिक है। १ टन फसल से कम-से-कम ९० लीटर इथेनॉल निर्माण होता है। इस सूत्र के आधार पर निम्न तरीके से इथेनॉल की संभाव्यता स्पष्ट की है।

| फसल | प्रति वर्ष उत्पाद (मे. टन) | १० प्रतिशत उत्पाद (मे. टन) | इथेनॉल की संभाव्यता (लीटर) |
|---|---|---|---|
| गन्ना | २५,००,००० | २,५०,००० | २,२५,००,००० |
| खाद्यान्न | ५,००,००० | ५,००० | ४,५०,००० |
| फल और सब्जियाँ | १०,००० | १,००० | ९०,००० |
| कुल | २५,६००,००० | २,५६,००० | २,३०,४०,००० |

उपर्युक्त तख्ते का अध्ययन करने से यह महसूस हो जाता है कि, अध्ययन क्षेत्र में सबसे जादा गन्ने की फसल उगायी जाती है। गन्ने की उत्पाद प्रति वर्ष २५,००,००० मे. टन है, तो इनमें से १० प्रतिशत गन्ने का इथेनॉल बनाया गया तो भी २,२५,००,००० लीटर इथेनॉल बन सकता है। खाद्यान्न पचास हजार मे. टन से जादा उत्पादित होता है। इनमें से १० प्रतिशत का इथेनॉल बनाया तो ४,५०,००० लीटर इथेनॉल बन सकता है। फल और सब्जियाँ भी १०,००० मे. टन से जादा उत्पादित होती हैं। इनमें से १० प्रतिशत का भी इथेनॉल बनाया तो ९०,००० लीटर तक इथेनॉल बन सकता है। लातूर जिले में कुल मिलाकर २५,६०,००० मे. टन गन्ना, खाद्यान्न और सब्जियाँ और फल की उत्पाद क्षमता है। इनमें से इनमें से १० प्रतिशत फसल का भी इथेनॉल बनाया तो २,३०,४०,००० लीटर इथेनॉल बन सकता है, जो लातुर जिले की पेट्रोलियम की जरूरत है, वह पूरी हो जाएगी।

**इथेनॉल का महत्व ः**

इथेनॉल का महत्व दिन-ब-दिन बढ़ता जा रहा है। आर्थिक, पर्यावरणीय, कच्चे माल की उपलब्धता के दृष्टिकोण से इथेनॉल का महत्व निम्न प्रकार से है।

## A) आर्थिक महत्व ः

१. किसानों को फायदा ः १ मे. टन गन्ने से ११० से १२० कि.ग्रॅ. शक्कर मिलती है। शक्कर का ठोक भाव ३० रु. प्रति किलो का माने, तो एक टन गन्ने से निर्माण होनेवाली १२० किलो शक्कर के ३६००/- रु. होते हैं। इसीलिए शक्कर फैक्टरी को जादा भाव देना संभव नहीं है। इसकी तुलना में इथेनॉल की दर ६०/- रु. प्रति लभटर माने तो एक टन गन्ने से ९० लीटर इथेनॉल के ५४००/- रु. मिलेंगे। उत्पाद खर्च छोड़कर किसानों को ४४००/- रु. भाव प्रति टन गन्ने को मिल सकते हैं।

2. इंधन ग्राहक को फायदा ः डिझल और पेट्रोल के दर दिन-ब-दिन बढ़ती जा रही है क आज पेट्रोल का दर ८५ रु. से जादा हो गया है और आनेवाले दिनों में कितनी बढ़ेगी इसका अंदाज नहीं है। इसकी तुलना में इथेनॉल की दर जादा बढ़ने की  संभावना नहीं है। क्योंकि इथेनॉल का कच्चा माल स्थानीय है, उसका दर जादा बढ़ने की गुंजाईश ही नहीं है।

3. कार्बन क्रेडिट से इन्सेंटिव्ह मिलने का फायदा ः अगर हम रिन्युएबल सोर्स के सहायता से इथेनॉल बनाते हैं। तो हमारे देश का प्रदूषण स्तर कम होने से हम ज्यादा प्रदूषण करनेवाले देशों को कार्बन क्रेडिट कर सकते हैं और अंतर्राष्ट्रीय बाजार से इन्सेंटिव्ह मिलवा सकते हैं।

4. देश को फायदा ः अर्थशास्त्रीय दृष्टि से देखा जाय तो स्थानीय इथेनॉल मिश्रित डीजल और पेट्रोल, विदेश से आयात किए जाने में होनेवाले विदेशी मुद्रा खर्च को कम कर सकता है। और ये पैसा देश के विकास को जोड़ा जा सकता है।

5. रोजगार की उपलब्धता ः भारत के हर गाँव में इथेनॉल के छोटे-छोटे प्लांट खड़े हो जाएँगे तो हर गाँव में लोगों को रोजगार मिलेगा।  रोजगार के लिए लोगों को शहर आने की भी जरूरत नहीं पड़ेगी। शहर में नागरीकरण कम होने से दबाव कम आएगा और शहरों का सौंदर्य भी खुलेगा।

## ब) पर्यावरणीय महत्व ः

१. इथेनॉल का पर्यावरणीय दृष्टि से बहुत जादा फायदा है। क्योंकि इथेनॉल oxygenated है, जिसका अर्थ है कि डीज़ल और पेट्रोल की तुलना में इथेनॉल से २०% कम कार्बन मोनो ऑक्साइड और हाइड्रोकार्बन का उत्सर्जन होता है।

२. दिन-ब-दिन वाहनों की संख्या बढ़ती जा रही है। इसीलिए डीज़ल और पेट्रोल का इस्तेमला भी दिन-ब-दिन बढ़ता जा रहा है और डीज़ल, पेट्रोल-ज्वलन से कार्बन मोनो ऑक्साइड, कार्बन डाय ऑक्साइड का उत्सर्जन बहुत बडी मात्रा में हो रहा है। महाराष्ट्र में मुंबई, नासिक के बाद लातुर जिले का नंबर आता है। इसीलिए वायु प्रदूषण कम करने की जरूरत है, नहीं तो आनेवाले नई पीढ़ी में हम बहुत दर्दनाक बिमारियाँ पैदा कर सकते हैं।

३. अध्ययन से पता चल रहा है कि यदि हम इथेनॉल का पेट्रोल में उपयोग १० प्रतिशत से १५ प्रतिशत करें, तो वायुप्रदूषण ३३ प्रतिशत कम हो जाएगा और यदि डीजल में भी १० प्रतिशत से १५ प्रतिशत किया तो वायुप्रदूषण का स्तर ८० प्रतिशत तक कम हो सकता है। आज हमारे देश में वाहनों के कारण करीब ४० प्रतिशत या उससे भी जादा प्रदूषण हो रहा है। इस वायुप्रदूषण के कारण हमारे देश में सालाना तकरीबन चार लाख लोगों की मौत हो रही है। एक सर्वे के अनुसार अगर हम इथेनॉल मिश्रित पेट्रोल का इस्तेमाल करें, तो पारंपरिक इंटरनल कंबचशन वाले इंजन के मुकाबले वायुप्रदूषण का स्तर २० से ३० प्रतिशत कम हो सकता है। और एक फायदा यह भी है कि इथेनॉल मिश्रित इंधन से वाहनों का इंजन 'ठंडा' रहता है। इस कारण इंजन से स्फोट होने की संभावना बहुत कम हो सकती है।

४. एक अनुमान के मुताबिक ऐसा भी मालूम हो गया है कि यदि हम पेट्रोल, डीजल में इथेनॉल का इस्तेमाल करते हैं, तो पेट्रोल, डीज की आक्टने वेल्यू २.५ प्रतिशत और ऑक्सिजन की वैल्यू ३ प्रतिशत बढ़ जाती है। और इससे इंजन में १०० प्रतिशत पेट्रोल जलता है तथा धुआँ भी बहुत कम प्रदूषण करता है। इसीलिए दिन-ब-दिन इथेनॉल इंधन का उपयोग बढ़ाने की जरूरत है।

## भारत के हर गाँव में इथेनॉल का प्लांट ः

इथेनॉल कौन-सा भी आदमी बना सकता है, वह लीगली है। आपको सिर्फ इथेनॉल निर्माण का परवाना (Permit) निकालना पड़ता है। इसीलिए भारत के हर गाँव में इथेनॉल के प्लांट खड़े हो सकते हैं। किसान अपने खेती में भी छोटा प्लांट लगवा सकता है। क्योंकि साधारणतः एक एकड़ जमीन में उगाई गई फसल से ३०० गॅलन इथेनॉल बना सकते हैं और इथेनॉल बनाने के लिए आप खेती में जो भी फसल है, जैसे कि टमाटर, राई, ज्वार, गेहूँ, सब्जियाँ, फल और Waste food का इस्तेमाल करके इथेनॉल बना सकते हैं।

एक अनुमान के अनुसार भारत में साधारण तीस प्रतिशत फसल waste होती है। यह waste होनेवाले फसल में हम अगर इथेनॉल बनाए, तो हमें परदेस से जो पेट्रोल आयात करते हैं, उनके ऊपर का खर्च कम करके यह रकम हम किसानों को जरूरत है, वह बिजली और पानी के ऊपर खर्च करेंगे तभारत में जो तीस प्रतिशत जमीन पानी के अलावा पडीत है, वह उत्पादक्षम हो जाएगी। इसीलिए हर गाँव से बायोवेस्ट की छोटी–छोटी गिरणी बनाएँगे और उनसे डिनेचर्ड-अल्कोहल बनाएँगे। दूध डेयरी जैसे हर गाँव में बायोवेस्ट की एक गिरणी रहेगी। उस गिरणी से डिनेचर्ड अल्कोहोल बनेगा और जिला के स्थान पर या अन्य कहीं एक जगह पर इथेनॉल बनेगा तो वाहतूक खर्चा कम होगा और इथेनॉल की कीमत भी ठीक रहेगी। इसीलिए भारत के हर गाँव में इथेनॉल का प्लांट खड़े करने की जरूरत है।

## संदर्भ ग्रंथ :

१. एस. व्ही. पाटील, मद्यार्क : इथेनॉल : रसायनांचा व ऊर्जेचा पुनरुद्भवी स्रोत, *Silver Jubilee Years, Souvenir, Vasantdada Sugar Institute* (१९७५-२०००), पृष्ठ क्र. ६९-७०.

२. *Angelo Basile, Adolfo Lulianlli, 'Ethanol' (1st Edition) Science & Engineering, Franscesco Dalena, T. Nejat Veziroglu.*

३. संतोष गव्हाणे, 'इंधनासाठी इथेनॉल निर्मिती फायद्याची', दै. प्रभात, शनिवार २८ एप्रिल २०१७, मुख्य पान.

४. श्यामराव देसाई, जैवइंधन, शेतकरी संघटनेचे संस्थापक अध्यक्ष, 'देशात इथेनॉलचा प्रभावी वापर वाढायला हवा', ॲग्रोवन.

५. केंद्रीय कृषी राज्यमंत्री संजीव बालियाँ, 'इथेनॉल उत्पादनवाढीसाठी कर्ज', महाराष्ट्र टाइम्स, ऑनलाइन, जाने ०५, २०१६.

६. इथेनॉल से दूर हो सकता है प्रदूषण, *published- Facebook, June 17, 2018.*

७. बी. एस. पाबला, इथेनॉल! गाडी चलेगी दारू पीकर, ड्राईवर भले ही ना पिए!!, *posted on Dec. 22, 2013.*

८. 'चीनी उत्पादन पिछले साल से १८ लाख टन कम रहने का अनुमान,' दै. भास्कर, दि. जाने. २१, २०१९.

# भौगोलिक माहीती प्रणालीचे वाढते महत्व :एक सूक्ष्मस्तरीय अभ्यास

डॉ. राजेश्वर कोटलवार

भूगोल विभाग प्रमुख

शंकरराव चव्हाण महाविद्यालय अर्धापूर जि. नांदेड

बालाजी आव्हाड

भूगोल विभाग

शंकरराव चव्हाण महाविद्यालय अर्धापूर जि. नांदेड

**प्रस्तावना :**

जागतिक पातळीवर संसाधनाचा जसा विकास झाला त्या-त्या टप्प्यानुसार त्याच्या वापराची उपयुक्तता दिवसेंदिवस वाढत गेली. जीआयएस प्रणालीही पण संगणकावर आधारीत प्रणाली असल्यामुळे संगणकाप्रमाणे हिचा पण वापर अनेक क्षेत्रात केला जावू लागला. यात सरकारी कार्यालये, खाजगी कार्यालये, शैक्षणिक संस्था, संशोधन केंद्रव्यवस्थापन विभाग इत्यादीचा यात समावेश आहे. जीआयएस प्रणालीची गतीशिलता, अचूकता, उपयुक्तता व कार्यक्षमता या गुणधर्मामुळे याचे उपयोजन दिवसेंदिवस वाढतच आहे. दुस-या बाजूला जगामध्ये असंख्य सांख्यिकी दरवर्षी निर्माण होत आहे. त्याचे व्यवस्थापन, संसाधन व मानवसंसाधन यांचे असमान वितरण आहेच. त्याचबरोबर त्या घटकात गुंतागुंतीचे अनेक आहेत. मानवाच्या दैनंदीन जीवनात जीआयएस एक अविभाज्य भाग बनत आहे. उदा. एखाद्या ठिकाणाचा पत्ता, सेवासुविधा तत्पर मिळवण्यासाठी आज प्रत्येक माणूस आपल्या मोबाईलच्या गुगल मॅपचा वापर करत आहे. हे एक व्यापक स्वरुपात वापरले जाणारे जीआयएस प्रणालीच आहे. कोणत्याही क्षेत्रात जीआयएसचा उपयोग करत असतांना हेतूची पुर्तता होते. किंवा नाही याचा विचार करुन जीआयएस प्रकल्पाचा आराखडा ठरवला जातो. यात उदिदष्टयाची निश्चिती सांख्यिकीचे पृथ्थकरण व निष्कर्ष अशा वेगवेगळया टप्प्यातून कार्य करावे लागते. जगामध्ये जीआयएस नाविन्यपूर्ण असल्यामुळे काही ठराविक देशात, प्रमाणात किंवा खाजगी कंपन्याद्वारे याचे उपयोजन अशा पातळयावर जीआयएस प्रणाली वापरली जाते. जीआयएसचे उपयोजन खालील विविध क्षेत्रात, विविध उदिष्टयासाठी केले जाते.

**उदिदष्टये:**

१. जीआयएस बदलत्या काळानुसार अभ्यास करणे.

## जीआयएसचे उपयोजन :

### 1) नकाशास्त्र (Cartography):

नकाशाचा उगम व विकास प्राचीन काळात झाला असला तरी त्याच्यातील शास्त्रशुध्दपणा हा संगणक काळात निर्माण झाला. याच काळात नकाशा हा जीआयएस प्रणालीमुळे डिजीटल स्वरुपात उपलब्ध झाला. यात नकाशा नव्याने निर्माण करणे, तो अद्यावत करणे व तो उपभोक्यापर्यंत पोहचवने यात गतीशीलता व अचूकता जीआयएसमुळे आली याचे उत्तम उदाहरण म्हणजे गुगल मॅप, याहू मॅप होय.

### 2) संशोधन (Research):

संशोधन हा मानवी जीवनाच्या विकासासाठी एक महत्वाचा भाग आहे. सुरुवातीपासून अनेक विषयामध्ये संशोधन केले जाते. हे संशोधन केले जाते. हे संशोधन करत असतांना माहीतीचे संकलन, संस्करण, विश्लेषन व पृथ्थकरण करण्यासाठी भौगोलिक माहीती प्रणालीचा वापर केला जातो. उदा. भूगोल, वनस्पतीशास्त्र, भौतिकशास्त्र इ. विषयाच्या संशोधनास जीआयएस अविभाज्य घटक बनला आहे.

### 3) आपत्ती व्यवस्थापन(Diaster Management):

आज एक अचूक निर्णय देण्याची क्षमता जीआयएस प्रणालीकडे पाहीले जाते.आपत्तीचा शास्त्रीय अभ्यास, व्यवस्थापन इत्यादी संदर्भात अभ्यास करण्यात व निर्णय घेण्यास जीआयएस मदत करते.उदा. नदीच्या पानलोट क्षेत्रात किती व कसे पर्जन्य झाले तर नदीच्या खालच्या कोणत्या व किती भागावर पुराची आपत्ती येवू केला जातो.

### 4) भूमी उपयोजन(Land use):

विशिष्ट जमीन विशिष्ट गोष्टीसाठी वापरली तर त्या जमीनीची उपयोगीता परीणामकारक ठरते. कोणती जमीण, कोणत्या घटकासाठी वापराची किंवा वापरु नये. हे ठरण्यासाठी जीआयएस प्रणालीत उपग्रह प्रतीमा व सरकारी माहीतीच्या आधारे नकाशे तयार केले जातात. अनेक वर्षाच्या भूमीउपयोजनाचा अभ्यास केल्यास कोणत्या क्षेत्रात भूमीचा वापर वाढत आहे. उदा. भारत संपूर्ण भूप्रदेशाचे भूमीउपयोजन करुन नकाशे उपलब्ध करुन देण्याची यंत्रणा निर्माण केली आहे.

### 5) नेव्हिगेशन (Navigation):

प्राचीन काळापासून मानव नविन गोष्टी व प्रदेशाच्या शोधात प्रवास करत असतांना प्रवास करण्याच्या ठिकाणाचे अंतर, दिशा व त्याठिकाणी जाण्यासाठी असते. तो अगोदर नकाशाच्या साहाय्याने घेत असत सध्याच्या काळात जीआयएस बरोबर जीपीएसचा विकास झाल्याचे उपभोक्त्याचे सध्याचे स्थान ठरवण्यासाठी सोविस्कर झाले आहे. जगात सर्वात लोकप्रिय जीआयएसचा वापर याच क्षेत्रात केला जातो. भू, जल, हवाई, नळ, इत्यादी अनेक वाहतूक प्रकारात जीआयएसचा वापर केला जातो.

**6) नैसर्गिक संसाधनाचे व्यवस्थापन**(Natural Resource Management):

पृथ्वीवरील नैसर्गीक संसाधनाचे वितरण व उत्पादन असमान आहे. कोणत्या ठिकाणी कोणते संसाधन आहे. त्याची मागणी जगात कोणत्या प्रदेशात आहे. यासंदर्भात माहीतीचे भैगोलिक दृष्टीकोनातून संकलन करून अद्यावत माहीती जीआयएसद्वारे ठेवली जाते. उदा. जगातील वनाचे प्रमाण, जलसाठे, खनिजे, मृदा इत्यादीचे भौगोलिक वितरण व त्यात होणारे बदल जीआयएसद्वारे टिपले जाते इत्यादी गोष्टी अगोदर गोष्टी अगोदर करण्यासाठी मोठया प्रमाणात वेळ, मनुष्यबळ व पैसा खर्च करावा लागत होता. ते आता कमी पैसा व कमी वेळेस जीआयएसमार्फत होत आहे.

**7) पर्यटन**(Toursim):

पर्यटन म्हणजे एका ठिकाणापासून दुस-या ठिकाणी केलेला प्रवास होय. एखाद्या ठिकाणी प्रवासाला जात असतांना त्या प्रदेशात कुठली भौगोलिक परिस्थिती आहे. तेथील अन्न, भाषा, चलन व इतर सेवासुविधा यांचा अंदाज घेवूनच पर्यटक प्रवास करत असतात. अगोदरच्या काळी पर्यटकास यासंदर्भात माहीती सहज उपलब्ध होत आहे. याचाच परिणाम म्हणून दिवसेंदिवस पर्यटकांच्या संख्येत देखील वाढ होत आहे.

**8) स्थानिक प्रशासनासाठी** (Local Adminstration):

देश, घटकराज्ये, जिल्हा, तालुका, गाव या विविध पातळीवर प्रशासनात वेगवेगळी कामे करावी लागतात. यात सर्वेक्षण, माहीतीची मांडणी, नियोजन यासंदर्भात प्रशासनात सामान्य नागरीक देण्यासाठी जीआयएसचा वापर केला जात आहे. उदा. शेतीमध्ये घेतली जाणारी पिके, जलसिंचन क्षेत्र, मालमतावरील कर, विहीरीची संख्या इत्यादी संदर्भात माहीती जीआयएसमार्फत गोळा केली जात आहे.

**9) बॅंकीग** (Banking):

बॅंकीग हे सर्वत्र व्यापक स्वरूपात दैनंदीन जीवनात वापरली जाणारी सेवा आहे. कोणत्या बॅंकेची आहे, तीचे सेवा क्षेत्र काय, ती किती अंतरावर आहे, तीच्या एटीएमच्या सुविधा आहेत की नाही इत्यादी संदर्भात जीआयएसचा वापर करून आपले व्यवहार करत आहेत.

**10)संरक्षण** (Defince):

मुलातच जीआयएस विकास व उगम अमेरीकेतील सुरक्षा विभागात झालेला आहे. यात देशाची सिमा, सैनिकांचे कॅंप, शस्त्रसाठयाचे ठिकाण, वाहतूक व्यवस्था, संरक्षनाच्या दृष्टीकोनातून भौगोलिक गोष्टींची माहीती संरक्षण विभागात संकलित करून तीचा वापर केला जातो. आज तर आंतरराष्ट्रीय पातळीवर संपूर्ण सुरक्षा व्यवस्था जीआयएस, आरएस व जीपीएसवर आधारीत आहे.

**11) गुन्हेगारी** (Crime):

गुन्हेगारीही व्यक्तीसापेक्ष असली तरी गुन्हेगारीचा उगम व विकास विशिष्ट क्षेत्रात होतो. विशिष्ट गुन्हा करतो व वापरतो. काही प्रकारचे गुन्हे तर विशिष्ट भागातच जास्त घडतात. या सर्वांची माहीती जीआयएसमध्ये क्षेत्रानुसार संकलित केली जाते. व त्याचद्वारे तीचे विश्लेषन करूने गुन्हगारी उपायात्मक कार्यवाही केली जाते. उदा. The National Instistute Justice हे जीआयएस, गुन्हेगारी नोंद करण्यासाठी व त्याचे व्यवस्थापन करण्यासाठी उपयोगी पडते.

**12) शेती** (Agriculture):

शेती हा जगाच्या पाटीवर चालणारा व्यवसाय आहे. जगामध्ये भौगोलिक परिस्थिती व मानवाच्या उदिष्टयानुसार शेती प्रकारात भिन्नता आढळते. या शेती प्रकारातील साम्यता व भिन्नता, जीआयएसमार्फत अभ्यासला जातो. त्याचबरोबर विशिष्ट शेतीसाठी कोणती परिस्थिती कोणत्या प्रदेशात आहे, कोणत्या प्रदेशात शेती करणे सोयीस्कर होईल. या सर्वांचे विश्लेषण करण्याची क्षमता जीआयएसमध्ये असल्याने जीआयएसचा वापर शेती क्षेत्रात, पिकासाठी लागणारे घटक, वितरण, पिकाचे उत्पादन, वितरण, मागणी इत्यादीची माहीती संकलन करून तीचे व्यवस्थापन जीआयएसमार्फत केले जाते.

**14) आरोग्य सुविधा** (Health Facility):

सुदृढ आरोग्य हे देशाच्या विकासाचा निर्देशांक असतो. आरोग्य सुविधा देण्यासाठी प्रत्येक देश प्रयत्नशिल असतो. आजारी लोक आजाराचे प्रकार व आरोग्य सुविधा इत्यादीचे भौगोलिक विश्लेषन जीआयएसमार्फत अचूककाढण्यात आला. आजदेखील अनेक देशामध्ये आरोग्य खाते याचा वापर करतो. उदा. युएसएमधील स्वास्थ व मानवी सेवा आरोग्य संसाधने, आरोग्य सेवाकेंद्र याची माहीती जीआयएसमार्फत पुरवते.

संदर्भ :
1- कार्लेकर श्रीकांत, भौगोलिक माहीती प्रणाली.
2- http://datawarehouse.hrsa.gov.
3- DeMers Michael, GIS Modeling in Raster.
4- W.H.Freeman and Co, Introduction to geospatial technologies/ Bradley A. Shellito, 2012.

# सार्वजनिक आरोग्य व्यवस्थेत तंत्रज्ञानाचे विविध आयाम

प्रा. डॉ. खाकरे आर. डी

जयक्रांती महाविद्यालय लातूर

ता. जि. लातूर

प्रा. देविदास निळकंठ भोयर

शहीद भगतसिंग महाविद्यालय किल्लारी

ता. औसा जि लातूर

**प्रस्तावनाः**

आरोग्य भूगोल हि मानवी भूगोलाची एक नवीन शाखा असून या शाखेच्या अभ्यासाला इ.स. पूर्व ५ व्या ते ४ थ्या शतकात सुरवात झाली आहे. सर्वात प्रथम हिप्पोक्रेटस यांनी आपल्या लिखानात एखादया ठिकाणाच्या स्थान, हवा, व पाणी या घटकांचा मानवी आरोग्यावर कसा परिणाम होतो हे स्पष्ट करण्याचा प्रयत्न केला. सुरवातीच्या काळात आरोग्य भूगोलाला वैद्यकिय भूगोल (Medical Geography)या नावाने ओळखले जात असे. इ.स. १९७६ मध्ये आंतराष्ट्रीय भौगोलीक संघटनेने वैद्यकिय भूगोलया ऐवजी आरोग्य भूगोल(Health Geography) या नावाची शिफारस केली तेव्हापासून या शाखेला आरोग्य भूगोल या नावाने ओळखले जावू लागले.

आरोग्य भूगोलामध्ये मानवी आरोग्यावर परिणाम करण्या प्राकृतिक, मानवनिर्मित, पर्यावरणीय घटकांचा होणाया परिणामाचा तसेच विविध आजाराचा, वैद्यकिय सेवेच्या वितरणाचा व वेगवेगळया योजनाचा अभ्यास केला जातो.

**आरोग्य भूगोलाच्या व्याख्याः**

१. मॉस्की डी. ए. व डॉ. भाईसे:–

"भौगोलीक घटकामुळे मानवी आरोग्यावर होणाया प्रभावाचा अभिक्षेत्रीय दृष्टीकोणातून सखोल व क्रमबध्द अभ्यास करण्या शास्त्राला आरोग्य भूगोल असे म्हणतात"

२. "आरोग्य भूगोल म्हणजे भौगालीक माहिती विनियोग हा आरोग्य, आजार आणि आरोग्याची काळजी या मध्ये संभाव्य अभ्यास पध्दतीने करणे होय"

**संशोधन कार्याचे महत्वः**

अन्न, वस्त्र, निवारा या मानवाच्या मुलभूत गरजांबरोबर निरोगी आरोग्य हि सुध्दा मानवाची मुलभूत गरज आहे. मानवाची आर्थिक प्रगती ही पुर्णताहा निरोगी आरोग्यावर अवलंबून असते. जर सार्वजनिक क्षेत्राऐवजी जर खाजगी क्षेत्रात गुंतवणूक वाढली तर आरोग्याच्या सेवेवर खुप मोठा खर्च करावा लागतो. जगात क्युबा सारखा छोटा देश सर्वांना मोफत आरोग्याच्या सेवा पूरवितो तर भारत एकूण उत्पन्नाच्या ४ टके खर्च आरोग्यावर करतो. आरोग्यावर होणाया खर्चाचा जर विचार केला तर अनेक कुटूंबाची आयुष्याची कमाई रीती झालेली बघायला मिळते. निरोगी आरोग्यासाठी अनेक योजना आखल्या जातात पण लोकसंख्या वाढीचा दर, पुरेशे मनुष्यबळ नसणे, बेरोजगारी, गरीबी, सामाजिक घटक हे यातील अनेक अडथळे आहेत. सार्वजनिक आरोग्य व्यवस्थेत जर तंत्रज्ञानाचा वापर चांगल्या प्रकारे केला तर कमी मनुष्यबळाच्या जोरावर सार्वजनिक आरोग्य व्यवस्थेचे चांगले नियोजन होऊ शकते. सार्वजनिक आरोग्य व्यवस्था सर्वांना मिळाव्यात या दृष्टीने संशोधन कार्य व्हावे या दृष्टीकोणातून विषयाची निवड करण्यात आलेली आहे.

**संशोधनाची उदिष्टेः**

प्रस्तूत संशोधनासाठी खालील काही उदिष्टे ठेवण्यात आलेले आहेत.

१. सार्वजनिक आरोग्य व्यवस्था व तंत्रज्ञानाचा अभ्यास करणे.

२. सार्वजनिक आरोग्य व्यवस्थेत तंत्रज्ञान उपयोगी आहे किवा नाही हे अभ्यासणे.

३. सार्वजनिक आरोग्य व्यवस्थेच्या नियोजनात तंत्रज्ञानाची भूमिका स्पष्ट करणे.

**विश्लेषणः**

**सार्वजनिक आरोग्य व्यवस्था म्हणजे काय?**

जनतेला निरोगी आरोग्य देण्यासाठी वेगवेगळया योजनांच्या माध्यमातून आरोग्याच्या सेवा व सुविधा पुरवील्या जातात. या सेवा व सुविधा सर्वांना अल्प दरात व कमी खर्चात खुल्या असणाया सेवेला सार्वजनिक आरोग्य व्यवस्था असे म्हणतात. उदा. भारतातील सार्वजनिक आरोग्य व्यवस्था तीन स्तरावर विभागली आहे. १. केंद्र स्तर २. राज्य स्तर ३. जिल्हा स्तर असे स्तर करण्यात आलेले आहे.

**तंत्रज्ञान म्हणजे काय?**

"अवजारे, यंत्रे त्यापासुन बनलेल्या प्रणाल्या यांचे संकलन निर्मिती आणि उपाययोजना अभ्यासणारी तसेच त्यात सुधारणा घडवून आणणारी विद्याशाखा आहे"

प्रागैतिहासिक काळापासुन मानव तंत्रज्ञानाचा अभ्यास व वापर करत आहे. अगदी प्राचीन काळी नियंत्रीत पध्दतीने आग पेटवण्याचे तंत्र मानवाने शोधून काढले त्यानंतर चाकाचा शोध लागला. अधिक पल्ल्याचे अंतर कापण्यासाठी त्याचा उपयोग होऊ लागला. पुढे अधिक आधूनिक काळात छपाई तंत्रज्ञान, टेलीफोन, इंटरनेट या तंत्रज्ञानापर्यंत मानवाने तंत्रज्ञान विकसित केले. या तंत्रज्ञानाच्या विकासामुळे मानवाचे जीवन अधिक सोईस्कर बनले आहे.

## सार्वजनिक आरोग्य व्यवस्था व तंत्रज्ञानाचा उपयोगः

सार्वजनिक आरोग्य व्यवस्थेत तंत्रज्ञानाचा वापर जर प्रभाविपणे केला तर मानवी आरोग्य सुखकर होऊ शकते. त्यामध्ये खालील तंत्रज्ञानाचा उपयोग होऊ शकतो.

## संगणकः Computer

संगणक आज प्रत्येक क्षेत्रामध्ये वापरले जात आहे. पण त्याचा वापर माहिती साठवण्यासाठी व प्रदर्शन करण्यासाठी होत आहे. संगणकाचा उपयोग प्रत्यक्षपणे केला तर आरोग्यावर नियंत्रण येऊ शकते. गुगल कंपनीच्या एका जीवशास्त्र संशोधन विभागाने अमेरिकेतील कॅलिफोर्निया राजातील फ्रेस्ने जिल्हयात २० दसलक्ष जीवाणू बाधित डास सोडण्याचा निर्णय घेतला आहे. या डासाची पैदास एका रोबो पासून करण्यात आलेली आहे असे सांगीतल्यास त्यात काही काळेबेरे आहे का असे वाटते पण असे मूळीच नाही हा सार्वजनिक आरोग्य क्षेत्रातला एक अनोखा प्रयोग आहे.

अनेक देशात डेंग्यु, मलेरीया, हिवताप, चिकनगुनिया या आजाराने दहशत घातली असून त्यावर नियंत्रण आणण्यासाठी या प्रयोगावद्वारे फक्त नर जातीचेच डास सोडले जातील. नर जातीचे डास मानसाला चावणार नाहीत व मानवी आरोग्याला घातक ठरणार नाहीत. परंतू या डासामुळे इडीसी इजिप्तची पुढची पीढी प्रजनन क्षमता गमावून बसलेली असेल. या प्रयोगाने डेंग्यु, मलेरीया, हिवताप, चिकनगुनिया या सारख्या आजारांचे मुल नष्ट होईल. असे प्रयोग सर्वच देशात राबवल्यास सार्वजनिक आरोग्य व्यवस्थेला त्याचा फार मोठा आधार होईल.

## भ्रमणध्वनीः Mobile

सार्वजनिक आरोग्य व्यवस्थेत सर्वात महत्वाची भूमिका बजावणारे यंत्र म्हणजे भ्रमणध्वनी होय. आज विकसित व अविकसीत अशा दोन्ही देशात भ्रमणध्वनीचा वापर मोठया प्रमाणात होतो. जगातील प्रत्येक दोन व्यक्तीमागे एक भ्रमणध्वनी आहे. दुदैवाची बाब म्हणजे ज्या दुर्गम भागात आरोग्य व्यवस्था पोहचली नाही अशा भागात भ्रमणध्वनीचे जाळे मात्र पोहचले आहे.

एकाच प्रकारच्या आजाराशी लढणाया रूग्णापर्यंत आरोग्याचे संदेश पोहचवणे, आरोग्यपूर्ण सवयीची आठवण करून देणे, आजाराचे निदान करणे, रूग्णाशी संवाद साधने, गरजुना आरोग्य सेवेशी क्षणात जोडुन देणे, एखादया प्रदेशात फोफावणाया साथीच्या रोगावर बारीक लक्ष ठेवणे इत्यादी कामे भ्रमणध्वनीव्दारे केली जातात. स्मार्टफोन संकल्पनेत निर्माण केलेल्या विविध ॲपचा सार्वजनिक आरोग्य व्यवस्थेत वापर केला जावू शकतो. या ॲपव्दारे लहान बाळाचे HIV त्वरीत निदान करणे, मधूमेही व्यक्तीना आहार व व्यायामा संबंधी मार्गदर्शन करणे, गर्भवती स्त्रियांना योग्य त्या यंत्रणेशी जोडणे, आरोग्य सेवकांना माहिती संकलन करण्यासाठी मदत करणे अशी अनेक कामे घाना, केनिया, नायजेरीया, मोझाबीक या देशात केली जातात.

चीनने खास भ्रमणध्वनीव्दारे एक वेगळे जाळे तयार करून त्या जाळयामार्फत हदयविकार असलेल्या व्यक्तीच्या प्रत्येक ३० सेकंदाचा हदयाचा आलेख कॉल सेंटरला पाठवून त्याचा अभ्यास करून धोका असणाया व्यक्तीला त्वरीत मदत केली जाते.

## ड्रोनः Drone

ड्रोन कॅमेऱ्याच्या काळात वैद्यकिय ड्रोन नावाची संकल्पना पुढे येत आहे. वैद्यकिय ड्रोन मार्फत जो भाग दुर्गम आहे अशा भागात औषधी, चांगल्या प्रकारच्या रक्तपेढया पोहचवण्याचे काम करू शकतात. एखादया भागात जीवनावश्यक वस्तू कमी पडत असतील तर तासनतास वाट पाहण्यापेक्षा ड्रोनने त्या सेवा पुरवल्या जावू शकतात. उदा. रवांडा देशात वैद्यकिय ड्रोनचा वापर चागल्या प्रकारच्या रक्तपेढया पुरवण्याचे काम केल आहे त्यामुळे अनेक लोकांचे प्राण वाचले आहेत.

## दुरदर्शनः Television

आज प्रत्येक घरामध्ये व दुर्गम भागामध्ये दुरदर्शन पोहचले आहे. दुरदर्शनवर आरोग्यविषयक सल्ले, तज्ञ डॉक्टराच्या भेटी, आजारां विषयक मार्गदर्शन, संसर्गजन्य आजाराच्या काळात घ्यावयाची काळजी, आरोग्य विषयक नवीन चॅनल, योग व व्यायाम अशा अनेक गोष्टीच्या माध्यमातून आरोग्य विषयक माहिती प्रत्येक व्यक्तीजवळ पोहचवण्याचे काम दुरदर्शन करू शकतो व सार्वजनिक आरोग्य व्यवस्थेत त्याचा चांगला वापर होऊ शकतो.

## टच-बी तंत्रज्ञानः Touch-be-Technology

भारतातील इगवले आणि अभिसेक सेन या तरूणानी तयार केलेले हे टच-बी तंत्रज्ञान गर्भवती महिलासाठी मोलाचे कार्य करत आहे. गर्भवती महिलांच्या शरीरात लोहाचे प्रमाण प्रचंड कमी असते. ग्रामीण भागातील महिलांना आरोग्य केंद्रावर जायला वेळ नसतो. त्यामुळे या रोगाचे निदान होत नाही आणि महिलांना मोठया धोक्याला सामोरे जावे लागते. हि बाब लक्षात आल्यानंतर टच-बी तंत्रज्ञानाची निर्मीती झाली. शरीरात सुई टोचुन रक्त न घेता केवळ एका बोटाला लावायच्या चिमटा सदृश्य यंत्राने लोहाच्या कमतरतेचे निदान होऊ शकते व अनेक महिला व बाळाचे प्राण वाचू शकतात.

## भौगोलीक माहिती प्रणालीः (GIS)

भौगोलीक माहिती प्रणालीमध्ये कोणत्याही भागाच्या प्रत्यक्ष संपर्कात न जाता माहिती गोळा करून त्याचे विश्लेषण केले जाते.सार्वजनिक आरोग्य व्यवस्थेत दुर्गम भागात प्रत्यक्ष संपर्कात नसलेल्या व प्रत्यक्ष संपर्कात नजाता अनेक रोगाविषयी माहिती मिळवून त्या आधारे सार्वजनिक आरोग्य व्यवस्थेचे नियोजन भौगोलीक माहिती प्रणालीच्या आधारे केले जावू शकते.

## भौगोलीक स्थान निश्चीत प्रणालीः (GPS)

सार्वजनिक आरोग्य व्यवस्थेत भौगालीक स्थान निश्चीत प्रणालीचा उपयोग केला जावू शकतो. एखादया ठिकाणी अपघात झाल्यास, भूकंप, सुनामी अशा घटनाचे स्थान लवकर माहित झाल्यास त्या आधारे अनेक लोकांना मदत कार्य लवकर पोहचवता येईल व अनेक लोकांचे प्राण वाचण्यास मदत करता येईल या दृष्टीनेही विचार करायला हवा.

## सारांशः

मानवाला आता केवळ दिर्घ आयुष्यमान होऊन चालणार नाही तर उत्तम प्रतिच्या आयुष्याची व आरोग्याची आस तंत्रज्ञानाच्या साहाय्याने पूर्ण होऊ शकते. अर्थात मानवी भावना, इंद्रिय आणि विवेक, आरोग्याची गुंतागुत ज्या प्रकारे समजून घेतली तशी यंत्रे घेऊ शकतील याची खात्री नाही. मलेरीया रोखण्यासाठी पैदास केलेले डास मदत करतील, ड्रोनच्या साहाय्याने नाही त्या ठिकाणी औषध पोहचतील, वृध्दांना रोबो आयुष्याचा आधार देईल, गोळी घेण्याची आठवण मोबाईल करेल, अपघाताचे ठिकाण भौगोलीक स्थान निश्चीती प्रणाली दाखवेल, दुर्गम भागातील माहिती त्या भागाच्या संपर्कात न जाता मिळेल पण तंत्रज्ञान आरोग्य सेवकाची भूमिका बजावणार नाही.

युवल हरारी या इस्त्राईल लेखकाने मानवी भविष्याविषयी एक भीती व्यक्त केली आहे तो म्हणतो "भविष्यात माणूसच स्वतःला तंत्रज्ञानाच्या जाळयाने जोडलेली एक जैवरासायनिक यंत्रणा म्हणून वागवू लागेल! माणूस म्हणून नव्हे"

## संदर्भः

१. *Medical Geography- Dr. Renu Kathoaria- RBSA Publishers,३४० Chaura Rasta Jaipur (pp.२१,२५,८०)*
२. *Health Tourism In India- M. Sarngadharan, V.S. Sunanda- New Century Publication new Delhi, India (pp.२,८,११)*
३. *Medical Geography- S.B. Nangia- APH Publising Corporation ४४४५-३६१७ Ansari Road Darya Ganj New Delhi ११०००२ (pp.०१,०६,२०)*
४. *Interduction of Medical Geography- Dr. S.K.Shelar Chandralok Prakashan १३२ Shivam Kripa, Mayur Park Basant Vihar Kanpur २१ (pp. २५ to ४१ १३ )*
5. www.wikipedia.org.in 25/01/2019 time 6.45 pm
6. www.newsaap.in 25/01/2019
7. आरोग्य भूगोल– डॉ. म्हस्की पान नं. ०१ ते ०५
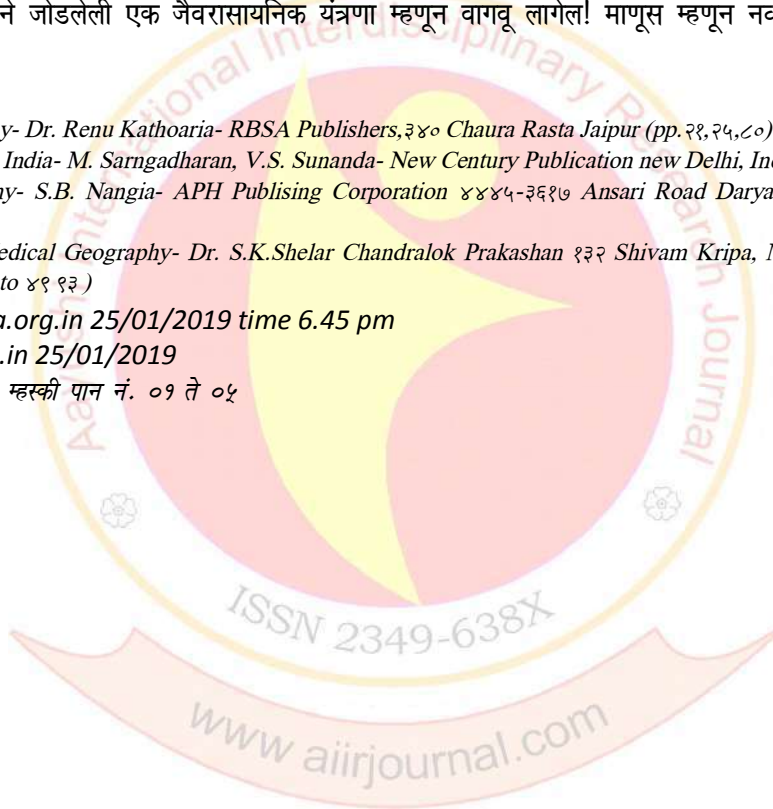
# Research Methodology and Methods in Geography

**Mr. Shashikant Sangram Bichkunde**
Research Fellow

## Introduction:

An introduction to research methods in geography a research method is a way of collecting and analyzing data. This sounds very " nuts and bolts, " but there is no way to properly engage in research – or in methods – without also tackling some of the  fundamental theoretical questions facing both human and physical geographers. These "philosophical" questions concern the nature of reality (ontology) and how we go about understanding it (epistemology).  Such philosophical concerns tend to get sorted out into "paradigms" – bodies of theory that groups of researchers follow as part of their everyday scientific practice. Nested within the theoretical coordinates of paradigms are a set of "middle level" decisions one has to make about methodology: the selection of research objects, the questions directed toward them, the design of a study, and the implications that our objectives have for carrying out research. Finally, at the most concrete and practical level we find research methods: the ways we go about collecting and analyzing data, and the conclusions we draw from these processes.

The intent of Research Methods in Geography is to provide a foundation for geography students, beginning with the big picture, moving through methodology, and finally introducing a number of commonly used methods in data collection and analysis. Research Methods in Geography therefore covers theory while providing a solid basis for engaging in concrete research activities. Schematically, the entire framework can be viewed like this.

**Epistemology and Ontology**
↓↑
**Paradigms**
↓↑
**Research Methodology**
↓↑
**Research Methods**

That the arrows work in both directions indicates that theory needs to be responsive – constantly amended and reworked – in light of the surprises and contradictions that emerge in concrete research activities.

An overview of the essential philosophical issues surrounding ontology and epistemology. It also describes the broad contours of four important paradigms – or theoretical frameworks – operating in geography today. Before turning to that chapter, it might be helpful to further consider the questions of research methodology and their distinction to research methods.

Research Methods in Geography covers a wide range of topics in data collection and analysis within the field of geography.

## Why Research Methods in Geography?

We developed the idea for after having taught many courses in our substantive areas in human and physical geography, respectively. What was lacking, we felt, was an introductory level textbook that spoke to theoretical issues but that also covered concrete aspects of methods as well as specific methods and techniques that geographers use to conduct research.

Research Methods in Geography is intended primarily for second or third year undergraduates embarking on a more focused course of study in human or physical geography, in human – environment relations, or in geographic techniques. Most second and third year students won't yet have taken many substantive courses, and our thought is that surveying a book like this will help improve their ability to conduct the sort of research projects that they might be expected to undertake for a senior thesis or undergraduate dissertation and improve their understanding of the research papers they might encounter in courses on, say, population, economic, and urban geography, or on geomorphology, climatology, and biogeography, to name but a few.

Some students will have already taken a technical course or two, or intend to specialize in geographical information systems, remote sensing, or spatial statistics, but even they probably haven't encountered the breadth of methods and techniques that geographers use.

Research Methods in Geography is intended to assist students as they move forward in geography towards completion of their undergraduate degree. Its overarching objectives are to help them to understand and to begin to assess the research of others, and to assist them in the development and conduct of their own high quality research projects.

If students find that research turns them on, then perhaps they will seek out more advanced training at the masters or doctoral level in geography. Some of the chapters in this volume might be profitably read by students at those levels, particularly those just starting out in the world of research, but our intention is, first and foremost, to assist undergraduates in the discipline.

Geography is a tremendously wide ranging field; most geographers have a difficult time just keeping up with their own area of research, much less staying abreast of developments in areas far from their domain of interest. There are several excellent recent and competing texts that converge on the topic of research methods in geography.

The fact that no single geographer would be likely to attempt to write a volume that includes such a range of material drawn from human and physical geography and closely related disciplines, as well as such a diversity of theory and methods, should suggest to students that the faculty instructor for their particular course on "research methods" will doubtless have more of a background in some of the chapters than in others. This means that individuals will have to step up to the plate, so to speak, and take some responsibility for their own education as a geographer. With that in mind, each chapter in Research Methods in Geography includes sections that contain "Additional Resources" and "Practical Exercises". These sections are provided to help students plant their feet and dive more deeply into the areas that most interest them, and provide instructors who come across unfamiliar content some direction and ideas about how to develop particular topics.

Research Methods in Geography is divided into four Parts. The first comprises five chapters that address overarching issues of theory and research methodology, including research design. In Part II the focus moves to the methods used to collect specific types of information, for example, about physical and cultural landscapes. Addresses the issues of how geographers represent and analyze different types of data.

**Conclusion:**

Learning about research in geography should be a rewarding experience that allows students to pursue their own interests, learn more about a chosen topic and, above all, examine a subject from different perspectives. The best reason for researching a topic in depth is that you find it stimulating and important. But students should also be encouraged to approach the eclecticism of their chosen discipline with a broad mind and an ecumenical spirit. Many prominent geographers have been attracted to the field precisely because of its wide remit, and some topics that are now considered mainstream were, as recently as a generation ago, not considered to be part of the discipline. So we encourage students to let their imagination run free as they select objects of analysis and ways to study them. Finally, while all research is constrained by such basic considerations as the amount of time available or the presence of supporting equipment, facilities, or funding, it is your curiosity about questions and your commitment to finding answers that are most important in influencing your success.

**References:**
1) *Research Methods book in Geography.*
2) *Geography techniques in study book.*
3) *Physical geography study book.*
4) *www.google.com*
5) *www.gov.in.*
6) *Philosophical study book. Etc.*

# Analytical Studies of the Consequences of the Effect of Groundwater on Nitrate Fertilizers in Yavatmal District

**Shailaja Krushnrao Mathane**
Research Student,
Department of Geography,
Dhanwate National College, Nagpur.

**Summary:**

Ground water is the foamy water in the surface. Their appearance depends on the amount of rain in which they are transmitted, which is dripping from the flood, which drains the soil without draining the water, it starts flowing through the ground floor and flows through it. The rain water is the same as the taste and color of water, but as it flows into the soil, the taste, color, and chemical properties of water vary according to the properties of soil and rock. Recently, rainwater due to human action also leads to pollution in the form of acid rain and falls on the surface. Indians need 4 thousand croresliters of water daily. World water consumption of 350 billion liters It is more than water, although it is an indestructible and renewable resource, but it is rare at some places. Recently, human life style agricultural practices, industrial factories etc. started to be used for irrational water. And to pollute the water.

Under the development of the contamination, the groundwater in the contamination is polluted, where the soil is saline, with less biological content as well as the mud. High concentrations of pesticides in the presence of irrigation, as well as the increased use of irrigation water, are the main reasons for ground water pollution.

Recently, water and groundwater reservoirs are becoming defunct and some are natural and some man-made reasons. The water quality affects its human health. Due to human action, the biological properties of physical and chemical water quality change, when the pollutants are mixed with water, the quality of the water is exhausted. And it is harmful to humans, animals and plants. Such water is contaminated.

## Introduction:

From this research, the number of nitrate of groundwater in 2015 is taking the statistics. Based on this data, efforts have been made to study the consequences of nitrified ground water in Yavatmal district and the state map shows.

## Objectives of study:

After studying the main objectives of the research essay on the study of the impact of nitrified ground water on human health, awareness of pure drinking water, conservation of water resources, and the impact of groundwater affecting the groundwater, will not contaminate the ground water and try to protect the soil.

## Number of sources and methods of study:

Based on the data collected by the data obtained from the district level, obtained the data obtained by drawing the figures, making maps, analyzing and analyzing the results. 1.3 Practice Areas:

Yavatmal District is situated in the state of Maharashtra in western Vidarbha, with its latitudinal expansion 19 '26' to 20 '42' north axis and rectangular expanse 77 '18' to 79 '98 east long lines. The total area of the region is 13584 sq.kms and in district 16 tehsil It is divided, 550 meters north-west, 200 meters south east.

The total population of this district is 27,72,348, and the urban population is 5,98,153 and the rural population is 21,74,195. Most of the population is tribal and backward and appears to be living under the influence of the cultural environment of the region not only under the influence of the natural environment.

## Water resources and nitrates in Yavatmal district:

Due to the production of water of the infected ground water with nitrate, the effect on the human body is found. Due to the continuous use of drinking water, health naturally worsens. Mainly due to drinking water containing blue baby syndrome, gastric cancer, goiter, congenital hyper tension etc., nitrates are caused by water and this is mainly where large quantities of nitrogen fertilizers are used in agriculture. So, this problem seems to have created mainly.

In the context of polluted groundwater and human health with Nitrate of the Division of Gourmet Science Indian Agriculture Research Institute (Indian Society of Environmental Health 2000, 42 (W) 28.39), Mujumdar (2000) (28.39) and An Gupta (2000) (28.39) Nitrate is formed from the elements and it is concluded that by soil it pollutes the underground water source.
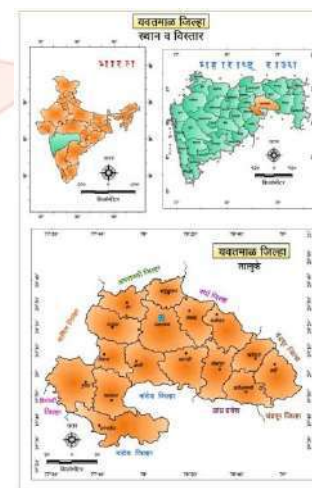
Talukanaiyya of Yavatmal district from 2006 to 2015.Taluka wise wise no. In the district is a practice using more than 40 percent of fertilizers. It is basically agricultural tehsil and 72,297 hectares of agricultural land. Availability of water supply for irrigating agricultural fields. If the use of chemical and biological fertilizers is increased in agriculture, then 50% of the nitrate in the ground water level is found.

**Amount of water source and nitrate in Yavatmal district (Survey wise)**

| Sr. | Taluka | Survey Water Resources Number | Fertilizer | Percentage | Crop irrigation area (ha) | irrigated area under crop(s):[ %] | The ratio of nitrate to maximum | The ratio of nitrate to minimum |
|---|---|---|---|---|---|---|---|---|
| 1 | Ner | 13 | 9616 | 4.41 | 52200 | 5.05 | 165.10 | 32.95 |
| 2 | Babhulgao | 10 | 7298 | 3.35 | 57184 | 5.23 | 158.78 | 19.09 |
| 3 | Kalamb | 16 | 4252 | 4.40 | 51321 | 4.69 | 137.30 | 44.09 |
| 4 | Yavatmal | 19 | 12468 | 5.72 | 74102 | 6.78 | 101.30 | 15.4 |
| 5 | Darwha | 14 | 12267 | 5.63 | 83799 | 7.66 | 158.55 | 13.1 |
| 6 | Digras | 11 | 10902 | 5.00 | 62708 | 5.73 | 135.78 | 2.60 |
| 7 | Pusad | 12 | 19538 | 8.99 | 99577 | 9.11 | 92.41 | 13.3 |
| 8 | Umarkhed | 16 | 17993 | 8.25 | 82509 | 7.55 | 65.50 | 7.00 |
| 9 | Mahagao | 17 | 16670 | 7.65 | 94525 | 8.65 | 130.42 | 14.0 |
| 10 | Arni | 09 | 13086 | 6.00 | 63798 | 5.83 | 160.3 | 28.0 |
| 11 | Ghatangi | 19 | 9030 | 4.14 | 73811 | 6.75 | 230.92 | 5.89 |
| 12 | Kelapur | 18 | 19791 | 9.07 | 62384 | 5.71 | 556.00 | 2.741 |
| 13 | Ralegao | 19 | 14641 | 6.72 | 64367 | 5.89 | 153.44 | 4.58 |
| 14 | Maregao | 20 | 10008 | 4.59 | 49557 | 4.53 | 128.09 | 14.06 |
| 15 | Zarijamni | 20 | 8250 | 3.78 | 46924 | 4.30 | 343.10 | 1.745 |
| 16 | Wani | 18 | 26833 | 12.31 | 71469 | 6.54 | 245.90 | 6.97 |

*Source: Reflecting students themselves.*

Additional irrigation water in the talukas is affected due to nitrate. The talukas are from Babhulgaon, Digras, Arni, Mahagaon, Kelapur, Maregaon and Wani respectively. These talukas come from north side of the district, towards the west. Here the fertilizer consumption of 20% to 40% of the area is used here. The water content of nitrate mineral reserves is more than 50 percent of the water source. The remaining Ner, Darwha, Yavatmal, Kalamb, Ralegaon, Ghatanji, Umarkhed, and zarijamanitalukas come. Here, less than 20 percent of fertilizers are used here. In this taluka, the water content of nitrate is less than 25 percent.

Since the use of ground water with nitrate in Yavatmal district is found in the primary survey, due to nitrified patients. He found them feeling tired, fractured bones, kidney stones, etc. Given the intensity of the diseases in the district, the intensity of the disease was found in Ghatanjea, Kelapur, Ralegaon, Maregaon and Zarijamanitalukas. The majority of these diseases are found in the ground water and due to misdiagnosis. On the basis of the information and pre-study methods obtained from the medical experts in this regard, and the effects of the health and health of these minerals, the results of the survey were found in patients. Then there are talukas in Umarkhed, Mahagaon, Arni, Yavatmal, NerBabhulgaon and KalambWani. The talukas are rural and the number of untouchables is also high.



After that, 20 to 40 percent of the total talukas of 7 talukas are 71,04,588 metric tonnes of fertilizers. On the basis of the mineralogical properties of geological sources, the generality of the illness appears to be moderate. The key is due to the use of underground water. The main area where Yavatmal falls in the district is the large number of people using tap water in this area, but the district is also drought-laden water, due to shortage of water, due to the lack of water supply.

The number of patients in Pusad, Darwha and Digras is less because Pusad is an advanced taluka; People living in talukas of the district are literate and have access to health facilities. According to statistics, the number of ground water use is less in Digras and Darwha, these three talukas come under intensity of fewer diseases.

**Contains excessive nitrate water resources:**

There are 10 talukas in Ner, Babhulgaon, Yavatmal, Ghatanji, Kelapur, ZariJamani, Wani, Pusad, Mahagaon, Digras, with more nitrified sources. The total population of this water source is 67.31 percent. Due
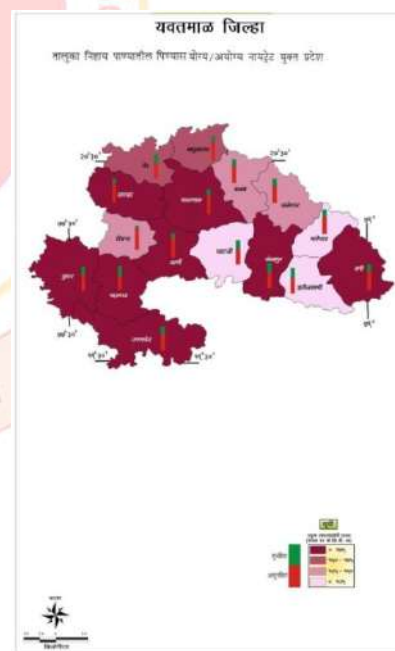
to drinking water damaged by nitrate water reservoirs, there is a human health threat. (However, if the primary survey conducted underground survey, the ground water in the amount of maximum nitrate is 150.95, 245.29, 139.45, 235.68, 559, 343.1, 245.9, 92, 160, 137 mg / ll minimum quantity 32.95, 19.9, 15.4, 5.89, 2.741, 1.745, 6.97, 10.3, 14, 20.6 mg / l was detected.)

**Medium nitrified water resources:**

In the presence of water consisting of medium nitrate water, talukas are Ralegaon, Maregaon, Arni, Umarkhed. The population of these water bodies is 22.08 percent. (The maximum quantity of nitrate was found to be 156, 133, 167.65, 103 mg / lac respectively whereas the minimum quantity was found in 7.151, 16.71, 40, 5 mg / l.

**Contrast with low nitrate water resources:**

There are talukas of Darwha, Kambal in the presence of water source with low nitrate. The population of this reservoir stands at 10.61 percent of the population. (The maximum volume of nitrate was 158.55, 140.8 mg / ll, respectively, whereas the minimum amount was 20,75, 17.14 mg / ll respectively.)

According to the standard of water nitrate, 45 mg / l of human health is not as harmful. But more than that, the water consuming excess water can have potentially harmful effects on human health. Considering this fact, the water level of Nitrate was found to be 500mg / l in Yavatmal district. And this situation is horrific. In view of the malnutrition in Yavatmal district, the number of nitrate is found in almost all the talukas. Today people are using it for drinking waterNitrate affected water source affected population.

### Yavatmal District - Impacted Population in NITRATE Water Resource (2014-15)

| Sr | Tehsil | Total water resource | Test sample | The percentage of Affected population | nitrate | percentage |
|----|--------|---------------------|-------------|---------------------------------------|---------|-----------|
| 1 | Ner | 6707 | 413 | 4.34 | 311 | 75.30 |
| 2 | Babhulgaon | 8584 | 486 | 3.18 | 416 | 85.60 |
| 3 | Kalamb | 4272 | 530 | 3.72 | 85 | 16.04 |
| 4 | Yavatmal | 8618 | 632 | 13.81 | 452 | 71.52 |
| 5 | Darwha | 11316 | 635 | 6.89 | 104 | 19.44 |
| 6 | Digras | 5839 | 215 | 5.56 | 187 | 86.98 |
| 7 | Pusad | 9908 | 434 | 12.31 | 295 | 67.97 |
| 8 | Umarkhed | 2368 | 565 | 9.35 | 181 | 32.04 |
| 9 | Mahagaon | 7490 | 465 | 6.86 | 253 | 54.41 |
| 10 | Arni | 5490 | 372 | 5.84 | 105 | 28.23 |
| 11 | Ghatangi | 6421 | 444 | 5.00 | 332 | 74.71 |
| 12 | Kelapur | 8904 | 499 | 5.66 | 368 | 73.75 |
| 13 | Ralegaon | 3773 | 498 | 4.05 | 169 | 33.94 |
| 14 | Maregaon | 3593 | 214 | 2.85 | 86 | 40.19 |
| 15 | Zarijamni | 3179 | 335 | 2.89 | 218 | 65.07 |
| 16 | Wani | 8579 | 470 | 7.70 | 260 | 55.32 |

By analyzing the samples of nitrate water in the Yavatmal district, it was observed in three editions by looking at distribution of water supply of more than 25% to 50% and less than 25% nitrate. More than 50 percent of the water source coverage is 4490 and 25 to 50 percent is spread across 1795 and 25 percent is less than 799 total. These water resources are public wells, handpumps, plumbing etc. and these water resources are used for drinking water. Out of this, 251 water samples were collected in the sample, out of which 172 water released monsoon and 168 nitrate mineral water polluted water sources were found. In it, nitrate containing quantities of water samples are collected, tested and tested at some primary level. In this scenario, the total population of more than 50 percent of the water source is 67.31 percent and 22.08 percent in 25 to 50 percent and less than 25 percent of the population is 10.61 percent. The citizens of these lands use water resources for drinking water.Drinking water in excess of nitrate results in the loss of the blood's oxygen levels, feeling fatigue, bone fracture, goiter, kidney stones, gastric cancer, due to adverse effects on human health, that is, the conclusion is that the health of people living in this region is in danger.

**Measures:**

1.      Reducing the use of chemical fertilizers in agriculture.
2.      Use the process of sewage treatment.
3.      Proper disposal of stools.
4.      Use of traditional agricultural texts.
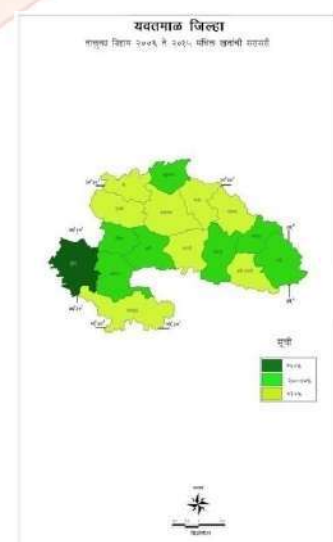
**Findings:**

Overall, when attempting to study the ground water in Yavatmal district, it is found that the malfunctioning zero is found in the whole district. Measures are done at the level of the administrative level, but they are very frivolous. Shortage of Health Services, Ignorance of fluoride, nitrates, and the main center of the Yavatmal district, if the distance increases, then due to the perceived differences in the facilities, people in the affected areas do not get adequate facilities. There is no adequate health and water supply facility available. The biggest reason for depression is the cause of the increase in the disease.

**Reference:**

1. *Yavatmal District Social and Economic Commentary*
2. *ECCTOC 2000*
3. *(Majumdar D. & Gupta N (2000), Pp. 28.39)*
4. *(Sallmn (1975) Pp. 28-29) Stated by (Majumdar D. & Gupta N (2000), Pp. 28-29)*

# Seychelial Distribution of Sex Ratio of Yavatmal District (1991 - 2011)

**Chitra Shankarrao Raut**
Research Student,
Department of Geography,
Dhanwate National College, Nagpur.

**Summary:**

Sex ratio is an indication of the present social, financial condition of any transition. It is also a useful tool for regional analysis. The effect of this is on marriage and population growth as well as on business structure. Changes in sex ratio can result in changes in birth rates and mortality rates of mortals and women in different ages as well as changes in mortality rates.

Yavatmal district's sex ratio is lower than in 1991 and it has increased in 2011. The difference between these 20 years is that in this subtle management, Nertaluka has a sex ratio of 952 in 1991 and it is 949 in 2011. The Yavatmal district has shown the ratio of women having 1000 males in the year 1991 and in 2011. It is characterized by gender ratio as shown in the ratio of low, middle, higher sex ratio, hence the importance of urban ligne structure in the study of urban population is of particular importance.

**Preface**:

The study of sex ratio is important in social and economic perspectives. Mortality, marital status, and migration is the driving factor. It is also responsible for some human actions and disasters. Eg Drought, war, government policies, abortion, customs, traditions and family pressures, torture and family welfare desire etc.

"The measurement method used to measure the numerical gender structure of the population is called a lig ratio."

**Objectives**:

1) Study the difference between sex ratio in Yavatmal district in the year 1991 and year 2011.
2) Study the number of women following 1000 males.

**Research Methodology:**

Required statistics for the essay essay presented by the secondary information source. It has been used in the 1991-1991 study of social and economic critiques. According to the statistics received, the causal relationship has been clarified. The shade method has been used to present statistics.

**Practice Areas:**

Yavatmal district has been selected for essay writing essay. The total population of this district is 27,72,348, and the urban population is 5,98,153 and the rural population is 21,74,195. Yavatmal district is situated in western Maharashtra in the state of Maharashtra, with its axial



Seychelial distribution of sex ratio of yavatmal district {1991-2011}

expansion 19 '26' to 20 '42' north axis and horizontal The extension is a preliminary line from 77 '18' to 79 '98'. The total area of the region is 13584 sq. Km and the district is divided into 16 tahsils, 550 meters north of the sea, 200 meters to the south east. In terms of area Amravati is bigger in all the districts in the division. It is also 6th compared to Maharashtra.

**Subject explanation:**

In the present table, the ratio of taluka-wise proportion of Yavatmal district has been given in the year 2011.

In Yavatmal district, in 1991, the ratio of women with 1000 males was drawnTahsil, which is between 920 to 940, covers Tahasil of Mahagaon 940, Kelapur 922 and Pusad 937.

Between 940 and 960, the tahsil consists of Ner 952, Yavatmal 941, Darwh 954, Digras 944,Umarkhed 954, Ralegaon 954, and seven tehsils of 944.

In the Tahsil, Babhulga 961, Kalamb 962, Ghatanji 961, and Maregaon 981, these tahsils are included in the ratio of sex ratio of more than 960.
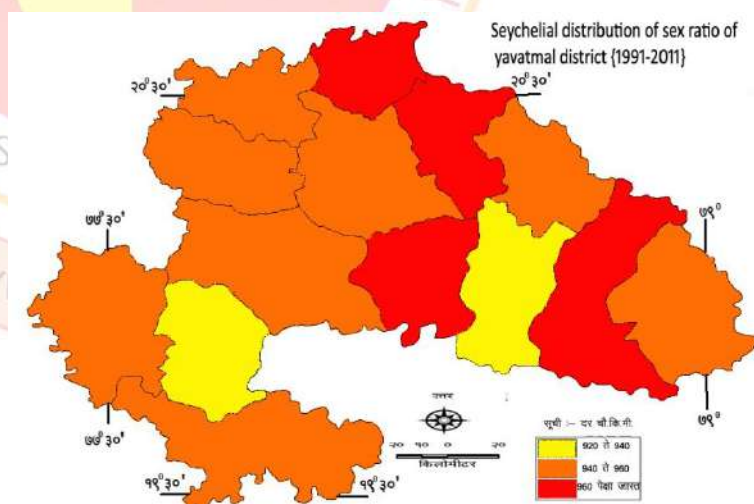
#### Table no. 1: Nectar Distribution of Sex Ratio of Yavatmal District – 1991

| Sr. | Tahsil | Sex ratio/1000 |
|-----|--------|----------------|
| 1 | Ner | 952 |
| 2 | Babhulgao | 961 |
| 3 | Kalam | 962 |
| 4 | Yavatmal | 941 |
| 5 | Darwha | 954 |
| 6 | Digras | 944 |
| 7 | Pusad | 937 |
| 8 | Umarkhade | 954 |
| 9 | Mahagao | 940 |
| 10 | Ghatangi | 961 |
| 11 | Kelapur | 922 |
| 12 | Ralegao | 954 |
| 13 | Maregao | 981 |
| 14 | Wani | 944 |

*Source:Yavatmal District - Census Handbook (1991).*

#### Table no. 2: Nectar Distribution of Sex Ratio Ratio of Yavatmal District – 2011

| Sr. | Tehsil | Sex ratio/1000 |
|-----|--------|----------------|
| 1 | Ner | 949 |
| 2 | Babhulgaon | 954 |
| 3 | Kalamb | 964 |
| 4 | Yavatmal | 955 |
| 5 | Darwha | 954 |
| 6 | Digras | 931 |
| 7 | Pusad | 935 |
| 8 | Umarkhed | 945 |
| 9 | Mahagaon | 940 |
| 10 | Arni | 956 |
| 11 | Ghatangi | 951 |
| 12 | Kelapur | 976 |
| 13 | Ralegaon | 955 |
| 14 | Maregaon | 963 |
| 15 | Zarijamni | 986 |
| 16 | Wani | 929 |

*Source:Yavatmal District - Census Handbook (2011).*

In Yavatmal district 2011, the ratio of women in 1000 males has been removed. In this, between 925 and 950, the number of Nahr 949 in Tehsil, 915 in Das, 931 in Pusad 935, Umarkhed 945, Mahagaon 940 and Wani is 929.

The ratio of women per 1000 males is shown, and in the 950 to 975, Tahasil is included in Babhulga 954, Kalamb 964, Arni 956, Ghatanji 951, Ralegaon 955 and Maregaon 963.The Tahsil contains more than 975 Kelapur 976 and two tehsils of Zorani 986.

**Differences in the non-resident distribution of the sex ratio in Yavatmal district from 1991 to 2011:**

From 1991 to 2011, the percentage of women below 1000 males is recorded. The Yavatmal district has shown the distinction between non-resident distribution of sex ratio ratio of 1991 to 2011.

Nertahsil has a ratio of 952 in 1991, and in 2011 it is 949. In Tahsil of Babulgaon, the ratio of sex ratio to 1991 is 961 and in 2011 it is 954. Kalamb is a tehsil's 1991 ratio of sex ratio of 962 and in 2011 it is 964.



Seychelial distribution of sex ratio of yavatmal district {2011}
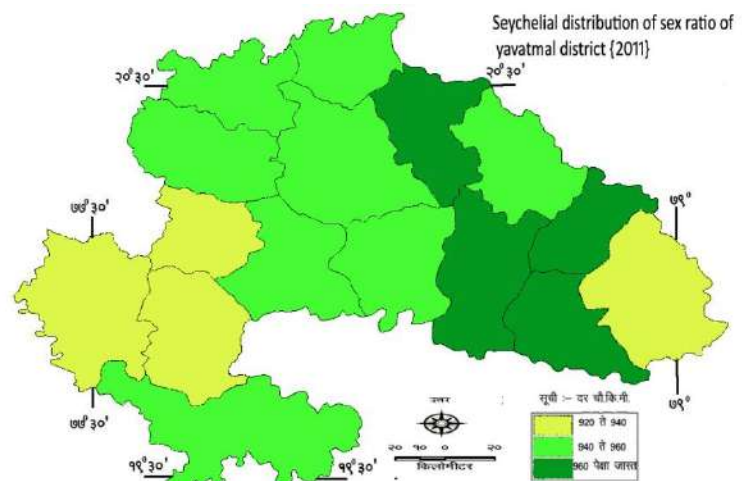
YavatmalTehsil has a sex ratio of 941 in 1991 and in 2011 it is 955. Darwha Tehsil has a sex ratio of 954 in 1991 and it is 954 in 2011. Tejsil of Digras has a sex ratio of 944 in 1991, in 2011 it is 931. PusadTahsil's 1991-year sex ratio is 937 and in 2011 it is 935. The percentage of gender ratio ratio of 1991 in Umarkhed Tehsil is 954 and in 2011 it is 945. Mahagaon tehsil has a sex ratio of 940 in 1991, in 2011 it is 940. Ghatanjea Tehsil has a sex ratio of 961 in 1991 and it is 951 in 2011. In Kelapur, Tehsil has a sex ratio of 922 in 1991 and in 2011 it was 976. The ratio of sex ratio of 1991 to Tahsil in Ralegaon is 954 and in 2011 it is 955. Maregaontahsil has a sex ratio of 991 in 1991 and it is 963 in 2011. The tahasil of Wani, 1991, has a sex ratio of 944 and in 2011 it is 929.

**Conclusion:**

1) In the ratio of sex ratio from 20 years 1991 to 2011, the percentage of sex ratio in 2011 has improved significantly in 1991.

2) n today's modern times, the effect of changing attitude and mentality of traditional girls is seen in Yavatmal district's sex ratio. This means that family planning is particularly effective in this.

**Reference:**

1 *www.maharashtra.gov.in*
2 *Yavatmal District - Census Handbook (1991 - 2011)*
3 *Chandana R.C. 1994 population geography, kalyani publication. Agra*
4 *Dr. Mishra Jayprakash 2005 population, literature building publication Agra.*

# Analytical Studies of Various Sources of Water and Population in Yavatmal District

**Mayuri Nandkumar Thakare**
Dhanwate National College,
Nagpur.

**Summary:**

Water is of paramount importance in human life, It is the basis of the life of the living beings, animals, birds and plants in the living world. Earlier the use of water was only for drinking and other uses, due to the increasing population, modern agricultural practices, various industries and factories in the city, electricity generation and modern lifestyles, the use of water has increased. Although water is a renewable resource, its limitless use is increasing the need for water in the city and rural areas. These water dishes are available in various forms and in different quantities and their distribution is uneven.

**Preface:**

From this research, the number of water sources of 2015 is taken by this figure. Based on this data, efforts have been made to study the consequences of the drought and its population in Yavatmal district and the state map is shown in the map.

**Objectives of study:**

The main objective of the study is to study water resources and minimum water supply in the state.

**Practice Areas:**

Yavatmal District is situated in the state of Maharashtra in western Vidarbha, with its latitudinal expansion 19 '26' to 20 '42' north axis and rectangular expanse 77 '18' to 79 '98' east long lines. The total area of the region is 13584 sq.kms and in district of 16 tehsil, It is divided, 550 meters north-west, 200 meters south east.

The total population of this district is 27,72,348, and the urban population is 5,98,153 and the rural population is 21,74,195. Most of the population is tribal and backward and appears to be living under the influence of the cultural environment of the region not only under the influence of the natural environment.

**Various water sources in Yavatmal district (2015):**

Water source for the year 2015 in Taluka of Yavatmal District.Given in 4.5. Also table no. 4.5 According to the district, total 4812 public wells, plumbing number 93593.4 and 6324 handpumps are in the district.

**Table no. 1: Various water sources in Yavatmal district (2015)**

| Sr. | Tahsil | Public wells | percentage | Tap plans | percentage | Hand pump | Percentage |
|---|---|---|---|---|---|---|---|
| 1 | Ner | 415 | 8.62 | 6030 | 6.44 | 262 | 4.14 |
| 2 | Babhulgao | 261 | 5.42 | 7888 | 8.43 | 399 | 6.31 |
| 3 | Kalamb | 371 | 7.71 | 3456 | 3.69 | 454 | 7.10 |
| 4 | Yavatmal | 458 | 9.52 | 7362 | 7.86 | 798 | 12.62 |
| 5 | Darwha | 449 | 9.33 | 10461 | 11.17 | 406 | 6.42 |
| 6 | Digras | 198 | 4.11 | 5554 | 5.93 | 87 | 1.37 |
| 7 | Pusad | 360 | 7.48 | 9124 | 9.75 | 424 | 6.70 |
| 8 | Umarkhed | 286 | 5.94 | 1670 | 1.78 | 412 | 6.51 |
| 9 | Mahagaon | 220 | 4.57 | 6971 | 7.44 | 298 | 4.71 |
| 10 | Arni | 203 | 4.21 | 5032 | 5.38 | 255 | 4.0 |
| 11 | Ghatangi | 277 | 5.75 | 5746 | 6.14 | 398 | 6.29 |
| 12 | Kelapur | 236 | 4.96 | 8225 | 8.79 | 443 | 7.0 |
| 13 | Ralegao | 364 | 7.56 | 2895 | 3.09 | 514 | 8.12 |
| 14 | Maregao | 148 | 3.7 | 3098 | 3.31 | 347 | 5.48 |
| 15 | Zarijamni | 108 | 2.24 | 2758 | 2.95 | 313 | 4.94 |
| 16 | Wani | 458 | 9.51 | 73234 | 7.82 | 798 | 12.62 |
| | Total | 4812 | 100.0 | 935934 | 100.0 | 6324 | 100.0 |

*Source:Yavatmal District - District Social and Economic Commentary (2015).*

**Public Wells:**

In Yavatmal district this year, 4812 public areas have been supplied water supply. People also run their hands to water their needs. In 2015, there is an inequality in taluka distribution. The percentage of this source has been viewed by distributing this source.

**Excess of wells:**

It contains 9% more public wells in the Yavatmaltaluka. After that the people of Darwha, Ner, Wanitalukas came in.

**Contrast of medium wells:**

It has a water source for 5 to 9 percent. Ralegaon, Babulagaon, Kalamb, Kelapur, Ghatanji, Umarkhed, Pusadiatalukas are included.

**Replacement of low wells:**It has water reservoirs ranging from 0 to 4 per cent, in which the lowest public is located in Maregaon, Arni, Digras, Mahagaon, Zarzamanitalukas, and later in Maregaontaluka.

**Distribution of water through plumbing:**

It is obvious that the development of nanosecurity in 2015. Although the plots have been implemented in the district, the quality of the water is not available in the rural areas due to the plumbing wells, yet water is supplied through the taps in Yavatmal district. Tubalysis Table number to see how much water supply is available in the taluka of Til Scheme in different talukas. On the basis of the distribution of water supply through talukar plots based on 4.5, the population has been classified according to statistics based on statistics. Has been analyzed.

**A Excessive stereotype:**

The high concentration of pollution in Darwha, Babhulgaon, Pusad, Kelapur is more than 8%, and the highest water supply source at Darwha is here and thereafter at Pusad. Because the popularity of Pusad is very popular because of its political support, it has developed very recently in the service facilities.

**B Moderate faucets:**

It contains 4 talukas containing 4 to 8 percent of the resources. This group includes Ner, Yavatmal, Digras, Mahagaon and Wanitalukas.

**A Lower low air source:**

These include talukas containing 0 to 4 percent polling. This includes the remaining Kalamb, Umkhed, Arni, Maregaon, Ralegaon and Zarzamanitalukas. It is found that the water supply is done through the lowest taps at Umarkhed in the district.

**Hand pump (As per 2015):**

It is found in the study of various water sources in Yavatmal district that the use of hand pump water in the district is done in large numbers in the rural areas. In 1991, the Yavatmal district had a large number of talukas on the scale of handpumps. And they are also used in those proportions. Nearly all the districts see this water use. In 1991, water is available through ground water supply in Ner, Babulgaon, Kalamb, Ralegaon, Wani, Darwha, Digras, Pusad and Mahagaon. Most of the district shows that there are handpumps in most places.

Yavatmal and Wanitalukas have the highest handpumps and more than 12 percent of the arms pumps are visible. The lowest handpumps are found in Digras. Distribution has been observed by distributing handpumps as above.

**A Excessive handpumps:**

In Yavatmal, Wanitaluka, the district has more than 12 percent hand pump.

**B Medium handpump resists:**

This transit comprises talukas of 5 to 12 percent of the sources. In this group Nir, Girijamani, Digras, Arni, Mahagaon, Pusad, Darwhatalukas come.

**A Less handpumps**

This transit comprises of talukas containing 0 to 4% handpumps. The remaining talukas come from Balbhagaon, Kalamb, Ralegaon, Kelapur, Ghatanji, Pusad, Umarkhed and Maregaon in this area.

In the period from 1991 to 2015 Yavatmal district was supplied water supply, hand pump, coupling, plumbing. Compared to the population, the water supply system is inadequate. The water is called liquid gold. Man has to be used for water. Because water is increasing due to increasing population.

Without the involvement of local people, no plan is completely fulfilled, the development depends on the availability of water and the water should be stressed throughout the year. Water, industry, and household use all have the need of water. There is a need to store the droppings of the droppings drop. For this, some activities have also been implemented on the day-to-day basis. It is only through development that development is done. Day-to-day water scarcity is a terrible form. Even if there is much rain, there is no water scarcity in the summer. Through this, ground water is extracted. Therefore, groundwater level in the soil is open.

**Conclusions:**

Yavatmal district is not only inadequate to the population considering the source of water. Well, tubewells, plumbing, these cannot meet the requirement of water for adequate quantity. Therefore, the use of groundwater is also used. The scheme does not have adequate water supply and other water supply at the village level and district level. Some special types of water supply schemes are implemented in the summer, they do not remain perennial.

**Reference:**

1. *Pvt.Dr.AnilrajJagdale (2004), petlelepani, petanarepani. SumettePrakashan.*
2. *Yavatmal District - Census Handbook (1991 - 2015).*
3. *Yavatmal District - District Social and Economic Commentary (2015).*
4. *ZillaParishad, Water Supply Department, Yavatmal (2015).*

# Growth of Population in Beed District of Maharashtra

**Miss. Mahananda U. Murge**
Research Fellow,
Mahatma BasweshwarMahavidyalaya, Latur.

## Introduction:

Population in simpler terms is the number of people in a city or town, region, country or world; Population refers to a collection of humans. Demography is a social science which entails the statistical study of human populations. Population is usually determined by a process called census (a process of collecting, analyzing, compiling and publishing data) In this paper the present study reveals the growth of population in Beed district during 1991-2011. The growth of population in Beed district from 1,822,072 in 1991 to 2,585,049 during 2011 from this study we observe the population is increase day by day from 1991 – 2011 in the span of 20 years the growth of population in Beed district is normal ie 7,62,977 people were born or migrate.

## Database and Methodology:

The data for the present study is collected from secondary sources i.e. census handbooks, socio-economic review of Beed district, and government publications. Data is tabulated and presented with suitable cartographic techniques with analysis. The collected data are analyzed by statistical techniques. The actual growth rate of specific decade is obtained by dividing the difference between the populations of two decades. In order to assess the population growth, the following formula has been adopted.

$$r = \frac{Pn - Po}{Po} \times 100$$

Where,

r = the population Growth rate

Pn = the Population of next year

Po = the Population of base year

## Objectives of the study:

The objectives of this paper are to analyze the tahsilwise changes in growth rate of population in Beed district during 1991-2011.

## Study Area:

The district of Beed lies between $18^0 28$ to $19^0 28'$ north latitudes and $74^0 54'$ to $76^0 57'$ east longitudes. It is surrounded by Aurangabad district in the north, Parbhani and Latur districts at east, Osmanabad and Ahmadnagar districts at south Ahmadnagar district in the west. The Beed district has an area of 10693.00 sq.km. and population 2,585,049 as per 2011 census. Out of the total population of the district 81.96 percent lives in rural areas while 19.91 percent lives in urban areas. The study region includes 11 tahsils such as Beed, Ambajogai, Keij, Majalgaon, Georai, Ashti, Dharur, Parli, Wadvani, Patoda and Shirur (Kasar). There is a spatial variation in the socio-economic development in the study region. Economy of the study region is mainly based on agriculture.

## Growth of Population:

The growth of population may be approached just by taking into consideration the next growth of population over the basic year. The growth of population is determined by three basic factors namely births, deaths and migration. The difference between birth and deaths is called natural growth of population and with considering births, deaths and migration (in migration or out migration) is called total population growth.

### Table No.1 Decadal Growth of Population in Beed District

| Year | Total Population | Growth rate of variation in (%) | Rural Population | Growth rate of variation in (%) | Urban Population | Growth rate of variation in (%) |
|------|------------------|----------------------------------|------------------|----------------------------------|------------------|----------------------------------|
| 1951 | 784920 | -- | 698414 | -- | 86506 | -- |
| 1961 | 949673 | 20.99 | 851024 | 21.85 | 98649 | 14.04 |
| 1971 | 1223694 | 28.85 | 1074393 | 26.25 | 149301 | 51.35 |
| 1981 | 1412990 | 15.47 | 1183219 | 10.13 | 229771 | 53.90 |
| 1991 | 1822072 | 28.95 | 1495104 | 26.36 | 326968 | 42.30 |
| 2001 | 2161250 | 18.54 | 1774180 | 18.66 | 387070 | 18.38 |
| 2011 | 2585132 | 19.65 | 2070751 | 16.72 | 514385 | 32.97 |

*Source: Census Handbook in Beed District -2011.*

This table reveals that the trend of general, rural and urban population growth rate is vary from one another during the span of sixty years. The trend of general population growth rate was increased by 20.99% during the decade of 1951-1961. After 1951-61 decade the general population growth rate shows continuous increase. The highest increase in general population growth rate was (28.95 percent) found in the decade of 1981-1991, while the lowest increase (15.47 percent) was noticed in 1971-1981. After the decade of 1981-1991 the growth rate of population was decreased from 18.54 percent to 19.65 percent.



Though the total rural population is increasing since, 1951. The growth rate of rural population is decreased from 21.85 to 16.72 percent. In urban population growth rate was lowest in decade 1951-61 (14.04 percent) and highest in the decade (1971-81) i.e. 53.90 percent. It is also observed that after the decade (1991-2001) growth rate of urban population creased from 18.38 percent to 32.97 percent in decade 2001-2011.

**Tahsil wise growth of population:**

Population growth refers to the growth of human population in a particular area during a specific period of time. It can be measured either in terms of percentage or in absolute numbers. The growth may be positive or negative. Population growth may be due to 113 natural increases or due to migration from outside in search of employment or to enjoy the facility and amenities available in a region.

**Table No. 2 Beed district: Tahsil wise population Growth Rate (1991-2011)**

| Sr.No. | Tahsil | Growth Rate |
|--------|--------|-------------|
| 1 | Ashti | 29.64 |
| 2 | Patoda | 29.40 |
| 3 | Shirur | 44.52 |
| 4 | Georai | 36.21 |
| 5 | Manjlegaon | 24.37 |
| 6 | Wadwani | -5.97 |
| 7 | Bid | 4.17 |
| 8 | Kaij | 12.95 |
| 9 | Dharur | 78.33 |
| 10 | Parli | -0.53 |
| 11 | Ambejogai | -1.90 |
| **District** | | **41.47** |

*Source: Census Handbook in Beed District.*

Table No.2 shows that the growth of population, temporal as well as spatial, is far from being even. This table clearly shows that growth rate of population is low level. In 1991-2011 decades, the growth rate of population is recorded higher in Dharurtahsil and low growth rate of population in Paralitahsil. During the period 1991 to 2011 the high growth rate of population for the study region was recorded 78.33 % and low growth rate of population recorded in threetahsil area like wadmani, parali, &ambajogai so total growth of population growth rate in beed district is 41.47% is observed during study.

**Conclusion:**

The research work which is undertaken in the Beed district reveals that population growth in some tahasil is increases like Ashti, Patoda, Shirur, Geori,ManjlegaonBeed, Keij, &Dharur. The population growth is decreases in three tahasil like Prali, Wadwani, Ambajogai. Overall in majority of tahasil place shows that there is an increase in growth of population and therefore.The study shows that population growth in overall Beed district is increases due to main reasons is like being an increase birth rate, the birth rate is increases due to increase the health and medical facility and also improve quality of life of people in this area and therefore decrease the death rate of infants as well as human being in this area. This resulted increase the population growth in Beed district

**References:**

1. *Geography of Population by R C Chandra .(1994)*
2. *Clarke J. I. (1977) Population Geography.*
3. *ChaurasiaAlokRanjan, Gulati S.C. (2008) The State of Population 2007*
4. *Government of Maharashtra Census of India, 1991, 2001*
5. *Chakrawarthy K. (2006) Geography of Population.*
6. *Dyson T. (2004) India's Population.*
7. *Gosal G.S. (1982) Population Geography.*
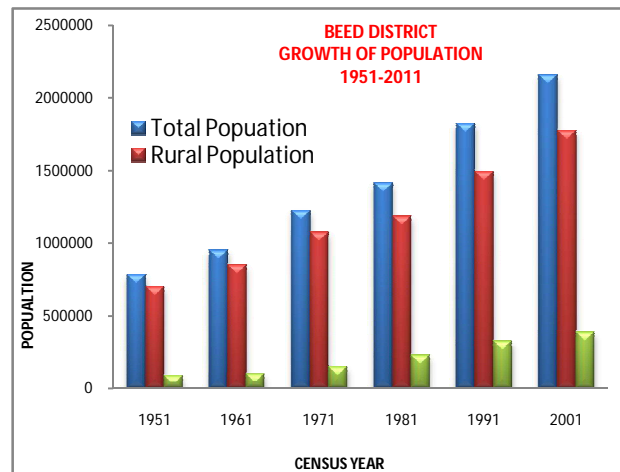
# Environmental Issues

**Shital G. Jagtap**
Student, M.A. second year,
Department of Geography,
RajarshiShahuMahavidyalya, (Autonomous) Latur.

**Abstract:**

Environmental issues are harmful effects of human activity on the biophysical environment. Environmental protection is a practice of protecting the natural environment on individual, organizational or governmental levels, for the benefit of both the environment and human environmentalism issues through advocacy, education and activism.

The carbon dioxide equivalent of greenhouse gases (GHG) in the atmosphere has already exceeded 400 parts per million (NOAA) (with total "long – term" GHG exceeding 455 parts per million) (Intergovernmental Panel on Climate Change Report). This level is considered a tipping point." The amount of greenhouse has in the atmosphere is already above the threshold that can potentially cause dangerous climate change. The UN office for the coordination of humanitarian Affairs (OCHA) has stated "Climate change just a distant future threat. It is the main driver behind rising humanitarian needs and we are seeing it's impact. The number of people affected and the damages inflicted by extreme weather has been unprecedented."

Environment destruction caused by humans is a global problem, and this is a problem that is on going every day. By year 2050, the global human population is expected to grow by 2 billion people, there by reaching a level of 9.6 billion people. The human effects on earth can be seen in many different ways. A main one according to report "Our Changing Climate". The global warming that has been going on for the past 50 years is primarily due to human activities. Since 1895, the U.S. average temperature has Increased taken place since around year 1970. The study of environmental issues have been explained in the paper.

**Keyword** : Environment, pollution.

## Introduction:

Our environment is constantly changing. There is no denying that However, as our environment changes, so does the need to become increasingly aware of the problems that surround it. With a massive influx of natural disasters, different types of weather patterns and much more. People need to be aware of what types of environmental problems our planet is facing.

The carbon dioxide equivalent of greenhouse Gasses (GHG) in the atmosphere has already exceeded 400 parts per million. This level is considered a tipping point." The amount of greenhouse gas in the atmosphere is already above the threshold that can potentially cause dangerous climate change. We are already at risk of many areas of pollution….. Its not next year or next decade.Its now." The UN office for coordination of Humanitarial Affairs (OCHA) has stated "Climate Change is not just a distant future threat. It is the main driver behind rising humanitarian needs and we are seeing its Impact. The number of people affected and the damages inflicted by extreme weather has been unprecedented." Further OCHA has stated:

Climate disasters are on the rise. Around 70 percent of disasters are now climate related- up from around 50 percent from two decades ago.

These disasters take a heavier human toll and come with a higher price tag. In the last decade, 2.4 billion people were affected by climate related disasters compared to 1.7 billion in the previous decade. The cost of responding to disasters has risen tenfold between 1992 and 2008.

Destructive sudden heavy rains, intense tropical storms , repeated flooding and droughts are likely to increase , as will the vulnerability of local communities in the absence of strong concerted action.

Environment destruction caused by humans is a global problem, and this is a problem that is on going every day. By year 2050, the global human population is expected to grow by 2 billion people there by reaching a level of 9.6 billion people. The human effects on earth can be seen in many different ways. A main one is the temperature rise, and according to the report "Our Changing Climate", the global warming that has been going on for the past 50 years is primarily due to human activities. Since 1895, the U.S. average temperature has increased from 1.3 F to 1.9 F , with most of the increase taken place since around year 1970.

In the Major current environmental issues may include climate change pollution, environmental degradation and resource depletion etc. The conservation of endangered species and protection of any ecologically valuable natural areas, genetically modified foods and global worming.

## Objectives :

1. To analyse the impact of environmental issues.
2. To find the appropriate solutions for environmental issues.

**Methodology:**

The study is diagnostic and exploratory in nature and makes use of secondary data. The primary data collected by survey method and the relevant secondary data have been collected mainly through the data bases published by live scince, thought com and journals in the relevant study area. The report of WHO survey.

**Major Current Environmental Problems:**

In the major current environmental problems are pollution, global warming, over population, natural resource depletion, west Disposal, Climate change, loss of Biodiversity, Deforestation, ocean Acidification, ozone layer Depletion, Acid Rain, Water Pollution.

**Pollution:**

Pollution of air. Water and soil, require million of years of to recoup. Industry and motor vehicle exhaust are the number one pollutants. Heavy metals, nitrates and plastic are toxins responsible for pollution. While water pollution is caused by oil spill, acid rain, urban runoff ; air pollution is caused by various gases and toxins released by industries and factories and combustion of fossil fuels; soil pollution is majorly caused by industrial waste that depruvessiol fro, essential nutrients.

**Air Pollution :**

"Air pollution threatens us all, but the poorest and most marginalized people bear the brunt of the burden," SaidTedrosAdhanomGhebreyesus, director general of the WHO. Breathing polluted air can lead to heart disease, a stroke and lung cancer, the WHO said.

This report is the largest air pollution survey undertaken of world cities.

The WHO survey also named New Delhi as the world's most polluted big city. Other polluted megacities, with populations over 14 million, include cairo, Dhata, Bangladesh, Mumbai, India and Beijing.

"Many of the world's megacities exceed who's guideline levels for air quality by more than five times, representing a major risk to people's health/" said Maria Neire, the WHO director for environment and public health.

Air pollution is measured by how many grains of "particulate matter" (PM) are in a cubic meter. PM is broken down into two groups: PM10 and PM2.5, which are measurements of the particle in micrometers.

For human health, the toxic PM2.5 particles of black carbon and sulfate "pose the greatest problems, because they can get deep into your lungs, and some many even get into your bloodstreams," the Environmental Protection Agency said. For perspective, the width of a human hair is 30 times larger than a single PM2.5 particle. India has 14 of the 15 top polluted cities in the world, in terms of the dangerous PM2.5 particles, the report said.

Indian environment officials told Reuters that the WHO findings were embarrassing but not surprising. The report also shows some countries are trying to reduce air pollution. China, for example, is taking serious strides to clean up its air, and the WHO said India should follow China's example. This is the WHO's fourth report on air quality. Compiling air pollution levels from more than 4.300 cities and towns in 108 countries.
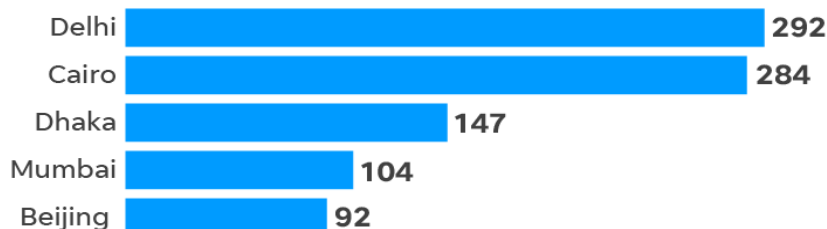
**Water Pollution :**

Water is where life began and why life continues, but it is also the world's most threatened essential resource. According to UN- Water, 75% of freshwater is divided into glaciers and ice caps and the remaining 30% into land surface water, such as rivers, lakes, ponds and groundwater.

Most of the freshwater resources are either unreachable or too polluted, leaving less that 1% of the world's freshwater, or about 0.003% of all water on Earth, readily accessible for direct human use. 70% of this unpolluted freshwater is used for domestic use (see Also : finite freshwater). In addition to the accelerating clinaticdriven threat threat of drought, where water sources all over the world face the threat of potentially drying up as the warming climate accelerates, water is



**World's top 5 most polluted megacities**

Based on the number of particles of pollution per cubic meter. Megacities are those with at least 14 million people.

| City | |
|---|---|
| Delhi | 292 |
| Cairo | 284 |
| Dhaka | 147 |
| Mumbai | 104 |
| Beijing | 92 |

SOURCE World Health Organization, 2010-2016
Frank Pompa/USA TODAY

becoming increasingly polluted every year. Water pollution affects drinking water, rivers, lakes and oceans all over the world. This consequently harms human health, wildlife and the natural environment. According to the NIEHS, water pollution is any contamination of water with chemicals or other foreign substances, such as

fertilizers and pesticides from agricultural runoff, sewage and food processing waste, lead, mercury and other heavy metals, chemical wastes from industrial discharges, and chemical contamination from hazardous waste sites, that are detrimental to human, plant or animal health. Polluted, unsafe water is the leading cause of sickness and death with half of the world's hospital beds filled with people suffering from water-related illnesses

## Industrial Agriculture:

Most water pollution comes from industrial agriculture, also knows as factory farms, which can contain hundreds of thousands of pigs, chickens, or cows, producing vast amounts of waste and often generating the waste equivalent to a small city. According to the EPA, agricultural activity was identified as a source of pollution for 48% of stream and river water and for 41% of lade water in the US. Water pollution from industrial farms not only harms ecological areas and wildlife, but it can also sicken and kill people. The manure of cattle, hogs and poultry, which contains drugs, antibiotics, growth hormones, heavy metals from feed additives, pathogens, even human sewage and excess phosphorus, on these massive farms are over-applied onto fields and pastures as raw, untreated liquefied manure, which is up to 160 times more toxic than raw municipal sewage, creating an enormous threat of pollution to both surface and ground water as this waste runs off into nearby water systems.

## Marine Plastic Pollution:

Most of marine debris comes from land based sources, such as trash and debris in urban runoff, ports and marinas, commercial and industrial facilities, and landfills. Most debris found on land eventually makes its way to a streams, storm drain or river and ultimately, the ocean, which is downhill to everything. The rest of the marine debris comes from ocean-based sources, such as overboard discharges from ships and discarded fishing gear. Food containers, packaging and plastic bags are among the largest components of the municipal solid waste stream. The quantity of marine debris is increasing in oceans world-wide. Researchers at the Algalita Marine Research Foundation documented an increase in plastic debris in the Central Pacific Gyre five-fold between 1997 and 2007, where the baseline in 1997 showed plastic pieces outnumbered plankton on the ocean surface 6:1. In the ocean, plastic debris injures and kills fish, seabirds and marine mammals. Marine plastic pollution has impacted at least 267 species worldwide, including 86% of all sea turtle species, 44% of all seabird species and 43% of all marine mammal species. The impacts include fatalities as a result of ingestion, starvation, suffocation, infection, drowning, and entanglement. There are now 46,000 pieces of plastic per square kilometer of the world's oceans, killing a million seabirds and 100,00 marine mammals each year. The toxic small plastic particles engulfing the oceans are frequently mistaken as food by fish and eventually makes its way up the food chain to humans and other marine and even bird species.

## Oil Pollution:

Accouding ti NASA , when it comes to mixing oil and water, ocesns, suffer from far mire than an occasional devastating spill. Large oil disasters may grab media attention, but the hindreds of million of gallons of oil which quietly ends up in the seas every year, mistly fro, nin-accidental sources, does not. The graph below may be outdated, but it still shows clearly how big oil still shows clearly how big oil spills are just the tip of the iceberg. Much of the pollution occurs in residential areas, chiefly from used engine oil, and in runoff from land and municipal and indusrial wastes.

## Conclusion:

The needs for change in our daily lives and the movements of our government is growing. Because so many different factors come into play ; voting, governmental issues, the desire to stick to routine. Many people don't consider that what they do will affect future generations. It humans continue moving forward in such a harmful way towards the future, then there will be no future to consider. Although it's true that we cannot physically stop our ozone layer from thinning there are still so many things we can do to try and put a dent in what we already know. By raising awareness in your local community and within your families about these issues, you can help contribute to a more environmentally conscious and friendly place for you to live.

### References:

1. Dr. N.B. Mudnur, (2017): "Management of Global Warming- A Micro study of RMG Collage Campus.
2. https://en.m.wikipedia.org
3. m.everythingconnects.org
4. cbsnews.com
5. www.conserve-energy-future.com

# A Geographical Study of Spatio-Temporal Variation in Sex Ratio of Osmanabad District

**Vipul Trimbakrao Gaikwad**
Research Student
Department of Geography
Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

**Abstract:**
    The ratio of males to females within a population can have a strong effect on the per capita growth rate. Sex ratio is a indicator of social stability & development of that region. When men and women have near equal chances for survival, there are bound to be near equal number of males and females in society. In India, however the female population is much lower than the male population due to higher mortality among females, particularly during their reproductive span .This research paper deals with trends in sex ratio of Osmanabad district as well as sex differential in decadal wise 1901 to 2011. also a construction and discussion of a sex ratio.
**Keywords:** Sex ratio, variation, social indicator, demographic elements.

**Introduction:**
    Sex ratio signifies the number of females per thousand males. Sex ratio is an index of the socio-economic conditions of an area. It is an important tool for regional analysis. It has a profound effect on the demographic structure of a region. It is an important feature of any landscape. It is a function of three basic factors sex ratio at birth, sex ratio at death and sex ratio among migrants. Sex ratio is an important factor determining the death rate of any population. Women generally have lower death rates than men at most age in most countries. If females constitute more than half of the population, the total death rates is considerably affected. The scarcity of either men or women of adult age will reduce the marriage rate; and this will in turn affect the crude birth rate.

**Study Area:**
    In Marathwada region there are 8 district and Osmanabad is one of them. The District lying between 17°35' N to 18°40' N latitude and 75°16' E to 76°40' E longitude situated partly in Balaghat plateau region. Total Geographical area is 7569 sq.km. The district of Osmanabad has following Tahsils like Osmanabad, Tuljapur, Omerga, Paranda, Kalamb, Bhoom, Lohara and Washi. It is bounded by Solapur district to the west, Ahmadnagar to the north-west, Beed to the north, Latur to the east, Bidar to south-east and Gulbarga to south-west.

**Objectives:**
    For this research paper there are following objectives
1) To study the spatial distribution of sex ratio in study area.
2) To study the tehsil wise sex ratio in the study area.

**Database and Methodology:**
    The present study is based on the secondary data. The Census data of 1901 to 2011 are use. Secondary Data have collected from Census records published by Government of India and District Census handbook, District Socio-economic review of Osmanabad. The collected data is analyzed by statistical method.

**Temporal change in sex ratio:**
    The temporal variations in sex ratios for the Osmanabad district as a whole have been taken into consideration for the last 11 decades. Due to domestic violence, dowry death and also less attention on female medical illness as compare to male is a factor for low sex ratio for Osmanabad district as compared to the state of Maharashtra was significantly lower than fir Maharashtra state in the year 2011.

**Table 1 :Sex Ratio in Osmanabad District & Maharashtra State (1901-2011)**

| Sr. No. | Year | Osmanabad district | Decadal Change | Maharashtra state | Compare to state |
|---------|------|--------------------|----------------|--------------------|------------------|
| 1. | 1901 | 980 | --- | 978 | +2 |
| 2. | 1911 | 964 | -16 | 966 | -2 |
| 3. | 1921 | 939 | -25 | 950 | -11 |
| 4. | 1931 | 942 | +3 | 947 | -5 |
| 5. | 1941 | 942 | 0 | 949 | -7 |
| 6. | 1951 | 948 | +6 | 941 | +7 |
| 7. | 1961 | 948 | 0 | 936 | +12 |
| 8. | 1971 | 947 | -1 | 930 | +17 |
| 9. | 1981 | 958 | +11 | 938 | +20 |
| 10. | 1991 | 937 | -21 | 935 | +2 |
| 11. | 2001 | 932 | -5 | 922 | +10 |
| 12. | 2011 | 920 | -12 | 929 | -9 |

*Source : Registrar General & Census Commissioner, India.*

In the year 1901 the sex ratio of Osmanabad district was estimated to 980 which was relatively higher than the Maharashtra. After next 1911 to 1941 the sex ratio of Osmanabad is lower compared to Maharashtra. It has many reason, due to medical illness and some social issues.

After Independence of India, the first census is in 1951 and then the sex ratio of Osmanabad is always increasingly to 2011census as compared to Maharashtra state. But there is some increasing changes. The sex ratio of 1951 to 2011 there is fast and yearly increased as compared to Maharashtra. The decadal changes in sex ratio is less in 1911, 1921, 1971, 1991, 2001, 2011 by 16, 25, 1, 21, 5 and 12 respectively. The decadal changes in sex ratio is decrease in 1931, 1951, and 1981 by 3, 6, and 11 respectively. In 1941 and 1961 there is no changes in sex ratio compare to their previous year. In all census , The highest sex ratio is 980 in 1901, and the lowest sex ratio is 920 in 2011.

**Sex Ratio Of Osmanabad District And Maharashtra State**
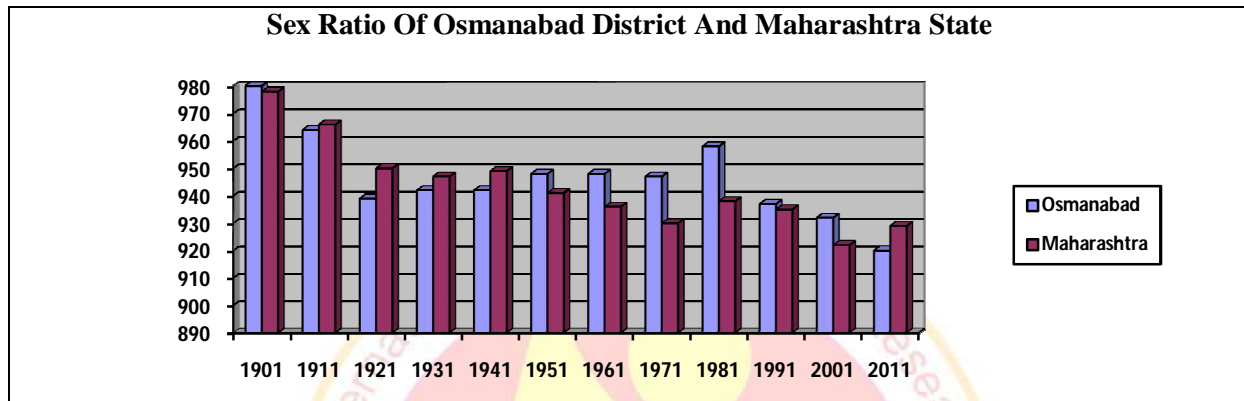


**Spatial Variation in Sex Ratio:**

The imbalance in sex ratio probably is due to relatively high mortality among the females and in migration of males on a large scale from other parts of the state of Maharashtra, which is generally dominated by males. According to 2011 census, the population of Osmanabad district is 1657576 out of this 861535 were males and 796041 were females. The sex ratio is 920. The Tahsil wise large variation is observed in study Region. Sex ratio of tahsils in study region is in Bhoom 905, Kalamb 914, Paranda 902, Washi 917, Osmanabad 925, Tuljapur 925, Lohara 937, Omerga 949. These sex ratios are classified into three categories.

**Table 2: Spatial Variation in sex ratio of Osmanabad District (2011)**

| Sr.no. | Sex Ratio | No. Of Tahsil | % to total | Name of Tahsils |
|---|---|---|---|---|
| 1. | Low(below 920 ) | 4 | 50% | Bhoom, Kalamb, Paranda, Washi. |
| 2. | Medium (921-930) | 2 | 25% | Tuljapur, Osmanabad. |
| 3. | High (above 931) | 2 | 25% | Omerga, Lohara. |

*Source: compiled by Researcher.*

- **Low sex ratio range :**

These tahsils are included in low sex ratio in which females are below 920 females to per 1000 males. A large no. of talsils (50%) areinclude in this range. Among them Bhoom, Kalamb, Paranda and Washitahsils are included.

- **Medium sex ratio range :**

These tahsils having sex ratio between 921 to 930 females are include in these range. Only Two tahsils are consist in this range and these are Tuljapur and Osmanabad.

- **High sex ratio range :**

This pattern includes tahsils those having sex ratio range is above 931 females per thousand male population. Out of total two tahsils are involved in this categories. These tahsils are Omerga and Lohara.

**Conclusion:**

- Osmanabad district has sex ratio is 920 for the census 2011. which is lowest to all census.
- sex ratio is continuously decreasing in last three decades in study region.
- Out of total, four tahsils include in low range of sex ratio. i.e. Clearly represent that declining the sex ratio is dangerous to the society and its create different social problems.
- This phenomenon mainly happen due to social tradition, more couples demand for male children in the home, inadequate medical facilities, relative low literary rate.

**References:**

1. *Chandna R.C. (2002), Geography of population, Kalyani publication, ludhiyana.*
2. *Ghosh B.N. (1985), fundamental of population geography, sterling publishers, New Delhi.*
3. *Shrivasti R.K.&Koshal R. (1998), Changing sex ratio of senoi district, 36.*
4. *Savdi A.B. (2015), MaharashtrachaBhugol, Nirali publication, Pune.*
5. *Census Handbook of Osmanabad District (2011), Socio-economic review of Osmanabad district (2012).*

# Environmental Issues and Movements in India

**Nitin V. Dadge**
Jaikranti College, Latur.

## Introduction:

With a population of over 1.3 billion, India is soon set to dislodge China as the most populous country of the world. While India has one of the fastest growing populations in the world today, it's far behind most others when it comes to preserving the environment and the ecology. Today, our country is riddled with a number of environmental concerns which have only aggravated in the last few decades. It is high time we tackled these issues head on as turning a blind eye is no solution. Even as India races ahead to join the league of top economies internationally, it must stick to a growth path that is environmentally sustainable. Neglecting the environment can create havoc and the damage done may become irreparable. Following are some of the major environmental concerns India is grappling with today. Pollution, Groundwater Depletion, Climate Change, Use of Plastics, Garbage Disposal and Sanitation, Loss of Biodiversity

Mrs. Indira Gandhi's speech on the 1970's conference on Human Environment was highly acclaimed. She established a National Committee for Environmental Planning and cooperation. Soon after a series of enactment of environmental laws for environmental protection-were passed in the parliament, the U.N. Conference on the world wide life protection Act 1972 was enacted and Gandhi was a great environmental activist of the world and for which she was awarded the prestigious International Union of conservation of Nature Award. In recent years so may gross root environmental movements launched against the developmental activities that have threatened the ecological balance.

## Objectives of the Study:

i) To study of major environmental Issues in India.
ii) To study major environmental movements in India**.**

## Methodology:

The present research paper is based on the secondary sources. The secondary sources used for this article are various research journals, the reports of the Government of Indian etc.

## Major Environmental Movements in India:

### Chipko Movement:

It was started by noted a environment list SunderlalBahuguna in 1970 to safe guard the rich forest of Western Himalaya Range. This movement was basically a people movement to resist the cutting of trees. There were frequent floods in the Alkanand River catchment area due to cutting trees for developmental world like the construction of roads, river dam project etc. The people of village Gopeswar formed and association called Dasholi Gram SarajaManda! in 1970 mainly to provide relief to flood affected people in that area. Than they diverted their attention to the importance of forest cover and under the leadership of Bahuguna made a movement to protect environmental and ecology and the movement draws the attention of the Govt, and World Bank.

### Silent Valley Movement:

An NGO of Kerala called Kerala SahityaParishad (KSSP) raised their voice to stop the Silent Valley Hydral project in 1978. Silent valley is rich in tropical forest with enormous bio-reserve. The state Govt, of Kerala wanted to hydroelectric project for the power hungry state inside a deep tropical forest in silent valley. This tropical forest was the only remaining one'in the country. The environmentalist objected to the project and field a case in High Court, which they lost project was cancelled by the help of Mrs.Indira Gandhi.

### Narmada BachaoAndolan:

In the state Madhya Pradesh, it was started to protest the construction of dam around thirty in numbers on the river Narmada to produce hydroelectricity and irrigation facility to the drought prone area of Kutch, Gujarat social activist Baba Amte and environmentalist. MedhaPatkar is thetwo leaders to fight against the Govt, and judiciary for the benefits of tribal of that affected region. Noted writer Arundhati Roy also joined the movement. It was estimated that two big dams construction on the river Narmada costs Rs.30,923 loss. Besides this the project will submerge about 130482 Hectors of which 55681 hectors are prime agricultural land arid 56066 hectors are forests. The two dams namely SardarSarovar project and Narmada Sagar Project have enormous utilities to the people for supply of electricity and irrigation but the estimated environmental cost is too much to ignore according to the report by environment scientists.

### Appiko Movement:

It was started in 1983 by the people of vollageBalegadde district Uttar Kannada of Karnataka State. This district is a part rich forest of western Ghats. The people of this village

protested the cutting of teak trees by Chipko way of embracing the trees. The activist spread the movement throughout the region by Padayatras, meetings, folk dance etc. The movement mainly focused on the conserve to grow trees. This movement has played the most crucial role to preserve the environment and ecosystem of Western Ghats. Control Over Natural Resources Control over natural resources is an important reason for emergence of environmental movement in India. Some good examples of these kinds of movements are like Chipko and N.B.A. In the first case, the reason for conflict was control over forest; whereas, in the second the reason was control over water. Let's have a look on the reasons behind the emergence of Chipko Movement in the Garwhal Himalayas.

One important factor is that those poor people's are solely dependent upon those natural resources for their survival hood. So, the changes in control of resources directly hamper their subsistence economy due to which their survival hood came in danger. Therefore, the protest of peoplerise against those outsiders, which had ultimately taken the shape of environmental movement in instances.

**Conclusion:**

Now on the above arguments the conclusion could be drawn that the nature based conflicts, the false developmental policies of the government, the marginal ization of the tribal and other under privileged groups and the environmental degradation are the root causes of emergence of environmental movements in India. The lopsided, iniquitous, and environmentally destructive processes of development have propelled the people to go against the state in many cases and this leads to the environmental movements in the country. The risks on the survival hood of the marginal people due to the above mentioned factors had resulted in the movements. Therefore the point comes that the environmental movements in different parts of the country grows out of the distribution conflict over the ecological resources needed for livelihood. So we can conclude that environmental movements in India are the resistances by the people for their livelihood and their survival.

**References:**

1) Shinde, Telang, Environmental studies, Sheth Publisher Pvt. Ltd. Mumbai.
2) Dr.T.N.Gholap, Environmental Sciences, NishikantPrakashan, Pune-27.
3) S.C. Santra. Environmental Science.
4) MahendraPande, Global Warming Climate Change.
5) www.wikipedia, the free encyclopedia.
6) http://www.publi₁shyourarticles.net/environmental studies.
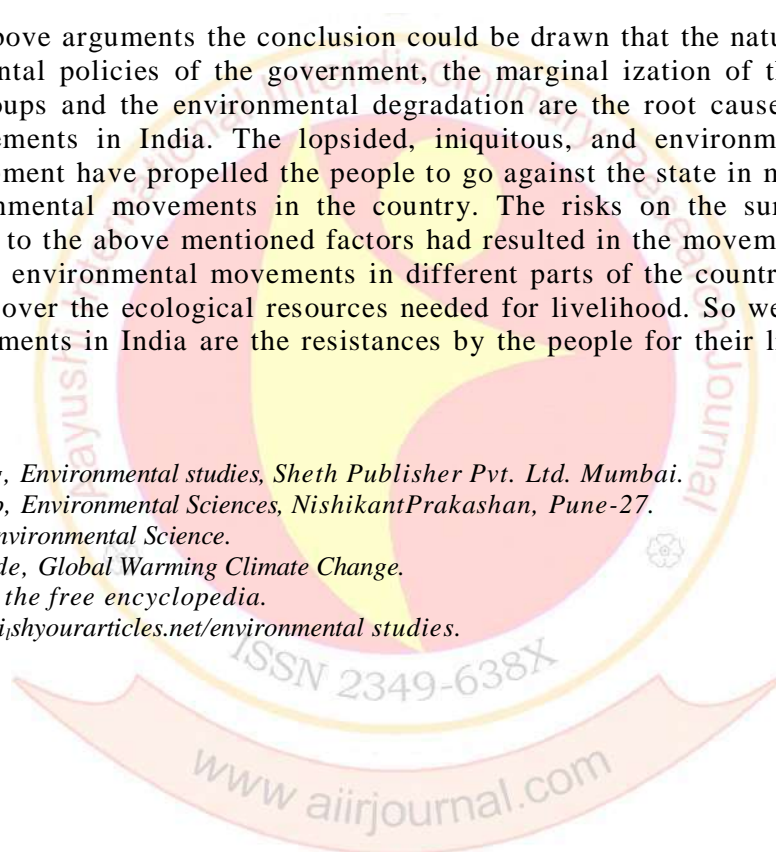
## Problems of Natural Resource Management in Developing Countries

**Dr. Sarwade M. P.**
Jaikranti Arts and Commerce College,
Latur.

### Introduction

A resource is a source or supply from which benefit is produced. Typically resources are materials or other assets that are transferred to produce benefit. Natural resource are materials and components that can be found within the environment Natural. From human perspective a natural resource in anything obtained from the ecological perspective a natural resource satisfies the need of living or organism. It means natural resources such as air, water ,soil vegetation. Energy etc. derived from the environment. Many of them essential for human survival while others are used for satisfying human desire or wants.

Sustainable development of any country depends upon the use of these natural resources that aims to meet human needs while preserving the environment. The problem today is not primarily on of absolute physical shortage but of economic and social mal-distribution and misuse of resources soil, water, animals, vegetation energy air are the most vital natural resources survival of man. To obtain maximum and optimum production all these resources have managed efficiently. For their efficient management one has to look  for sustainable methods of management so that these resources are handled and managed efficiently and collectively many countries all over the world particularly developing countries are facing acute problems of natural resource management.

### Natural Resource Management:

Natural resource management refers to the management of natural resources such as land, water, soil, plants, animals etc, with a particulars focus on how management affects the quality of life for both present and future generation. It deals with managing the way in which people  and natural landscape interact. In brings together land use planning water management bio diversity conservation and the future sustainability of industries like agriculture mining tourism fisheries and forestry. Natural resource management is similar to environment management. It is also similar to the concept of sustainable development a scientific principal that forms a basis for sustainable global land management and environmental governance to conserve and preserve natural resource .Natural resource management specifically focuses on a scientic and technical understanding of resources and ecology and the life supporting capacity these resource .

### Problem Of Natural Resource Management

Natural resource including air, water, soil, vegetation energy animals etc. are important to human life. The natural balance of these environmental elements has been upset over a period because of mans anxiety to over exploit some of these for his betterment or progress. Industriazation and urbanization agriculture have reduced the natural forest cover. It resulted in the pollution of the atmosphere. Degradation of the environment of natural  resources has been going on for a long period and has reached the stage where It is posing a danger to human and other life on earth. The greenhouse effect is getting stronger, pollution levels in air and water are increasing. Climate cycles are getting disturbed, natural resources are being depleted the development process itself becoming hazardous and human being are faced with new pressures of mental and physical health all this because the environment is threatened in many ways. Time is not for when the planet will suffer the consequences of acid rain, global warming ozone depletion widespread desertification and species loss; if nothing is done urgently and effectively to reserve the process of environment degradation.

Environmental streets has been seen as the result of the growing demands of scarce natural resources. The pollution generated by the rising industrialization and living standards.

In the undeveloped and developing countries poverty itself pollutes the environment creating environmental streets in a different way. According to the world commission on environment and development, those who are poor and hungry will often destroy their immediate environment in order to survive e.g. They cut down forests they overuse marginal land, their livestock overgraze grass land etc. on the other had where economic growth has led to improvement in living standards, it has  sometimes been achieved in ways, that are globally damaging in the long run.

Natural resource management issues are inherently complex as they involve the ecological cycles hydrological cycles, climate animals plant and geography etc. All these are dynamic and inter-related. A change in one of them may have far reaching and/or long term impacts which may even irreversible.

Natural resource management also has to mange various stakeholders and their interests, policies, politics, geographical boundaries economic implications and list goes on. It is very difficult to satisfy all aspects at the same time. This results in conflicting situation.

Ownership of natural resources in also the problem of natural resource management. Ownership and control over the use of resources is in hands of different bodies. Some resources are owned and controlled by Govt. some by group and some by defined individual or corporate entity. Some resources do not have any definite owner. These areas are the most exploited. it is said that "everybody" s property is nobody property " e.g. Fishery.

**Suggestions:**

To overcome the problems of natural resource management for sustainable development following steps should be taken

1. There is tremendous population pressure on the limited resource in the developing countries so they must make genuine efforts of control the unbridled population growth to ensure sustained development of society.

2. Different issues and element of natural resource management are inter related and inter dependent. Hence while natural resource planning a more integrated approach should be implemented. Integrated management of land, water, forests etc. should be done.

3. Different ownership of natural resources is a one of the problem of natural resource management. As people care about their private resource. they should also care about public resources.

4. Advance technology and methods should be developed in order to promote the use to renewable resource of energy such as wind, water, and solar energy. Creating awareness about the need for conserving energy by switching over to compact fluorescent lamps (CEL) from conventional light bulb and promoting the use of solar energy for household activates as well as industrial activates.

5. There is exigency to ensure strict compliance of the vehicular in diesel towns and cities. This will ban the use leaded petrol and sulphur in diesel vehicles to reduce vehicular emissions. Use of CNG and ethanol instead of petrol and diesel should be promoted to reduce vehicular emissions. bicycles for shorter distances should be done instead of vehicles.

6. Awareness and participation in social forestry programme in must. The local community should be initiated in programmes of regenerating forest which should taken as continuous process. The community can be aware and encouraged to use alternative fuels such as biogas and solar energy cookers etc.

7. For most mental revolution must be created to conserve natural resources Government and non-Government organizations should be organize public awareness camps and programmnes about environment.

**Conclusion:**

Degradation and depletion of natural resources in developing countries is a serious problem. It creates hindrance in the sustainable development of the country. It is foremost need of today, to create revolution about the conservation of natural resource and make this earth a better place to live in.

**References:**

1. *Sharma Jyoti (2010) : Global warming and sustainable Development, University News Vo 48 Aug 16-22,2010.*
2. *Premkumar (1998) : Environment to Gender issues, Manual on women 's Development and gender justice Ed. By Dagar Rainuka*
3. *G.Agroramoorthy (2009) : Sustainable Development Daya publishing House New Delhi.*
4. *Dhekale. V.S. (2011) : Human resources Management and sustainable Development Vivek Research Journal June – 2011.*
5. *Desai N. (2006) : The Challenge – A Development Yojana, June 9-10*
6. *Ghanchi D.A. (2011) : Sevenfold Sustanability for Ensuring o Holistic life in contemporary India:Role of Higher Education. University News Vol.49, Aug, 29 Sept 4, 2011.*
7. *http:www.google.com Date : 16/02/2012*

# बिदर जिल्ह्यातील साक्षरतेत झालेला बदल एक भौगोलिक अभ्यास

प्रा.डॉ.भिमराव लालप्पा माळगे

वै.धुंडा महाराज देगलूरकर महाविद्यालय, देगलूर

**सारांशः**

बिदर जिल्हा हा कर्नाटक राज्यातील एक मागास जिल्हा म्हणून ओळखला जातो. बिदर जिल्ह्यातील साक्षरता दर २०११ मध्ये ७१.०१ % आहे. तर २००१ च्या आकडेवारीनुसार तोच दर ५७.१० % इतका होता. गेल्या दहा वर्षात यात १४.२३ नी वाढ झालेली दिसून येते. बिदर जिल्ह्यातील साक्षरता वाढीचा दर सर्वात जास्त बसवकल्याण तालुक्याचा असून सर्वात कमी साक्षरता वाढीचा दर भालकी तालुक्याचा आहे.२००१ च्या जनगणने नुसार बिदर जिल्ह्यात सर्वात कमी ५७.९०% साक्षरता दर औराद तालुक्यात होते, तर सर्वात जास्त साक्षरता दर ६५.००% बिदर तालुक्यात असल्याचे आढळून येते.वर्ष २००१ मध्ये स्त्री साक्षरता दर ४८.८ % होते तर २०११ मध्ये ६९.५५ % झाले आहे अर्थात स्त्री साक्षरतेत २०.२८ % नी वाढ झाल्याचे दिसून येते. पुरुष साक्षरता २००१ मध्ये ७५.५० % होते तर २०११ मध्ये ७९.०९ % इतके झाले अर्थात पुरुष साक्षरतेत ४.६४ % ने वाढ झाल्याचे दिसून येते. तर बिदर जिल्ह्याच्या एकूण साक्षरतेत १३.६१ % नी वाढ झाली आहे.

**प्रस्तावना:**

बिदर जिल्हा हा कर्नाटक राज्यातील एक मागास जिल्हा म्हणून ओळखला जातो. राज्याच्या ईशान्य भागात असलेला व महाराष्ट्र, तेलंगणा आणि कर्नाटक राज्याच्या सीमेवर असलेले हा जिल्हा आहे. पूर्वी बिदर बडोदाकोटा (बदरकोट) या नावाने ओळखला जात होता. बिदरचा इतिहास ई.स.पु. २३१ पासूनचा आहे. बिदर जिल्हा निजामशाहीचा भाग होता. अशा मागास व ऐतिहासिक जिल्ह्यातील प्रमुख पिकांचा आढावा घेण्यासाठी या निबंधात प्रयत्न करण्यात आला आहे. बिदर जिल्ह्यात एकूण पाच तालुके असून बिदर जिल्ह्याची एकूण लोकसंख्या २०११ च्या जनगणनेनुसार १७०००१८ इतकी आहे. २०११ च्या आकडेवारीनुसार साक्षरता दर ७१.०१ % आहे.

**संशोधन विषयाचे महत्व :**

शिक्षण हे ज्ञानाचे साधन, आणि साक्षरता हि शिक्षणाचे साधन आहे. विकासाच्या कल्पवृक्षाची हि पायामुळं सर्वांगीण सामाजिक विकासाचे बहुआयामी ध्येय गाठण्याचा एकमेव महामार्ग आहे साक्षरता. जगात जे जे विकसित राष्ट्र आहेत त्या सर्व राष्ट्रामध्ये साक्षरता दर १००% आहे. अर्थात ज्या देशात साक्षरता जास्त त्या देशात विकास झालेला दिसून येतो. म्हणूनच भारतातील महाराष्ट्र, पंजाब, तामिळनाडू, केरळ सारखी राज्ये विकसित राष्ट्र म्हणून ओळखली जातात तर बिहार, उत्तरप्रदेश आणि राजस्थान सारखे राज्ये अविकसित म्हणून ओळखले जातात. म्हणून प्रस्तुत शोध निबंधात बिदर जिल्ह्यात साक्षरता किती प्रमाणात आहे याचा आढावा घेण्यासाठी अभ्यास करण्यासाठी बिदर जिल्ह्यातील साक्षरता हा विषय निवडण्यात आला आहे.

**गृहीतके :**

१) बिदर जिल्हा कर्नाटक राज्यात शैक्षणिक दृष्ट्या मागास आहे.

२) बिदर जिल्ह्यात शहरी भागापेक्षा ग्रामीण भागात कमी साक्षरता आहे.

३) बिदर जिल्ह्यात पुरुषापेक्षा स्त्रियामध्ये साक्षरता दर कमी आहे.

**उद्दिष्टे :**

१) बिदर जिल्ह्यातील साक्षरतेचा अभ्यास करणे

२) बिदर जिल्ह्यातील स्त्री-पुरुष साक्षरता दराचा अभ्यास करणे.

३) संशोधन क्षेत्रातील वेगवेगळ्या तालुक्यातील साक्षरतेचा आढावा घेणे.

४) अभ्यास क्षेत्रातील शैक्षणिक दृष्ट्या मागास तालुक्यांचा अभ्यास करणे.

५) अभ्यास क्षेत्रातीलसाक्षरता दर व कर्नाटक राज्याचा साक्षरता दर याचा तुलनात्मक अभ्यास करणे.

**सामग्री संकलन आणि संशोधन पद्धती :**

संशोधन क्षेत्रातील जलसिंचन सुविधेचा अभ्यास करण्यासाठी दुय्यम स्त्रोताचा आढावा घेण्यात आला. प्रत्यक्ष बिदर जिल्ह्यातील जिल्हाधिकारी कार्यालय व जिल्हा सांख्यिकी केंद्रात जाऊन माहिती जमा करण्यात आली. त्याचप्रमाणे २००१ व २०११ च्या जणगणनेचा अभ्यास करण्यात आला.सदर शोध निबंध बिदर जिल्ह्यातील साक्षरतेवर आधारित आहेव हा शोधनिबंध साक्षरता संदर्भातच मर्यादित असून त्यासाठी २००१ ते २०११ वर्षाच्या कालावधीची संशोधनासाठी निवड करण्यात आली आहे.

**अभ्यास क्षेत्र :**

बिदर जिल्ह्याचे स्थान महाराष्ट्र, कर्नाटक व तेलंगणाच्या सीमेलगत असून कर्नाटक राज्याच्या इशान्येस आहे. याचा अक्षवृतीय विस्तार १७°३१' उत्तर अक्षवृत्त ते १८°२३' उत्तर अक्षवृत्त आहे. आणि रेखावृतीय विस्तार ७६°४५' पूर्व रेखावृत्त ते ७७°३९' पूर्व रेखावृत्त आहे

बिदर जिल्ह्यात सरसरी पर्जन्य ८८६ मी.मी. एवढे असून बिदर जिल्हा कोरडवाहू जिल्हा म्हणून ओळखला जातो. कर्नाटकामध्ये बिदर जिल्हा तूर व उसाच्या उत्पादनासाठी प्रसिद्ध आहे. बिदर जिल्हा आर्थिक दृष्ट्या मागासलेला जिल्हा म्हणून ओळखला जातो. देशातील ७०% लोक हे शेती व्यवसायाशी निगडीत आहेत. त्याचप्रमाणे बिदर जिल्ह्यातील बहुतांश लोक शेती व्यवसायावर अवलंबून आहेत. म्हणून कृषी विकासाचा परिणाम आर्थिक विकासावर होतो. यामुळे बिदर जिल्ह्यातील कृषी विकास किती झाला ते पाहणे गरजेचे आहे.

**बिदर जिल्ह्यातील साक्षरता :**

कोणत्याही देशाचा विकास हा तेथील साक्षरतेवर अवलंबून असते विकासाच्या अनेक मानकापैकी एक मानक म्हणजे साक्षरता होय. कर्नाटक राज्याच्या एकूण साक्षरतेचा विचार केल्यास बिदर जिल्ह्याचा साक्षरता दर फारच कमी आहे. म्हणूनच बिदर जिल्हा एक मागास जिल्हा म्हणून ओळखला जातो. कर्नाटक राज्याचा वर्ष २००१ मध्ये साक्षरता दर ६७.०४% होता तर २०११ मध्ये ७५.३६% इतका होता आणि बिदर जिल्ह्याचा २००१ मध्ये साक्षरता दर ६०.९०% होता तर २०११ मध्ये ७०.०१ % साक्षरता दर होता.

**बिदर जिल्ह्यातील साक्षरता-२००१**

| तालुके | | औराद | बसवकल्याण | भालकी | बिदर | हुमनाबाद | एकूण |
|---|---|---|---|---|---|---|---|
| एकूण लोकसंख्या | | २४५२९४ | २९९९१० | २५७०४२ | ४०५५४० | २९४५८७ | १५०२३७३ |
| ग्रामीण साक्षरता | एकूण | ११०८१३ | ११५३२० | ११३९०८ | १०३४६९ | १०७११५ | ५५०६६५ |
| | पुरुष | ६८८६४ | ७२११५ | ७०७७४ | ६४२९८ | ६७३०० | ३४३३५१ |
| | स्त्री | ४२०४९ | ४३२०५ | ४३१३४ | ३९१७१ | ३९८१५ | २०७३३४ |
| शहरी साक्षरता | एकूण | ८६१३ | ३२४९६ | २२२८० | ११७८६७ | ३६३७७ | २१७६३३ |
| | पुरुष | ५१६१ | १८९१० | १३५६२ | ६६६४५ | २०९४२ | १२५२२० |
| | स्त्री | ३४५२ | १३५८६ | ८७१८ | ५१२२२ | १५४३५ | ९२४१३ |
| एकूण साक्षरता | एकूण | ११९५२६ | १४७८१६ | १३६१८८ | २२१३३६ | १४३४९२ | ७६८३५८ |
| | पुरुष | ७४०२५ | ९१०२५ | ८४३३६ | १३०९४३ | ८८२४२ | ४६८५७१ |
| | स्त्री | ४५५०१ | ५६७९१ | ५१८५२ | १०३९३ | ५५२५० | २९९७८७ |

**संदर्भ:** www.bidar.nic.in

**बिदर जिल्ह्यातील साक्षरता दर -२००१**

| तालुके | | औराद | बसवकल्याण | भालकी | बिदर | हुमनाबाद | एकूण |
|---|---|---|---|---|---|---|---|
| एकूण लोकसंख्या | | | | | | | |
| ग्रामीण साक्षरता | एकूण | ५७ ३. | ६० ५०. | ५३५०. | ५५ १०. | ५६ ७०. | ५६ ६०. |
| | पुरुष | ६९ ५०. | ७० ७०. | ७३ ७०. | ६४८०. | ६७ ५०. | ६९ २०. |
| | स्त्री | ४४ ५०. | ४३ ३०. | ४६८०. | ४१६०. | ४२००. | ४३ ६०. |
| शहरी साक्षरता | एकूण | ६५ ९०. | ६७ १०. | ७४ ७०. | ७९ ९०. | ७१ ६०. | ७५ १०. |
| | पुरुष | ७६ २०. | ७५ २०. | ८५ ३०. | ८६ ९०. | ८० ३०. | ८३ १०. |
| | स्त्री | ५४ ८०. | ५८ ४०. | ६२ ७०. | ७२ ३०. | ६२ ३०. | ६६ ५०. |
| एकूण साक्षरता | एकूण | ५७९. | ५९ १०. | ६२ ४०. | ६५००. | ५८ ५०. | ६० ९०. |
| | पुरुष | ६९९०. | ७१ ६०. | ७५३०. | ७४ ५०. | ७० २०. | ७५ ५०. |
| | स्त्री | ४५२. | ४६ २०. | ४८ ८०. | ५४ ८०. | ४६ २०. | ४८ ८०. |

२००१ च्या जनगणने नुसार बिदर जिल्ह्यात सर्वात कमी ५७.९०% साक्षरता दर औराद तालुक्यात होते, तर सर्वात जास्त साक्षरता दर ६५.००% बिदर तालुक्यात असल्याचे आढळून येते. स्त्री साक्षरतेच्या बाबतीत विचार केल्यास

सर्वात कमी साक्षरता औराद तालुक्यात असून त्याचे प्रमाण ४५.२०% इतके आहे आणि सर्वत जास्त स्त्री साक्षर प्रमाण बिदर तालुक्यात आहे. पुरुष साक्षरतेचा विचार केल्यास सर्वात जास्त साक्षरता भालकी तालुक्यात असून त्याचे प्रमाण ७५.३०% आहे आणि सर्वात कमी पुरुष साक्षरता दर औराद तालुक्यात असून त्याचे प्रमाण ६९.९०% आहे.

### बिदर जिल्ह्यातील साक्षरता-२०११

| तालुके | | औराद | बसवकल्याण | भालकी | बिदर | हुमनाबाद | एकूण |
|---|---|---|---|---|---|---|---|
| एकूण लोकसंख्या | | २७८४०० | ३४५२४७ | २७७३५० | ४६९९४१ | ३३२३६२ | १७०३३०० |
| ग्रामीण साक्षरता | एकूण | १४३३३८ | १६००३७ | १४५५५८ | १४२५०२ | १४८२७६ | ७३९७११ |
| | पुरुष | ८३८१३ | ९३५२८ | ८४३५२ | ८२४९३ | ८६९३५ | ४३०६८१ |
| | स्त्री | ५९५२५ | ६६५०९ | ६१२०६ | ६००४९ | ६१७४१ | ३०९०३० |
| शहरी साक्षरता | एकूण | १९१५८ | ४६२९५ | २८३१५ | १६२१३२ | ४७०६२ | ३०२९६२ |
| | पुरुष | १०८५३ | २५४१७ | १५८९५ | ८८४२२ | २५९३० | १६६५१७ |
| | स्त्री | ८३०५ | २०८७८ | १२४२० | ७३७१० | २११३२ | १३६४४५ |
| एकूण साक्षरता | एकूण | १६२४९६ | २०६३३२ | १७३८७३ | ३०४६३४ | १९५३३८ | १०४२६१३ |
| | पुरुष | ९४६६६ | ११८९४५ | १००२४७ | १७०८७५ | ११२४६५ | ५९७१९८ |
| | स्त्री | ६७८३० | ८७३८७ | ७३६२६ | १३३७५९ | ८२८७३ | ४४५४७५ |

**संदर्भ:** www.bidar.nic.in

### बिदर जिल्ह्यातील साक्षरता दर -२०११

| तालुके | | औराद | बसवकल्याण | भालकी | बिदर | हुमनाबाद | एकूण |
|---|---|---|---|---|---|---|---|
| एकूण लोकसंख्या | | | | | | | |
| ग्रामीण साक्षरता | एकूण | ६६ ५७. | ६६ ८७. | ७० ०७. | ६८ ८०. | ६५ ५४. | ६६ ७३. |
| | पुरुष | ७६ १८. | ७६ ९३. | ७९ ८३. | ७३ ४८. | ७५ १४. | ७६ २८. |
| | स्त्री | ५६ ५३. | ५६ ४८. | ५९ १७. | ५५ ७५. | ५५ ५८. | ५६ ८२. |
| शहरी साक्षरता | एकूण | ७६ ७५. | ७७ ४६. | ८० ३४. | ८५ ८१. | ७७ ९६. | ८१ ८१. |
| | पुरुष | ८१ ८४. | ८२ ४६. | ८७ ५२. | ९० ८१. | ८४ ०२. | ८७ ४२. |
| | स्त्री | ६५ ३१. | ७२ १३. | ७२ ७२. | ८० ४९. | ७१ ६१. | ७५ ८८. |
| एकूण साक्षरता | एकूण | ६७ ३४. | ६८ ९८. | ७१ ५६. | ७४ ५१. | ६८ १५. | ७० ५१. |
| | पुरुष | ७६ ७९. | ७८ ०५. | ८० ९६. | ८१ ५३. | ७७ ०१. | ७९ ०९. |
| | स्त्री | ५७ ४७. | ५९ ५७. | ६१ ८०. | ६७ १२. | ५८ ९५. | ६१ ५५. |

बिदर जिल्ह्यात मागील १० वर्षांच्या काळात साक्षरतेत वाढ झालेली दिसून येते. बिदर जिल्ह्यात वर्ष २००१ मध्ये साक्षरता दर ६०.९% होता तर २०११ मध्ये ७०.५१% होता. २०११ च्या आकडेवारीनुसार सर्वात कमी साक्षरता दर औराद तालुक्याचा असून तो दर ६७.३४% आहे. म्हणूनच औराद तालुका बिदर जिल्ह्यातील मागास तालुका म्हणून ओळखला जातो. तर सर्वात जास्त साक्षरता दर बिदर तालुक्याचा असून त्याचे प्रमाण ७४.५१% आहे म्हणूनच बिदर तालुका इतर तालुक्यांच्या तुलनेत सर्वात जास्त विकसित आहे. ग्रामीण भागाचा विचार केल्यास सर्वात जास्त साक्षरता भालकी तालुक्याचा असून त्याचे प्रमाण ७०.०७% आहे. भालकी तालुक्यात नव्याने अनेक उद्योग व शिक्षण संस्था उदयास आल्याने भालकी तालुक्यातील ग्रामीण भागात साक्षरता वाढल्याचे दिसून येते. बिदर जिल्ह्यात सर्वात कमी ५७.४७% स्त्री साक्षरता औराद तालुक्यात असून सर्वात जास्त ६७.१२% स्त्री साक्षरता बिदर तालुक्यात आहे.

वर्ष २००१ मध्ये स्त्री साक्षरता दर ४८.८ % होते तर २०११ मध्ये ६१.५५ % झाले आहे अर्थात स्त्री साक्षरतेत २०.२८ % नी वाढ झाल्याचे दिसून येते. पुरुष साक्षरता २००१ मध्ये ७५.५० % होते तर २०११ मध्ये ७९.०९ % इतके झाले अर्थात पुरुष साक्षरतेत ४.६४ % ने वाढ झाल्याचे दिसून येते. तर बिदर जिल्ह्याच्या एकूण साक्षरतेत १३.६१ % नी वाढ झाली आहे.

**निष्कर्ष** :

१) बिदर जिल्ह्याचा साक्षरता दर कर्नाटक राज्याच्या एकूण साक्षरता दरापेक्षा कमी आहे.

२) बिदर जिल्ह्यातील सर्वात कमी साक्षरता औराद तालुक्याचा असून स्त्री साक्षरता दर फारच कमी आहे.

३) बिदर जिल्ह्यातील स्त्री साक्षरता पुरुषापेक्षा कमी जरी असला तरी साक्षरता वाढीचा दर मात्र पुरुषापेक्षा जास्त असल्याचे दिसून येते.

४) बिदर जिल्ह्यात ग्रामीण भागापेक्षा शहरी भागातील साक्षरता दर जास्त आहे.

५) बिदर जिल्ह्यातील स्त्री साक्षरता दर ग्रामीण भागापेक्षा शहरी भागात जास्त आहे.

६) ग्रामीण भाग साक्षरतेच्या दृष्टीने मागास असल्याने बिदर जिल्ह्यात साक्षरता वाढविण्यासाठी प्रयत्न होणे गरजेचे आहे.

**संदर्भ:**

1. *https://marathivishwakosh.maharashtra.gov.in/khandas/khand19/index.php/component/content/article?id=1 0679&start=2*

2. *S PRUTHI (१९९५), " history of sugar industry in India" Reliance Publication House, New Delhi page no. 1-8*

3. *https://marathivishwakosh.maharashtra.gov.in/khandas/khand19/index.php/component/content/article?id=1 0679&start=2*

4. *Sami Uddin and MahfoozurrRahman (1983)'cooperative sector in india' S Chand & company Ltd New Delhi page no. 47-52*

5. *www.caneinfo.nic.in*

6. *अहवाल २०११, साखर आयुक्त बेंगलोर,*

7. *को-ऑपरेटीव सुगर जुन २०१५ vol.४६ no.१०*

8. *SDDS-DPS,Ministry of Agriculture, govt of india 2011*

9. *साखर कारखाना कायदा १९५९*

10. *करमरकर सु. वा. १९९०,"साखर निर्मिती" अनमोल प्रकाशन पुणे,  पृष्ठ -११-२३*

11. *http://www.indiansugar.com/uploads/FSS_ACT_2006.pdf*

12. *http://www.indiansugar.com/uploads/Sugar_Development_Fund_Act-1982.pdf*

# उदगीर तालुका जलप्रबन्धन का भौगोलिक अध्ययन

प्रा.डॉ. आर. एस. धनुश्वर
मार्गदर्शक
भूगोल विभागप्रमुख
भाई किशनराव देशमुख महाविद्यालय,
चाकूर जि.लातूर

सुरेखा बाबुराव खडके
संशोधक

**प्रस्तावना :**

वायू के बाद मानव समाज में जल की महानता प्रकृति प्रदान वरदानों में से एक है। जल के कारण ही पृथ्वी पर हरियाली विकसित हुई है। जल ही जीवन है। जल जीवन का अमर वरदान है। पृथ्वी पर ७१ प्रतिशत जल है। उसमें से ९८ प्रतिशत क्षारयुक्त है। २ प्रतिशत मीठे पानी के रुप में है। २ प्रतिशत में से ९७ पानी बर्फ के रूप में अस्तित्व में है। उपलब्ध जल का स्वरूप सागरजल-६७.१ प्रतिशत, हिमस्वरूप-२.१ प्रतिशत, भूपृष्ठजल-०.२ प्रतिशत, भूगर्भजल-०.६ प्रतिशत। जल हायड्रोजन और ऑक्सिजन के अणू से बनता है। जल द्रव है वायू के २ अणू और ऑक्सिजन के एक अणू के संयोग से जल का एक रेणू बनता है। जल के घनरूप को बर्फ कहते है और वायू को बाफ कहते है। जल में सभी पदार्थ घुलमिल जाते हैं। इसलिए उसे वैश्विक द्रावक कहते है। जल ही जीवन है इसलिए पानी बचाकर उसका सही जगह इस्तेमाल करना चाहिए। मानव को एक साल में २८०० अब्ज घनफूट जल लगता है लेकिन जो जल पृथ्वी पर है वह असमान रूप से हर राज्य में फैला हुआ है। जल का मुख्य स्त्रोत बारिश है।। यह बारिश हर जगह एक ही मौसम में नहीं होती हर गॉंव या हर शहर में कम या ज्यादा गिरती है। क्षेत्रीय वितरण भी एक जैसा नहीं होता है। भारत में ३० टक्के क्षेत्र में बारिश अच्छी होती है। ७० टक्के क्षेत्र में बारिश कम होती है। इसलिए जरुरी है कि जलसिंचन करके बारिश की समस्या से निपटने के लिए ज्यादा से ज्यादा जलसिंचन स्त्रोतों को बढाए जाए।
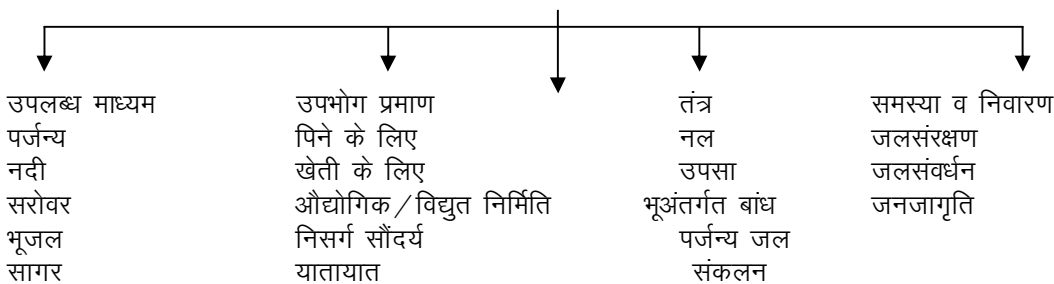
**अध्ययन क्षेत्रः**

प्रस्तुत शोधालेख के लिए उदगीर तालुका का चयन किया है। यह तालुका महाराष्ट्र राज्य के मराठवाडा विभाग में स्थित है। इस तालुके का अक्षवृत्तीय विस्तार १८°२१९ उत्तर से १८°२२९ उत्तर अक्षवृत्त और रेखावृत्तीय विस्तार ७७°५६९ पूर्व से ७७°२१९ पूर्व रेखावृत्त है। इस तालुके का क्षेत्रफल ६३२ मीटर है इस तालुके की जनसंख्या ३ लाख, ६ हजार ५२२ है। उदगीर तालुका में उदगीर, नागलगाव, नलगीर, मोघा, वाढवणा, देवर्जन और हेर यह ७ सर्कल है।
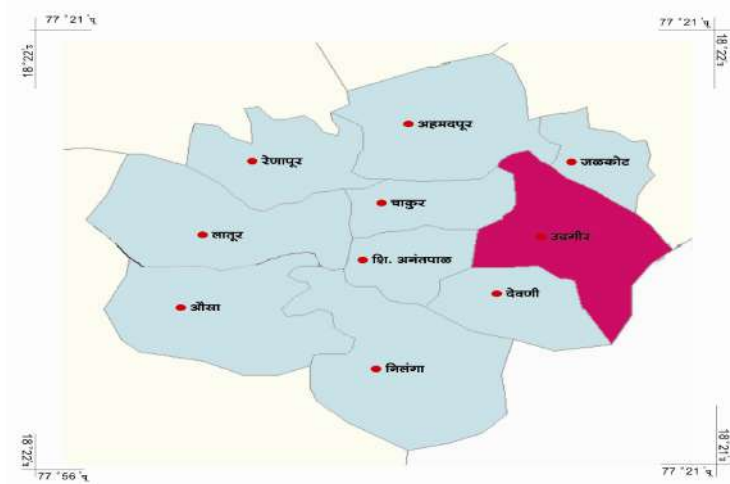


**उद्देशः**

१) उदगीर तालुका के जल स्त्रोतों का अध्ययन करना।
२) उदगीर तालुका के जल प्रबन्धन के फायदे का अध्ययन करना।
३) उदगीर तालुका में जलसिंचन के उपायों का अध्ययन करना।

**जलव्यवस्थापन**

| उपलब्ध माध्यम | उपभोग प्रमाण | तंत्र | समस्या व निवारण |
|---|---|---|---|
| पर्जन्य | पिने के लिए | नल | जलसंरक्षण |
| नदी | खेती के लिए | उपसा | जलसंवर्धन |
| सरोवर | औद्योगिक/विद्युत निर्मिति | भूअंतर्गत बांध | जनजागृति |
| भूजल | निसर्ग सौंदर्य | पर्जन्य जल | |
| सागर | यातायात | संकलन | |

**अनुसंधान पद्धतिः**

प्रस्तुत शोधालेख के प्राथमिक एवं द्वितीय स्त्रोत के द्वारा जानकारी संकलित की गई है। जानकारी के विश्लेषण के लिए अनुभवजन्य पद्धति का अनुसरण किया है। साथ में जिल्हा परिषद लातूर, कृषि अधिशक्त कार्यालय से जानकारी प्राप्त की है।

**विषय विवेचनः**

उदगीर तालुका में जल का मुख्य स्रोत बारिश है। हर जगह एक ही साथ एक ही महिने में बारिश नहीं होती। उदगीर तालुका के नलगीर, वाढवणा, उदगीर सर्कल में बारिश सबसे ज्यादा 600 से लेकर 900 मि.मी. (मिलीमीटर) होती है। उसमें कम बारिश हेर, देवर्जन इन दो सर्कल में होती है। उसके बाद अल्प बारिश नागलगाव, मोघा सर्कल में होती है। यहाँ 200 से लेकर 400 मि.मी. तक बारिश होती है।

**उदगीर तालुका : जलसिंचन स्रोत**

| अ.क्र. | जलसिंचन स्रोत | संख्या | टक्केवारी |
|--------|--------------|--------|-----------|
| 1 | बावडियाँ | 3437 | 3.32 |
| 2 | कूपनलिका | 231 | 2.39 |
| 3 | विद्युत पंप | 341 | 3.53 |
| 4 | हॅंडपंप | 74 | 0.76 |
| 5 | जलजोडनी | 5273 | 54.58 |
| 6 | लघुपाटबंधारे | 132 | 1.36 |
| 7 | तलाब | 46 | 0.47 |
| 8 | बंधारा | 37 | 0.38 |
| 9 | जलाशय | 119 | 1.23 |
| | एकूण | 9660 | 100 |

*आधार : कार्यकारी अभियंता, ग्रामीण पाणीपुरवठा, जिल्हा परिषद, लातूर*

**नदी :** प्रकृति द्वारा विकसित एवं लगातार परिमार्जित मार्ग पर बहनेवाली अविरत धारा को नदी कहते है। नदी को बरसात जन्म देती है। वह पहाडों से बहती सागर में अथवा झील में समा जाती है। इस यात्रा में अनेक सहायक नदियाँ उसे मिलती है।

उदगीर के दक्षिण की ओर से लेंडी नामक नदी बहती है। इस नदी का प्रवाह उदगीर से 40 कि.मी. का है। बाद में यह नदी नांदेड जिले में तिरु नदी से जुड जाती है। उसके बाद देगलूर नगर में मतगा नामक गाँव के पास मांजरा नदी के साथ जुड जाती है। देवन नदी उदगीर के पास रोहिणा गाँव की ओर से कर्नाटक राज्य में बहती है।

**झरना :** तोंडार गाँव के पास झरना है। वहाँ से आग्नेय की ओर से झरना देवन नदी के पास आता है।

**मध्यम प्रकल्प :** मध्यम प्रकल्प क्षेत्र की संख्या 5 है और उसका लाभक्षेत्र 7662 हेक्टर है और जलसिंचित क्षेत्र 2133 है।

**लघु प्रकल्प :** उदगीर तालुका में लघु प्रकल्प की संख्या 4 है और उसका लाभक्षेत्र 545 हेक्टर है और जलसिंचित क्षेत्र 3166 हेक्टर है।

**लघुपाटबंधारे :** उदगीर तालुके में जिल्हा परिषद स्तर पर 132 लघुपाटबंधारे है उनका लाभक्षेत्र 2799 हेक्टर है और जलसिंचित क्षेत्र 2799 हेक्टर है। स्थानिक स्तर पर (100 से 250 हेक्टर) में लघुपाटबंधारे की संख्या 5 है उसमें से जलसिंचित क्षेत्र 527 है। जबकी लाभक्षेत्र 879 है। उदगीर में गाँवों की संख्या 97 है उसमें वाडी और बस्ति की संख्या 34 है। गाँव की संख्या 74 है। उदगीर तालुके के कई गाँवों में अकाल के कारण जलसंकट बहुत ही भयानक है। जिस कारण 24 गाँवों को टँकर से जल पहुँचाया जाता है।

**कूपनलिकाएँ :** उदगीर तालुका में कुल 253 कूपनलिकाएँ है। उसमें से उच्च क्षमतावाले 160 कूपनलिकाएँ है।

**हॅंडपंप :** उदगीर तालुका में हॅंडपंपों की संख्या 74 है उसमें से कार्यरत हॅंडपंपों की संख्या 469 है।

**बोअर :** उदगीर तालुका में विद्युत पंपों की संख्या (बोअर) 341 है।

**कुआँ :** उदगीर तालुका में 3437 कुएँ हैं। उसमें से अधिकतर कुए पर डिझेल पंप बिठाने जाने से 38 है और विद्युत पंप इस्तमाल करनेवाले कुओं की संख्या 552 है जो इस्तेमाल नहीं होते। उन कुए की संख्या 229 है।

**तालाब :** उदगीर तालुका में तालाबों की संख्या 46 है और बंधारों की संख्या 37 है।

**जलाशय :** उदगीर तालुके में 119 जलाशय है और उनका सिंचनक्षेत्र 1730 हेक्टर है।

**निष्कर्षः**

उदगीर तालुके में जल प्रबन्धन का कठोर पालन करें। जल बचाव की मोहिम निभाना, जनजागृति करना, जलसंवर्धन करके पेड-पौधों की संख्या में वृद्धि करना और जल बचाव मोहिम आदि बहुत जरुरी बन गया है।

**संदर्भ ग्रंथः**

१) कृषी भूगोल-विठ्ठल घारपुरे
२) जिल्हा सामाजिक व आर्थिक समालोचन, लातूर जिल्हा
३) ॲग्रोवन (मासिक)
4) www.agri.com
5) www.latur.nic.in

# मुखेड तालुक्यातील आरोग्य सुविधांचा भौगोलिक अभ्यास

**रॅपनवाड सुनिल रामराव**
संशोधक

**प्रा. डॉ. मानकरी एम. पी.**
विभाग प्रमुख / संशोधन मार्गदर्शक
भूगोल विभाग
महाराष्ट्र उदयगिरी महाविद्यालय उदगीर,
ता.उदगीर जि.लातूर

**प्रस्तावना :**

एखाद्या भौगोलिक प्रदेशातील आरोग्य सुविधांचा अभ्यास करीत असताना आरोग्यावर आणि आरोग्य सुविधांवर परिणाम करणाऱ्या घटकांचा अभ्यास करणे म्हत्वाचे ठरते. परिणाम करणाऱ्या घटकात प्रामुख्याने प्राकृतिक आणि अप्राकृतिक घटकांचा समावेश होतो आणि अप्राकृतिक घटकांमध्ये आर्थिक, सामाजिक, जलसिंचन, उद्योग, लोकसंख्या इ. घटकांचा समावेश होतो. या सर्व घटकांचा तालुक्यातील आरोग्य सुविधावर परिणाम झालेला दिसून येतो.

**अभ्यास क्षेत्र :**

मुखेड तालुक्याचे भौगोलिक स्थान उत्तर गोलार्धात १८° २८ मिनीटे उत्तर ते २८° ४७ मिनीटे उत्तर अक्षांशावर तर ७७° १० मिनीटे पूर्व ते ७७° ४५ मिनीटे पुर्व रेखावृत्तीय विस्तारादरम्यान आहे. मुखेड तालुक्याचे सापेक्ष स्थान पाहता नांदेड जिल्ह्याच्या दक्षिणेत वसले असून पूर्वेस बिलोली तालुका पश्चिमेस लातूर जिल्ह्याची सीमा, उत्तरेस कंधार तालुका, तर दक्षिणेस देगलूर तालुका पसरलेला आहे. मुखेड तालुक्यात लेंडी व मन्याड या दोन प्रमुख नदया वाहतात. तालुक्याचा अधिकांश भाग डोंगराळ असून तालुक्यात एकूण १५२ महसूली गावे आहेत. तालुक्याचे एकूण क्षेत्रफळ ९९२३८ एवढे आहे.

**उदिदष्टे :**

१) मुखेड तालुक्यातील आरोग्य सुविधा केंद्रातील बदलाचा अभ्यास करणे.
२) मुखेड तालुक्यातील १९९१-२०११ या वर्षातील एकूण लोकसंख्या वाढ व वाढत्या लोकसंख्येनुसार आरोग्य केंद्रात झालेला बदल अभ्यासणे.

**मुखेड तालुक्यातील आरोग्य सुविधा केंद्र व त्यात झालेली वाढ यांचे अभिक्षेत्रीय वितरण :**

अभ्यास क्षेत्रातील मुखेड हा तालुका नांदेड जिल्ह्यातील १६ तालुक्यापैकी १ तालुका आहे. क्षेत्रफळाच्या दृष्टिने मुखेड हा नांदेड जिल्ह्यातील तिसऱ्या क्रमांकाचा तालुका आहे. मुखेड तालुक्याचे क्षेत्रफळ ९९२३८ हेक्टर इतके आहे. २०११ च्या जनगणनेनुसार लोकसंख्या २९३८८५ एवढी आढळते.

<div align="center">तक्ता. ०१</div>

| तालुक्याचे नांव | एकूण क्षेत्रफळ | लोकसंख्या | एकूण आरोग्य सुविधा केंद्र |
|---|---|---|---|
| मुखेड | ९९२३८ हे. | २९३८८५ | ४३ |

वरील दिलेल्या तक्त्यावरून एकूण क्षेत्रफळ व एकूण लोकसंख्या व एकूण आरोग्य सुविधा केंद्र दर्शविले आहेत.

**मुखेड तालुक्यातील आरोग्य सुविधा केंद्राचे पदानुक्रमे वितरण इ.स. १९९१-२०११**

तालुक्यातील आरोग्य सुविधा केंद्राचा २० वर्षाच्या अभ्यासातून आरोग्य सुविधा केंद्राची माहिती त्याचे वितरण आणि त्यात झालेला बदल याचा अभ्यास करण्यासाठी १९९१-२०११ हा कालावधी महत्वपूर्ण ठरतो. मुखेड तालुक्यातील आरोग्य सुविधा केंद्रात वाढ झालेली दिसून येते. २०११ या वर्षात एकूण ४३ आरोग्य सुविधा केंद्र आहेत. या आरोग्य सुविधा केंद्राचे स्थान हे प्रामुख्याने लोकसंख्या, बाजारपेठ, वाहतूक, कृषी, सार्वजनिक सुविधा या घटकावर आधारित आहे.

इ.स. १९८५ ला मुखेड या ठिकाणी प्राथमिक आरोग्य सुविधा केंद्राची स्थपना झाली. इ.स. १९९१ नुसार तालुक्यात ५ प्राथमिक आरोग्य केंद्र स्थापन झाली व २०११ मध्ये यांची संख्या ६ झाली.

<div align="center">तक्ता . ०२: मुखेड तालुक्यातील आरोग्य सुविधा केंद्राचे पदानुक्रमे वितरण ( १९९१ - २००१ )</div>

| पदानुक्रम तालुका | प्राथमिक आरोग्य उपकेंद्र (PHSC ) | | प्राथमिक आरोग्य केंद्र उपजिल्हा (PHC) | | ग्रामीण रूग्णालय / रूग्णालय | | आयुर्वेदिक युनानी केंद्र | | एकूण आरोग्य | |
|---|---|---|---|---|---|---|---|---|---|---|
| मुखेड | १९९१ | २०११ | १९९१ | २०११ | १९९१ | २०११ | १९९१ | २०११ | १९९१ | २०११ |
| | २७ | ३४ | ०५ | ०६ | ०१ | ०१ | ०२ | ०२ | ३५ | ४३ |

<div align="right">*स्त्रोत : तालुका आरोग्य कार्यालय मुखेड.*</div>

वरील तक्त्यावरून लक्षात येते की, १९९१ आणि २०११ या वीस वर्षाच्या कालावधीमध्ये आरोग्य सुविधा केंद्राच्या संख्येत तफावत आढळते. १९९१ मध्ये प्राथमिक आरोग्य केंद्र, उपकेंद्र, आयुर्वेदिक व ग्रामीण रूग्णालय या सर्वांची एकूण संख्या ३५ एवढी होती. तीच २०११ मध्ये ४३ अशी झाली. २० वर्षाच्या कालावधीत ८ आरोग्य केंद्राची वाढ झालेली आहे. मुखेड येथील ग्रामीण रूग्णालयाचे रूपांतर उपजिल्हा रूग्णालयात झाले आहे. त्याचे मुख्य कारण लोकसंख्येत मोठया प्रमाणात झालेली वाढ होत. वाढलेल्या लोकसंख्येत आरोग्याच्या दृष्टीने

आरोग्य सुविधा केंद्राची कमतरता भासू लागल्यामुळे आरोग्य सुविधा केंद्राची वाढ आणि ग्रामीण रूग्णालयाच्या ठिकाणी उपजिल्हा रूग्णालयाची स्थापना करण्यात आली.

## मुखेड तालुक्यातील आरोग्य सुविधा केंद्राचे प्राथमिक आरोग्य केंद्रनिहाय वितरण (१९९१ - २०११ )

मुखेड तालुक्यात १९९१ च्या आकडेवारीनुसार ०५ प्राथमिक आरोग्य केंद्र उपलब्ध होते. ज्यात सावरमाळ, राजूरा, बा-हाळी, चांडोळा, सावरगाव, या प्राथमिक आरोग्य केंद्राचा समावेश होतो व उपकेंद्राची संख्या २७ एवढी होती. त्यामध्ये सावरगाव प्रा. आ. केंद्रात ०५, सावरमाळ ०४, राजुरा ६, बा-हाळी ०६, चांडोळा ०६, इ. उपकेंद्राचा समावेश होतो.

इ.स. २०११ मध्ये बदल झालेला दिसून येतो, कारण वाढती लोकसंख्या आणि त्या लोकांना होणाऱ्या अपुऱ्या आरोग्य सुविधांची समस्या लक्षात घेऊन प्राथमिक आरोग्य केंद्र व उपकेंद्र यात वाढ करण्यात आलेली दिसून येते. ती पुढीलप्रमाणे सावरगाव प्रा. आ. के. ०५, सावरमाळ ०५, राजूरा ०८, जांब ०२, चांडोळा ०६ उपकेंद्राचा समावेश होतो.

## मुखेड तालुक्यातील आरोग्य सुविधा केंद्राचे बदलते प्रारूपाचे वितरण ( १९९१-२०११ )

एखाद्या भौगोलिक परिस्थितीचा विकास हा त्या प्रदेशाला लाभलेल्या विविध घटकामुळे होत असतो. एखाद्या प्रदेशाचा विकास होण्यासाठी सार्वजनिक सुविधा महत्वाची भूमिका बजावत असते. त्यात वाहतूक सुविधा, आर्थिक, कृषिविषयक, आरोग्यसुविधा म्हत्वाची ठरते, परंतू या सर्व सुविधावर भौगोलिक स्थान व लोकसंख्या या घटकांचा परिणाम आढळतो. या शोध निबंधामध्ये मुखेड तालुक्यातील आरोग्य सुविधा केंद्राचे प्रारूप कसे आहे हे पाहण्याचा प्रयत्न केला आहे. उदा : केंद्रीत, खंडित, वितरित, खंडित या प्रमाणे आरोग्य सुविधा केंद्राचे प्रारूप आढळते.

**तक्ता . ०३: मुखेड तालुक्यातील प्राथमिक आरोग्य सुविधा केंद्राचे आर. एन. मूल्य**

| इ.स. | क्षेत्रफळ हेक्टर | प्रा. आरोग्य केंद्र | OD | ED | Rn | Pattern |
|------|------|------|------|------|------|------|
| १९९१ | ९९२३८ | ०५ | १.४६ | ४.०० | ०.०३ | Approaching to clustered |
| २०११ | ९९२३८ | ०६ | १.०६ | ५.०० | ०.०३ | |

स्रोत : नियरेस्ट नेबर पध्दत.

नोट - 1) O. D. ( निरीक्षणात्मक अंतर)    २) E. D. (अपेक्षीत अंतर) ३) ( R.N. Randomties)

मुखेड तालुक्यात आरोग्य सुविधा केंद्राचे इ. स. १९९१ व इ.स. २०११ मधील आर.एन. मूल्य दर्शविले आहे. वरील तक्त्यावरून इ.स. १९९१ मधील ५ प्राथमिक आरोग्य सुविधा केंद्राचे मूल्य ०.०३ आहे. व २०११ मधील ६ प्राथमिक आरोग्य सुविधा केंद्राचे मूल्य ०.०३ एवढे आहे. यावरून असे लक्षात येते की, ते केंद्रीत स्वरूपाकडे झुकलेले आहे.

**तक्ता . ०४: मुखेड तालुक्यातील १९९१-२०११ या वर्षातील एकूण लोकसंख्या वाढ व या वाढत्या लोकसंख्येनुसार आरोग्य केंद्रात झालेला बदल**

| तालुक्याचे नाव | १९९१ | | २०११ | | एकुण बदल १९९१ - २०११ | |
|------|------|------|------|------|------|------|
| | आरोग्य केंद्र | लोकसंख्या | आरोग्य केंद्र | लोकसंख्या | आरोग्य केंद्र | लोकसंख्या |
| मुखेड | ३५ | २०४६०७ | ४३ | २९३८८५ | ८.१३% | ६.९६% |

स्रोत : तालुका आरोग्य कार्यालय मुखेड. जि. नांदेड.

वरील तक्त्यावरून असे लक्षात येते की, १९९१ या वर्षी ३५ आरोग्य सुविधा केंद्र होते. यात प्रा. आ. केंद्र व ग्रामीण रूग्णालय यांचा समावेश होतो. त्या वर्षी २,०४,६०७ एवढी लोकसंख्या होती. इ.स. २०११ मध्ये आरोग्य सुविधा केंद्राची संख्या ४३ एवढी झाली व लोकसंख्या २,९३,८८५ एवढयावर पोहचली. १९९१ च्या तुलनेत २०११ ला आ. सु. केंद्र आणि लोकसंख्येत प्रामुख्याने ८.१३ टक्के व ६.९६ टक्के एवढी वाढ झाली आहे. मुखेडच्या प्रा. आ. केंद्राचे उपजिल्हा रूग्णालयात रूपांतर झाले व या ठिकाणी १०० खाटांची व्यवस्था करण्यात आली आहे.

## निष्कर्ष :

वरील शोधनिबंधावरून असे दिसून येते की, मुखेड तालूका हा डोंगराळ प्रदेशातील एक तालूका असून या तालूक्यात लोकसंख्येच्या मानाने आरोग्य सुविधांचा विकास कमी स्वरूपात झालेला आहे. तालूक्यात प्राथमिक आरोग्य केंद्र आणि प्राथमिक आरोग्य उपकेंद्राची वाढ कमी स्वरूपात झाली आहे त्यात वाढ करायला पाहिजे कारण लोकसंख्या वाढीनुसार आरोग्य सुविधांमध्ये वाढ झाली पाहिजे ते दिसून येत नाही.

## संदर्भसूची :

१. जिल्हा आर्थिक सामाजिक समालोचन, नांदेड ( इ. स. १९९१, २००१ )

२. नांदेड जिल्हा गॅझेटीयर

३. जी.जी.सी. संघई, आरोग्य भूगोल, वसुंधरा प्रकाशन, गोरखपुर

४. मिश्रा आर. पी. (इ.स. १९७१ ) वैद्यकीय भूगोल व नॅशनल बुक, नई दिल्ली.

५. तालुका आरोग्य केंद्र, मुखेड, जि. नांदेड.

# लातूर शहरातील घनकचरा व्यवस्थापन : एक भौगोलिक अभ्यास

**बोराडे बळीराम राजाभाऊ**

पदवीव्युत्तर विद्यार्थी

राजर्षी शाहू महाविद्यालय (स्वायत्त), लातूर

**पाटील अभिजित आत्माराम**

पदवीव्युत्तर विद्यार्थी

राजर्षी शाहू महाविद्यालय (स्वायत्त), लातूर

**सारांश :**

आज पृथ्वी आजारी पडत आहे. कारण आहे. प्रदुषण पर्यावरणातील सर्वात मोठी समस्या आज पहायला मिळत आहे. जगातील अनेक विकसित व अविकसित देशांनी औद्योगिकरण सुरू केले आहे. परंतु यामधून जो कचरा निर्माण होतो. त्यावर उपाय त्यांनी काढलेला दिसून येत नाही. म्हणून जसा माणसांना रोग लागतो तसाच रोग या पृथ्वीला प्रदुषणच्या माध्यमातून जडला आहे हे नाकरता येणार नाही. म्हणून योग्य वेळी उपाययोजना करून प्रदुषणाला सोडवणे गरजेचे आहे. सदर संशोधन लेखात सर्वच प्रदुषकांचा अभ्यास करणे अवघड आहे. म्हणून मी यापैकी घनकचरा ही समस्या घेतली आहे. या माध्यमातून लातूर शहरातील घनकचरा व्यवस्थापन करण्यास मदत होईल.

**बीज शब्द :** घनकचरा व्यवस्थापन

**प्रस्तावना :**

भारत हा कृषी प्रधान देश असून सध्या उद्योगशिल अर्थव्यवस्था बनत आहे. स्वातंत्र्यानंतर साधारणतः 19 व्या शतकामध्ये जगभरातच औद्योगिकरणाला सुरूवात झाली. या औद्योगिक प्रगतीमध्ये भारताचा सक्रीय सहभाग दिसून येतो. म्हणून आज कृषी प्रधान अर्थव्यवस्था सोडून उद्योगशिल अर्थव्यवस्था बनत आहे. भारतामध्ये आज 36 औद्योगिक प्रदेश पहायला मिळतात. स्वातंत्र्याच्या आगोदर देशांमध्ये फक्त 5 उद्योग होते. ते आज सुमारे 1500 च्या पुढे गेले आहेत. म्हणून 1990 पासून वेग-वेगळे उद्योग प्रामुख्याने भांडवली उद्योगांची उभारणी मोठ्या प्रमाणात करण्यात आली आहे.

विकास प्रक्रियेमध्ये आर्थिक घटकांना चालना देण्यासाठी अनेक उद्योग समुह निर्माण झाले. परंतु या उद्योगाच्या उभारणीचा बोजा निसर्गावरती पडत आहे. एकीकडे प्रचंड लोकसंख्या वाढ त्यामधून निर्माण झालेल्या समस्या, अन्नधान्यांचा तुटवडा त्यामुळे बदलेली पिकपध्दती शिवाय नागरी सेवा सुविधावर प्रचंड ताण निर्माण झाला आहे. या औद्योगिक प्रगतीमधून शहरीकरणाची प्रक्रिया वाढत चालली आहे. या दोन्हीही प्रक्रियामधून प्रदुषणांची समस्या उग्र रूप धारण करत आहे. विज्ञान आणि तंत्राज्ञानाच्या विकासाबरोबर अवजड उद्योगधंदे, प्रक्रिया उद्योग, महानगरे वाहतुक व संदेशवहन यावरती ताण पडत आहे.

भारतामध्ये लोकसंख्या वाढ अतिशय झपाट्याने होत आहे. आज भारताची लोकसंख्या सुमारे 125 कोटीच्या पुढे गेली आहे. लोकसंख्या वाढीमुळे आर्थिक, सामाजिक अशा सेवावरती ताण वाढत चालला आहे. मोठ-मोठे उद्योग क्षेत्रांमधून बाहेर पडणारा कचरा त्याही पेक्षा जास्त लोकसंख्या वाढीमुळे व त्यातुन निर्माण झालेल्या विभक्त कुंटूंब पध्दतीमुळे घरांची संख्या वाढत आहे. शिवाय मानवाच्या हव्याशी वृत्तीमुळे आधुनिक साधनाचा वापर नविन-नविन वस्तु वापर आणि अधिक आरामदायी जीवन जगण्याच्या पध्दतीमुळे टाकावू पदार्थांचे प्रमाण वाढले आहे. यामुळेच घरातील कचऱ्याचे नियोजन होणे आवश्यक आहे. हा दृष्टीकोन समोर ठेवूनच प्रधानमंत्री नरेंद्र मोदी यांनी 2 ऑक्टोबर 2014 पासून स्वच्छ भारत अभियान ही योजना सुरू केली आहे. या स्वच्छ भारत अभियानाअंतर्गत देशातील 434 शहरांची निवड झालेली आहे. यापैकी लातूर शहराचा 318 क्रमांक असून स्वच्छ भारत अभियाना अंतर्गत स्वच्छतेसाठी कचरा गोळा करणे व याची योग्य विल्हेवाट लावणे किंबा त्याचे व्यवस्थापन होणे आवश्यक आहे.

**अभ्यास क्षेत्र :**

चालुक्य काळापासून ते आतापर्यंत लातूर शहर वेग-वेगळ्या प्रशासकीय कार्यालयाचे ठिकाण राहिले आहे. सध्या लातूर शहर हे जिल्ह्याचे मुख्यालय असून महाराष्ट्र राज्यातील 16 व्या क्रमांकाचे राज्य आहे. याचा अक्षवृत्तीय विस्तार $18^0 22'$ उत्तर ते $18^0 25'$ उत्तर तर रेखावृत्तीय विस्तार $76^0 32'$ पुर्व ते $76^0 36'$ पुर्व रेखावृत्ता दरम्यान स्थित आहे. याचे एकूण भौगोलिक क्षेत्रफळ 32.55 चौकिमी, याची समुद्रसपाटीपासूनची उंची 615 मीटर आहे. 2011 नुसार शहराची एकूण लोकसंख्या 382940 असून 197737 पुरूष लोकसंख्या आहे. व 185203 स्त्रि लोकसंख्या आहे. शहरातील साक्षरतेचे प्रमाण 84.22% तर लिंग गुणोत्तर प्रमाण दर हजार पुरूषामागे 937 एवढे आहे.

**उद्देश :** शहरातील घनकचरा व्यवस्थापन करणे.

**माहिती स्त्रोत व अभ्यास पध्दती :**

सदरील संशोधन पत्रिकेमध्ये प्राथमिक व द्वितीय माहितीचा वापर करण्यात आला आहे. काही ठिकाणी प्रश्नावलीच्या माध्यमामध्ये माहिती प्राप्त करण्यात आलेली आहे. द्वितीय माहिती स्त्रोतामध्ये शहरातील स्वच्छता विभागामार्फत प्रकाशित करण्यात आलेले रिपोर्टस व जिल्हा नियोजन कार्यालयामार्फत मिळालेल्या माहितीचा वापर करण्यात आला आहे.

वरील माहिती गोळा करून रॅन्डम सॅम्पलिंग पध्दतीचा वापर करून विश्लेषण करण्यात आले आहे.

**कचरा व्यवस्थापन :**

कचरा म्हणजे टाकाऊ पदार्थ घरे, कारखाना, वस्त्या, कार्यालये, उद्योगधंदे, सार्वजनिक कार्यालय अशा ठिकाणी कागद, पालेभाज्या, वाया गेलेले पदार्थ, प्लास्टीक कचरा, घाण पदार्थ, केर, टाकाऊ अन्न पदार्थ, कारखाने उद्योगातील ताज्य वस्तु त्यांचे ढिग सर्वत्र आढळतात. वाढत्या वस्त्या, वाढती शहरी, वाढती औद्योगिकरण, वाढती लोकसंख्या यांच्यामुळे कचऱ्याचे प्रमाण सतत वाढत

असते. अनेक ठिकाणी कुजलेल्या, नासलेल्या पदार्थाच्या कचऱ्याच्या ढिगामुळे परिसरात घाण वास पसरतो. या कचऱ्याच्या ढिगामध्ये अनेक ठिकाणी धातूची भांडी, वाहनांचे टाकून दिलेले भाग, प्लास्टिकच्या टाकाऊ वस्तू, काचेच्या वस्तू, कागद व इलेक्ट्रॉनिक कचरा इ. चे प्रमाण जास्त असते.

**कचऱ्याचे प्रकार :**

प्रामुख्याने कचऱ्याचे दोन प्रकारात वर्गीकरण करण्यात येते.

**1. ओला कचरा :**

यात टाकाऊ पदार्थात सुकलेला पाला, पाचोळा, पालेभाज्या, अन्न पदार्थ, मांस, वाया गेलेले अन्न, मलमुत्र यांचा समावेश होतो.

**2. सुका कचरा :**

यात प्लास्टिकच्या पिशव्या, प्लास्टिकच्या विविध वस्तू, वृत्तमान पत्र, कागद, काचेच्या वस्तू, बाटल्या, पुट्टे, लाकडी वस्तू, धातू, ॲल्युमिनिअमच्या फाईल्स यांचा समावेश होतो.

वरील सर्व घटकांचा मृदेच्या सुपिकतेवर विपरित परिणाम होतो.

**लातूर शहरातील कचरा व्यवस्थापन :**

लातूर शहर एकूण 32.55 चौकिमी क्षेत्रफळात आढळून येते. प्रशासकीयदृष्ट्या सुलभता यावी यामुळे शहराचे 18 प्रभागात विभागणी करण्यात आलेली आहे. या 18 प्रभागामधून प्रत्येकी 1 स्वच्छता निरीक्षक निवडण्यात आला आहे. लातूर शहरातील कचरा गोळा करण्यासाठी लातूर महानगरपालीकेतर्फे प्रत्येक वार्डात जावून जनजागृती मोहिम राबवितात. याशिवाय मुख्य ठिकाणी ओला कचरा टाकण्यासाठी हिरवी कचरा कुंडी तर सुका कचरा टाकण्यासाठी निळी कचरा कुंडी बसविण्यात आली आहे. याशिवाय प्रत्येकाच्या घरातील कचरा गोळा करण्यासाठी महानगरपालिकेने 17 ऑक्टोबर 2018 रोजी जन आधार सेवाभावी संस्था, लातूर यांनी कचरा गोळा करण्याचे कॉन्ट्रॅक्ट देण्यात आले आहे. कचरा गोळा करण्यासाठी शहरामध्ये 90 अप्पे, व 15 ट्रॅक्टर गल्लो-गल्ली व घरो-घरी जावून सुका व ओला कचरा गोळा करत आहे. हा सर्व गोळा केलेला कचरा वरवंटी या गावाजवळ टाकण्यात येत आहे.

**सारणी क्र. 1 : 2018 नुसार कचरा मेट्रीक टनामध्ये**

| महिना | ओला कचरा | सुका कचरा |
|---|---|---|
| जानेवारी | 3020.160 | 340.450 |
| फेब्रुवारी | 3140.314 | 338.790 |
| मार्च | 2986.216 | 302.860 |
| एप्रिल | 3120.116 | 296.420 |
| मे | 3140.240 | 250.480 |
| जून | 4298.420 | 255.220 |
| जुले | 4560.216 | 236.250 |
| ऑगस्ट | 4640.240 | 225.202 |
| सप्टेंबर | 3115.226 | 396.540 |
| ऑक्टोबर | 3104.426 | 338.420 |
| नोव्हेंबर | 3276.116 | 354.240 |
| डिसेंबर | 3156.420 | 386.460 |

*Source: Field Survey by Corporation.*

**आलेख क्र. 1 : 2018 नुसार कचरा मेट्रीक टनामध्ये**
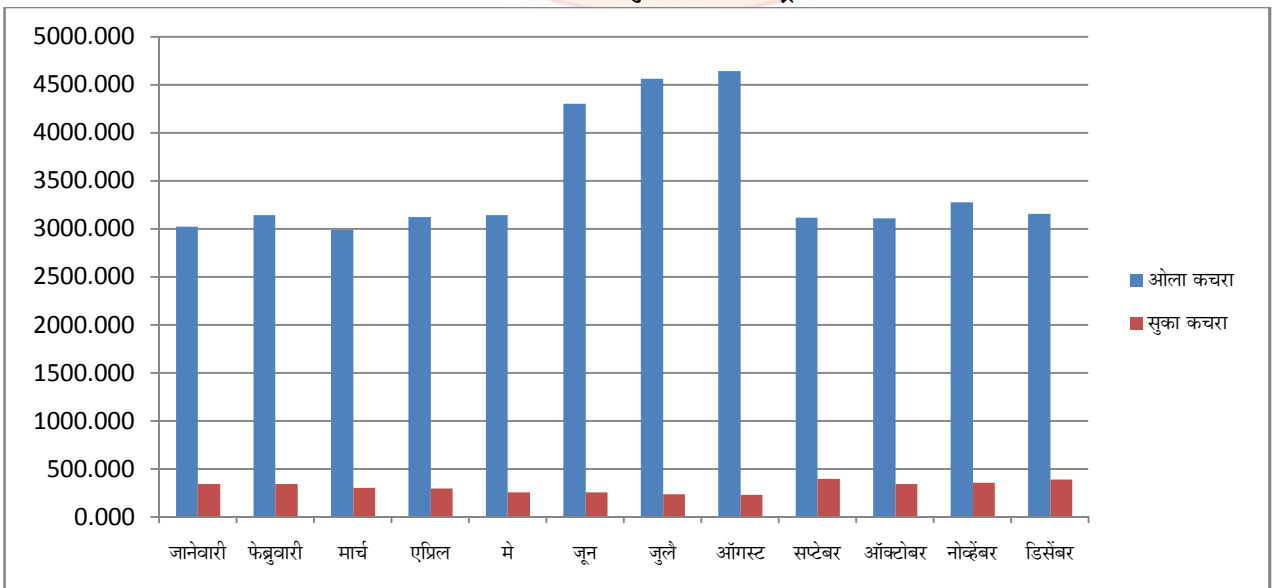
वरील आलेखावरून आपणास असे दिसून येते की, फेब्रुवारी ते मे महिन्यापर्यंत उन्हाळा ऋतू असल्यामुळे त्या काळामध्ये ओला कचरा कमी प्रमाणात आहे. तर सुका कचरा अधिक प्रमाणात वाढ झालेली दिसून येते. जुन ते डिसेंबर महिन्यात पाऊस असल्यामुळे त्याकाळात ओला कचरा अधिक तर सुका कचरा कमी आलेला दिसून येतो.

**खत निर्मिती प्रक्रिया उद्योग :**

ओला कचरा 45 दिवस एकाच ठिकाणी ठेवून त्यावर प्रक्रिया करून त्यावर बायोक्लेचर, ओढा, फ्रेश अशा प्रकारच्या काही फवारण्या करण्यात येतात. आणि त्याचे 45 दिवसानंतर कारखान्यात घेवून त्यापासून खत निर्मिती करण्यात येतो. तसेच खत निर्मिती करताना त्या कचऱ्यापासून खत वेगळा पाडला जातो. आणि प्लास्टीक वेगळा काढला जातो. त्या खताला महाराष्ट्र शासनाने हरित ब्रान्ड हे नाव दिले आले.

ह्या खताची विक्री वरवंटी कारखाण्यात केली जाते तो काही प्रमाणात पैसे घेवून व काही प्रमाणात गरजुंना निशुल्क प्रमाणात दिला जातो.

**निष्कर्ष :**

आपणास वरील माहितीच्या आधारे असे दिसून येते की, लातूर शहर महानगरपालीका अंतर्गत अतिशय काटेकोरपणे कार्य करत असलेली जन आधार सेवाभावी संस्था दिसून येते. त्यांनी जन जागृतीच्या माध्यमातून नागरिकांना कचरा एकत्र गोळा वेगवेगळ्या प्रकारे करण्यास सांगितले. त्यामुळे त्या कचऱ्यांचा खत होण्यास अतिशय कमी वेळ लागत आहे. व त्या खताचा वापर शेतीसाठी अत्यंत उपयुक्त असलेला दिसून येतो.

पंतप्रधान नरेंद्र मोदी यांनी 2 ऑक्टोबर 2014 रोजी सुरू केलेले स्वच्छ भारत अभियान मोठ्या प्रमाणात लातूर शहरात त्याचा विस्तार झालेला दिसून येत आहे.

**संदर्भ यादी :**

1. *पर्यावरण शास्त्र, डॉ. सुरेश फुले*
2. *लातूर महानगरपालिका स्वच्छता विभाग 2018 वार्षिक अहवाल*
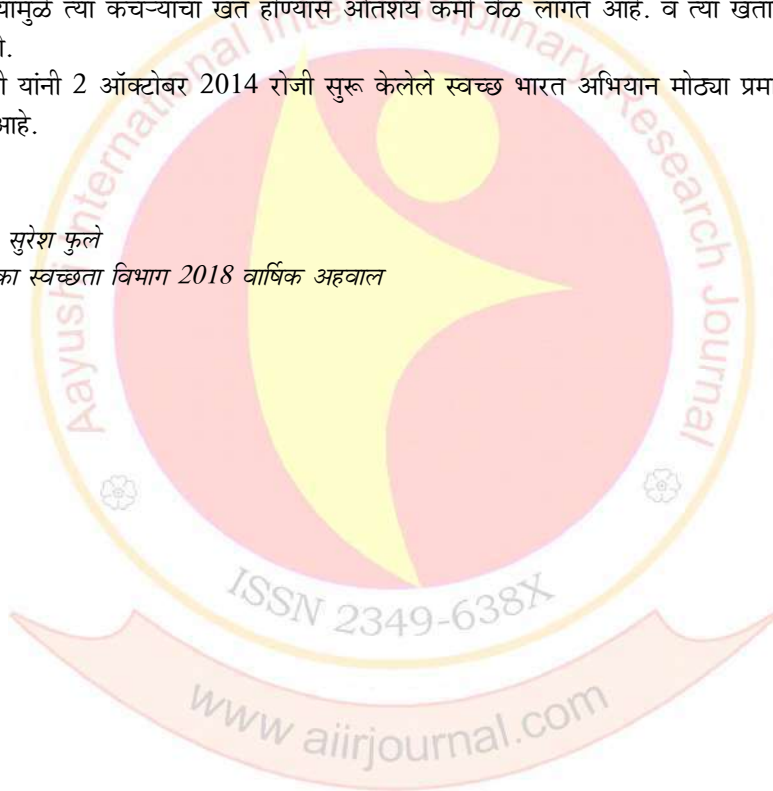
# पर्यावरणीय समस्या आणि व्यवस्थापन

**रोहिणी प्रकाश सांळुके**

एम.ए. (भूगोल) लातूर

**प्रस्तावना :**

"माणूस निसर्गाचा एक घटक असून सुद्धा आज तो स्वतःला निसर्गाचा राजा समजायला लागलाय."

आज जगात सर्वासमोर एक समान समस्या असेल तर ती पर्यावरणीय समस्या आहेत. जगात १८ व्या शतकापासून औद्योगिक प्रगतीला सुरुवात झाली. तेंव्हापासून घरगुती वस्तुंचे उत्पादन मोठ्या कारखान्यात होऊ लागले. त्यामुळे जे उत्पादन होण्यासाठी पुर्वी काही दिवस लागायचे ते आता काही तासात होऊ लागले. जसजशी औद्योगिक प्रगती व औद्योगिक विस्तार होऊ लागला. त्यामुळे नवीन औद्योगिक वसाहतीसाठी मोठ्या प्रमाणात जंगलतोड झाली. त्याचा परिणाम असा झाला की, एकतर एकीकडे वातावरणातील ऑक्सीजनचे प्रमाण कमी झाले आणि दुसरे म्हणजे जमिनीची मोठ्या प्रमाणात धूप होत आहे. जागतिक तापमान वाढत आहे. त्यामुळे हिमालयातील बर्फ मोठ्या प्रमाणात वितळत असल्याने समुद्राची पातळी वाढत आहे.

अमेरिकेत १९६२ मध्ये रेचल कार्सोन हिने साईलेंट स्प्रिंग हे पुस्तक लिहिले यात पर्यावरण समस्या मांडल्या पण तब्बल ३० वर्षांनी १९९३ मध्ये रिओमध्ये वसुंधरा परिषद घेण्यात आली. जागतिक सर्वेनुसार १९९० ते २०१५ या काळात १२९०००० चौ.कि मी जंगलतोड झाली आहे. याची तुलना भारताच्या क्षेत्रफळाशी केले तर १/३ इक्या भागात जंगलतोड झाली आहे. यावरुन समस्या किती गंभीर आहे हे लक्षात येते.

आपल्या देशातील दुर्मिळ वनस्पती आहेत पण जंगलतोड मोठ्या प्रमाणावर झाल्यामुळे त्या नष्ट झाल्या आहेत. तसेच जंगली प्राण्याचे अस्तित्व धोक्यात आले आहे. (उदा. हरिण कोल्हा) आता सर्व मानवजातीने याविषयी सावध झाले पाहिजे. नाहीतर याचे परिणाम खुप भयंकर होऊ शकतात. जर असे झाले तर आपण पुन्हा १३००० वर्ष मागे म्हण ४२००० पिढ्या मागे जाऊ. परत अशी परिस्थिती निर्माण होऊ नये म्हणून पर्यावरणाचे व्यवस्थापन करणे गरजेचे आहे.

१) मानवी व कृतीमुळे पर्यावरणाची घटलेली गुणवत्ता वाढविणे व पर्यावरणाची स्थिती सुधारणे या ध्येयासाठी जाणीवपुर्वक केलेले कृती पर्यावरणाच्या अवनतीमुळे सर्व सजीवांच्या अस्तित्वाला धोका निर्माण झाला आहे. त्यामुळे पर्यावरण, तज्ञ, शासक, अभ्यासक सामाजिक तसेच राजकीय कार्यकर्ते या समस्यावर विचारमंथन करित आहेत. त्यातूनच पर्यावरण व्यवस्थापन ही संकल्पना पुढे आली आहे.

पर्यावरण व्यवस्थापन ही विकास व नियोजनाच्या संदर्भातील संकल्पना आहे.यात समाजाचा सर्वांगीण विकास करणे तसेच नैसर्गिक संसाधनांचा समतोल वापर करुन सामाजिक व आर्थिक विषमता दूर करणे ही उद्दिष्ट्ये अभिप्रेत आहेत. त्याचबरोबर मानवाच्या अविचारी कृतीवर नियंत्रण तसेच नैसर्गिक संसाधनांचे संरक्षण व पर्यावरणीय समस्याच्या निवारणासाठी निर्धारित केलेली तत्त्वे यांचा पर्यावरण व्यवस्थापनात समावेश होतो. मानवाच्या सामाजिक व आर्थिक विकासाबरोबर पर्यावरणाची गुणवत्ता राखण्याचा यातून प्रयत्न केला जातो.

पर्यावरण व्यवस्थापन ही मानव आणि निसर्ग यांच्यात समन्वय साधणारी प्रक्रिया आहे. त्याद्वारे पर्यावरणाचे संतुलन बिघडू न देता व प्रदूषणविरहित पर्यावरण राखून मानवाचेहित साधण्याचा प्रयत्न केला जातो. पर्यावरणाच्या आपत्तीवर नियंत्रण ठेवण्याची प्रक्रिया ही पर्यावरण व्यवस्थापनाचे एक अंग असून यात नियोजन विश्लेषण व मुल्यांकन यांच्या आधारे संसाधनांचा विचारपुर्वक उपयोग करण्याचे तंत्र वापरले जाते.

पर्यावरणाचे व्यवस्थापन विशिष्ट प्रदेश किंवा राष्ट्र यांच्याशी मर्यादित नसून ती संपूर्ण जगाची गरज आहे. भविष्यात मानवी समाजाच्या समन्यायक्षम उपयोगासाठी परिसंस्थेचे रक्षण करणे व परिसंस्थेतील अखंडत्व राखणे हे पर्यावरण व्यवस्थापनाचे ध्येय आहे.

२) **पर्यावरण व्यवस्थापनाची उद्दिष्ट्चेः**

१) पर्यावरणातील निरनिराळ्या घटकांचे संशोधन करणे

२) पर्यावरणाच्या नियोजनाची रुपरेषा तयार करणे.

३) पर्यावरणाच्या विविध घटकांना प्रदूषणमुक्त ठेवणे.

४) मानवाला पर्यावरणाच्या प्रदूषणाच्या परिणामांपासून वाचवणे.

५) अवक्षय होत असलेल्या सजीवांना संरक्षण देणे.

६) पर्यावरणाचा दर्जा राखला जावा म्हणून विशिष्ट नियमावली व तत्व ठरविणे पर्यावरण नियंत्रणाद्वारे पर्यावरणाच्या गुणवत्तेचे रक्षण करणे.

७) व्यवस्थापनासाठी उपायांचे समीक्षण करणे व त्यात सुधारण करणे.

८) व्यवस्थापनासाठी नियोजित केलेल्या उपायांच्या परिणामाची तपासणी करणे.

९) पर्यावरण व्यवस्थापनासाठी साहित्य संग्रह करणे.

१०) पर्यावरण शिक्षण देण्याची व्यवस्था करणे आणि समाजात जाणीव जागृती निर्माण करणे.

११) संसाधनांचा बहुउद्देशिय वापर करुन परिस्थितीनुसार संतुलन राखवण्याचा प्रयत्न करणे.

१२) जैवविविधतेचे परिक्षण करणे.

१३) स्वच्छ तंत्रज्ञान उत्पादन संकल्पना स्विकारणे.

१४) पर्यावरण संधारणासाठी नियम व कायदे करुन त्यांची अंमलबजावणी करणे.

**३)** **पर्यावरण व्यवस्थापणाचे धोरण :**

पर्यावरण व्यवस्थापणाचे धोरण ठरविताना खालील घटकांवर लक्ष केंद्रित करणे आवश्यक आहे.

१) पर्यावरणीय अवनती टाळण्यासाठी हवाप्रदुषण, जलप्रदुषण व भुमिप्रदुषण यावर प्रभावीपणे नियंत्रण आणणे व कार्यक्षम उपाय योजने.

२) ऊर्जासंसाधनांसह इतर सर्व संसाधनांचा अतिवापर टाळणे व टाकाऊ पदार्थांची कमीत कमी निर्मिती व्हावी यासाठी कमी खर्चिक परंतु कार्यक्षम तंत्रज्ञानाचा स्वीकार करणे.

३) शाश्वत विकासासाठी पर्यावरण प्रभाव मूल्यांकन तपासणी पर्यावरण व्यवस्थापन पद्धती, पर्यावरण जोखीम मुल्यमापन इत्यादी साधनांचा स्वीकार करणे.

४) शाश्वत विकासासाठी उत्पादन निर्मिती करिता स्वच्छ तंत्रज्ञानाचा वापर करणे.

५) व्यापक स्तरावर पर्यावरणीय जनजागृती व्हावी यासाठी प्रोत्साहन देणे आणि शिक्षणाच्या माध्यमातून पर्यावरण समस्यांची समाजात जागृती व्हावी म्हणून विविध कार्यक्रमाचे आयोजन करणे.

६) शैक्षणिक स्तरावर पर्यावरण शिक्षण व प्रशिक्षण देण्याची व्यवस्था करणे.

७) लोकसंख्या वाढीस प्रतिबंध व्हावा यासाठी योजना आखणे.

८) सामाजिक समन्याय प्रस्थापित होण्यासाठी प्रयत्न करणे.

**पर्यावरण प्रमुख घटकांचे व्यवस्थापन :**

पर्यावरण हे जैविक तसेच अजैविक घटकांपासून बनलेले असते. असे व्यवस्थापन अत्यंत गरजेचे आहे. पर्यावरणातील काही प्रमुख घटक पुढीलप्रमाणे आहेत.

१) वनव्यवस्थापन

२) वन्यजीव व्यवस्थापन

३) मृदा व्यवस्थापन

४) जल संसाधन व्यवस्थापन

५) खनिज संसाधन व्यवस्थापन

६) ऊर्जा संसाधन व्यवस्थापन

याशिवाय पर्यावरण व्यवस्थापनात प्रदूषण नियंत्रित करण्याला अधिक प्राधान्य दिले जाते. यास प्रदुषण नियंत्रित व्यवस्थापन असेही म्हणतात यात.

अ) वायुप्रदुषण नियंत्रण उपाय

आ) मृदाप्रदूषण नियंत्रण उपाय

इ) जलप्रदूषण नियंत्रण उपाय

ई) अपशिष्ट पदार्थांचे व्यवस्थापन यांचा समावेश होतो.

**संदर्भग्रंथ :**

*१) स्पर्धा परीक्षा :- डॉ. आनंद पाटील*

*२) महाराष्ट्राचे आर्थिक सर्वेक्षण २००६-०७*

*३) मगर पी.पी. आणि नगराळे व्ही. आर. (२००६)*

*४) भुजल सर्वेक्षण आणि विकास यंत्रणा, महाराष्ट्र शासन भुजल भवन शिवाजीनगर पुणे — ५*

*५) Pathak H.G. (1977) A Study in Methodology and Crop Association Regions and their Role in Agriculture Regionalization a Case Study in up Himalaya*

# कॅन्सरग्रस्त शिरोळ तालुका

पी.ए. हुलवान

**सारांश:**

शिरोळ तालुक्यामधील जमीन, पाणी, हवामान, पिके यांचा तपशीलवार अभ्यास केल्यास येथील औषध फवारणी किंवा रासायनिक खते वापरल्यामुळे कॅन्सर पेशंटच्या संख्येत वाढ होत आहे असा एक विचार प्रवाह प्रबळ बनलेला दिसतो. या विचार प्रवाहाची लोक येथील प्रदुषित पाणी, औषध फवारणीयुक्त फळे, भाजीपाला खाल्याने कॅन्सर होतो आणि त्यामुळेच कॅन्सर पेशंटची संख्या वाढत आहे असा निष्कर्ष मांडतात व तशा बातम्या पेपरमध्ये छापुन आलेल्या आहेत.

पण या निष्कर्षाची दुसरी बाजू जर लक्षात घेतली तर काही कॅन्सरतज्ञ डॉक्टर, शेतीतज्ञ असे ठामपणे सांगतात की, आजपर्यंत जागतिक स्तरावर झालेल्या संशोधनामध्ये औषध फवारणी युक्त भाजीपाला खाल्यामुळे कॅन्सर होतो हे सिध्द झालेले नाही. परंतु दुषित पाण्यामुळे किंवा या विषारी रासायनिक घटक द्रव्ये मानवाच्या शरिरात गेल्यामुळे मानवाची रोगप्रतिकारक शक्ती कमी होवून अनेक घातक आजारांना निमंत्रण मिळते हे मात्र १०० टक्के खरे आहे.

दुषित पाणी किंवा औषध फवारणी युक्त फळे, भाजीपाला खाल्याने कॅन्सर होत नसता तरी शिरोळ तालुक्यामधीलच नव्हे तर संपूर्ण भारतवासीयांनी सुध्दा आपला ग्रामीण भाग सुजलाम, सुफलाम, निरोगी व शाश्वत बनवायचा असेल तर शेतकऱ्यांनी या रासायनिक खते, रासायनिक औषधे, किटकनाशके, तणनाशके यांच्यापासुन फारकत घेवुन त्यांचा वापर हळुहळू कमी कमी करत येवुन शाश्वत नैसर्गिक पध्दतीच्या शेतीकडे आल्यास एकुणच पर्यावरण व्यवस्थित राहुन मानवी जीवनाबरोबरच सजीव सृष्टीही निरोगी राहील.

शिरोळ तालुका कॅन्सर युक्त झाला आहे या अफवा पसरविण्यापेक्षा शिरोळ तालुक्यामधील भौगोलिक सत्य परिस्थिती जाणुन घेवुन येथील शेतकऱ्यांचे प्रबोधन, जनजागृती करून नियंत्रित पाण्याचा वापर, ठिबकसिंचन, सेंद्रीय खतांचा वापर या गोष्टींचा वापर केल्यास निश्चितच शिरोळ तालुकाच काय संपूर्ण कृषीप्रधान भारत देश सुजलाम सुफलाम होईल आणि पृथ्वीचे रक्षण केले जाईल.

**प्रस्तावना :**

मागील काही दिवसापासुन विविध वर्तमान पत्रामधुन शिरोळ तालुक्यामधील कॅन्सर पिडीत (पेशंट) रूग्णाची माहिती छापुन येत आहे. शिरोळ तालुक्यामध्ये १२ ते १५ हजार कॅन्सरचे पेशंट आहेत. शिरोळ तालुक्याला कॅन्सरचा विळखा पडत चाललेला आहे. तेथील शेतीमधील भाजीपाला, फळभाजी, ऊस ही पिके मोठया प्रमाणात घेतली जातात. परंतु कृष्णा, पंचगंगा या नदया मोठया प्रमाणात प्रदुषित झालेल्या आहेत. या नदयांच्या पाण्यामध्ये काही घातक रासायनिक घटक सापडलेले आहेत. येथील भाजीपाला व फळभाजीवर अतोनात किटक नाशके व इतर टॉनिक सदृश्य औषधांचा वापर केला जातो. शेतीमधील तनाचा नायनाट करण्यासाठी विविध घातक रसायनांचा वापर केला जात आहे. त्यामुळे शिरोळ तालुक्यामधील फळभाजी, पालेभाजी खाण्या योग्य राहिली नसुन कॅन्सर सदृश्य लक्षणे आढळुन येवून कॅन्सर ग्रस्त रूग्णांची संख्या झपाट्याने वाढत आहे. इत्यादि इत्यादि माहिती अलिकडील काळातच विविध वृत्तपत्रातुन छापून आली आहेत.

याच पाश्र्वभूमीवर शिरोळ तालुक्यामधील कॅन्सर रूग्णांची संख्या कितपत खरी आहे? खरच ही संख्या लाक्षणिक असेत तरत्या परिस्थितीसाठी शिरोळ तालुक्यामधील भौगोलिक स्थिती कशी आहे? वृत्तपत्रामध्ये म्हंटल्याप्रमाणे तेथील पाणी व जमीन किती मोठया प्रमाणात प्रदुषित झालेले आहे. तेथील शेतकरी रासायनिक खते आणि किटकनाशके, तणनाशके व टॉनिक सदृश्य औषधांचा किती वापर करतात? त्याचबरोबर किटकनाशके व तणनाशकांचा अति वापराने तयार झालेला भाजीपाला खाल्याने मानवाला कॅन्सर होतो का? आणि सर्वात महत्वाची बाब म्हणजे सधन शिरोळ तालुक्याला भाजीपाला विषयक बदनाम करून सेंद्रीय अन्नधान्य, भाजीपाला उत्पादक शेतकरी—व्यापारी आपला फायदा करण्यासाठी काही कुटिल डाव रचत आहेत का?

उपरोक्त प्रश्नाची उत्तरे भौगोलिक दृष्टाकोनातुन शोधण्याचा प्रयत्न प्रस्तुत शोधनिबंधामध्ये करण्यात आलेला आहे.

**शिरोळ तालुका भौगोलिक पाश्र्वभूमी :**

महाराष्ट्रमधील कोल्हापूर जिल्ह्यामधील सधन तालुका म्हणुन शिरोळ तालुक्याची ओळख आहे. या तालुक्याचे एकुण क्षेत्रफळ ५०७.०७ कि.मी. इतके आहे. येथील पावसाचे प्रमाण ही खुपच चांगले आहे.

१६०.३७” ते १६०.५२” उत्तर **अक्षवृत** आणि २४०.२७” ते ७४०.४२”पूर्व **रेख़ावृत** कोल्हापूर जिल्हयाच्या **एकूण** क्षेत्रफळाचा ६.१५ जमिनीचे क्षेत्रफळ शिरोळ तालुक्याचे आहे. लिंग—गुणोत्तर ९४१ असुन लोकसंख्येची घनता **७०७(२००१)** आहे. शिरोळ तालुक्यामध्ये एकुण ५४ गावे असुन दोन नगरपालिका आहेत. कृष्णा व पंचगंगा या दोन मुख्य नदया वाहन असुन कृष्णा नदीचा पूर्व किनारा ६५ कि.मी. असुन ४०% भौगोलिक क्षेत्र व्यापलेले आहे. या नदयाबरोबरच वारणा व दुधगंगा या दोन नदयाही शिरोळ तालुक्याला समृध करणयास कारणीभूत ठरलेल्या आहेत.

कोल्हापूर जिल्हयामधील शिरोळ तालुका हा सधन व समृध तालुका होय. कृष्णा, पंचगंगा, दुधगंगा व वारणा या बारामाही दुथडी भरून वाहणाऱ्या नदया या तालुक्याला लाभल्या आहेत. पावसाचे ही प्रमाण अतिशय चांगले आहे. राधानगरी व काळम्मावाडीच्या धरणामुळे इतर तालुक्याप्रमाणेच शिरोळ तालुका समृध झालेला आहे. शेती योग्य बागायती जमिनीचे प्रमाणही खुपच चांगले आहे. त्यामुळे या तालुक्यात ऊस या प्रमुख पिकाबरोबरच भाजीपाला, फळभाजी इ. नगदी पिकांचे ही उत्पादन येथे घेतले जाते आणि याच भाजीपाला, फळभाजीसाठी (उदा. कुरुंदवाडची वांगी) शिरोळ तालुका संपूर्ण महाराष्ट्र प्रसिध्द आहे. याच शिरोळ तालुक्यामधुन टोमॅटो, वांगी, कोबी, प्लॉवर, मिरची इ. फळभाजीची संपूर्ण गुजरात, मध्यप्रदेश, आंध्रप्रदेश, तामिळनाडू इ. राज्यामध्ये शेतकरी संघामार्फत निर्यात केली जाते.

कॅन्सर कशामुळे होतो या विषयी जगभरातील ९० शोध निबंधामध्ये स्पष्टता नाही किंवा ठोस पुरावा नाही. मात्र कोणत्याही गोष्टीचा अतिवापर हा मानवी शरिरासाठी घातक ठरू शकतो.

शिरोळ तालुक्यामध्ये खरोखर कॅन्सर पेशंटचे प्रमाण जास्त आहे आणि त्यासाठी किटक नाशके किंवा विविध रासायनिक औषधांचा अतिवापर कारणीभूत असल्यास शास्त्रीय पुरावा नाही. याबाबत केवळ अंदाज व्यक्त केले जात आहेत. परंतु ही निश्चित संख्या मिळण्यासाठी घरोघरी जावुन प्रामाणिकपणे सर्व्हे करणे गरजेचे आहे.

### डॉ. सुभाष आठले:

यांच्यामते कॅन्सर रोगाला कारणीभूत ठरणाऱ्या आंतरराष्ट्रीय पातळीवरील संशोधित संभाव्य यादीत किटकनाशाकांचा समावेश नाही. प्रमाणाबाहेर किटकनाशके पोटात गेली तर त्याचे अन्य दुष्परिणाम होतात. पण पिकावर किटकनाशने फवारल्यामुळे कॅन्सर होतो हे म्हणणे चुकीचे आहे.
३) उलट रासायनिक खते, औदयोगिकरण यांच्यामुळे भारतात हरीत क्रांती घडून आली. पण जेष्ठ शास्त्रज्ञ डॉ. मधुकर बाचुळकर यांनी म्हटल्याप्रमाणे रासायनिक खताचा व औषधांचा अतिवापर हा एकुणच पर्यावरणासाठी घातक ठरतो.

शिरोळ तालुक्यामधील कॅन्सरचा प्रचार—प्रसार जो मोठयाप्रमाणात केला जात आहे याविषयी सकाळ पेपरमध्ये पुढील माहिती देण्यात आली आहे.

शिरोळ तालुक्यामध्ये कॅन्सरचे फक्त २५० रूग्ण असुन शिरोळ तालुक्यामध्ये किटकनाशकांचा अतिवापर कॅन्सरचे प्रमाण वाढल्याची माहिती पूर्ण खोटी आहे. काही व्यावसायिक आपल्या स्वार्थापोटी अशा अफवा निर्माण करीत आहेत.

सर्वाधिक भाजीपाल्याचे उत्पादन घेण्याचे तालुक्यातील भाजीपाला उत्पादन बदनाम करण्याचा कुटिल डाव मांडला जात असल्याचे बोलले जात आहे. तालुका आरोग्य विभागाच्या पाहणी अहवालानुसार शिरोळ तालुक्यामध्ये केवळ २५० हुन कमी कॅन्सरचे रूग्ण असल्याची माहिती आहे.

मुळात ६०% कॅन्सर कशामुळे होतो, कोणत्या कारणामुळे होतो हे अदयाप स्पष्ट झालेले नाही. ३०% कॅन्सर हा तंबाखूजन्य पदार्थाच्या सेवनामुळे होतो. मदयपान, बुरशीजन्य पदार्थ, अनुवंशिकता इ. कारणामुळे कॅन्सर होतो. कोळशांची खाण, लाकुड, गिरणीमधील धुळ यामुळे ही कॅन्सर होवू शकतो.

शिरोळ तालुक्यामधील भाजीपाल्याची बदनामी होत आहे. यास सेंद्रीय शेती करणारे जबाबदार आहेत, ते लोकच कॅन्सरची अफवा पसरवत आहेत. बंदी असलेली औषधे सर्रास बाजारात मिळतात. त्याचबरोबर १००% शेती सेंद्रीय होवू शकत नाही असे मत कवठेसार येथील शेतकरी सुशांत माने यांनी मांडलेले आहे.

शेतकरी संघटनेचे नेते भगवानराव काटे यांच्या मते केवळ शिरोळ तालुक्यामधील भाजीपाला खाल्याने कॅन्सर होत आहे. कॅन्सरच्या रूग्णांची संख्या वाढत आहे असा प्रचार—प्रसार जाणीवपूर्वक करण्यात येत आहे.

## माहिती स्रोत व संशोधन पध्दती:

१) प्रस्तुत शोध निबंधासाठी प्राथमिक व द्वितीय सामुग्रीचा उपयोग करणार आहे

२) माहिती हि प्रत्यक्ष डॉक्टर  व संस्थाशी मुलाखती घेऊन माहिती संकलन करणे

## शिरोळ तालुक्याविषयी निर्माण केलेले कॅन्सरग्रस्त स्थितीचे भौगोलिक चित्रण:

शिरोळ तालुका भाजीपाला निर्यातदार तालुका असतानाच अलिकडील काळामध्ये शिरोळ तालुक्याविषयी वेगळेच चित्रे निर्माण करण्यात येत आहे. शिरोळ तालुक्यामध्ये इतर तालुक्याच्या तुलनेने कॅन्सरग्रस्त रूग्णांची संख्या १२ ते १५ हजार इतकी असुन ती दिवसेंदिवस झपाट्याने वाढत आहे. तेथील पाणी पिण्यायोग्य राहिले नाही. त्याचबरोबर या भाजीपाला, फळभाजी पिकावर फवारण्यात येणाऱ्या किटकनाश किंवा इतर रासायनिक घातक औषधामुळे या तालुक्यात कॅन्सर रूग्णांची संख्या वाढत आहे अशा पध्दतीचे एक चित्रण करण्यात आले आहे.

या कॅन्सरग्रस्त परिस्थितीच्या चित्रणासाठी खालीलप्रमाणे आधार देण्यात आलेले आहेत.

१) शिरोळ तालुक्याचे खासदार मा. राजू शेट्टीसाहेब यांनी या संपूर्ण परिस्थितीचा अभ्यास करण्यासाठी कर्नाटक राज्यामधील रायचूर येथील कृषी संशोधन संस्थेमधील संशोधक डॉ. शंकर गौडा यांच्या संशोधन टीमने केलेले संशोधन त्यामधील निष्कर्ष — शिरोळ तालुक्यामधील चार नदयांचे पाण्याचे नमुने घेतले. या पाण्यामध्ये ६० पटीने अधिक विषारी घटक असल्याचे स्पष्ट झाले आहे. त्यामुळे शेतीही नापिक होवून मानवाची रोग प्रतिकार शक्ती कमी होईल.

२) भाजीपाला नमुन्यामध्ये रासायनिक विषारी घटक मिळाले आहेत. यामुळे शेतकऱ्यांमध्ये औषध फवारणी संबंधी जनजागृती करण्याची गरज आहे.

सारांश रायचूर येथील कृषी संशोधन संस्थेने काढलेले निष्कर्षामधुन शिरोळ तालुक्यामध्ये कॅन्सरग्रस्त परिस्थिती निर्माण होण्यास शिरोळ तालुक्यामधील शेती, भाजीपाल्यावर फवारण्यात येणारी औषधे, तणनाशके, रासायनिक खते आणि नदयांचे प्रदुषित पाणी हे भौगोलिक घटक कारणीभूत ठरतात.

## नृसिंहवाडी येथील आरोग्य शिबीरामध्ये कॅन्सरची लक्षणे आढळणारे रूग्ण:

महाराष्ट्र शासनाच्या आरोग्य विभागाने केलेला शिरोळ तालुक्यामधील आरोग्यविषयक सर्व्हे शिरोळ तालुक्यामधील माती, पाणी व भाजीपाल्याचे नमुने घेवुन परिक्षण केल्यानंतर १०—१५ वर्षामध्ये १५ ते १६ हजार पेशंट असल्याचे अंदाज डॉ. श्रीवर्धन पाटील (जयसिंगपूर) यांनी व्यक्त केला. या रोगाचे कारण हे फिक्स नसुन अनैसर्गिक पध्दतीने पैशांची वाढ हे कारण असू शकते. वाढीसाठी पेस्टी साईड व ऑक्टोसेसीन या सारख्या पदार्थच्या वापरामुळे कॅन्सर होण्याची शक्यता असते. परंतु ते ठोसपणे याच कारणामुळे कॅन्सर होतो असा दावा करीत नाहीत. कॅन्सरसाठी अनेक कारणे असू शकतात.

पाणी पिण्यायोग्य नाही. भाजीपाला यामध्ये जड धातूचे प्रमाण अधिक आढळते.

किटक नाशके, टॉनिक सदृश्य औषध फवारणी तणनाशकांचा वारेमाप वापर

अनैसर्गिक व लेड यासारख्या जड धातूची धोक्याची पातळी ओलांडली आहे.

कमी दिवसात जास्त उत्पादन, त्यासाठी रासायनिक खते, रासायनिक घातक औषधांचा वापर त्यामुळेच शेतकरी कुटुंब कॅन्सरच्या विळख्यात सापडत आहे.

वरील सर्व कारणामुळे किंवा उपरोक्त संदर्भानुसार मानवाची रोगप्रतिकार शक्ती कमी होवून कॅन्सर सारखा आजार होतो.

## औषध फवारणी केलेल्या भाजीपाला खाल्याने कॅन्सर होत नसल्याबाबतचे युक्तीवाद:

किटकनाशके फवारलेला भाजीपाला खाल्याने कॅन्सर झाल्याचे जगामध्ये कुठेही सिध्द झालेले नाही त्यामुळे शिरोळ तालुक्यामध्ये रासायनिक औषधाच्या अतिवापराने कॅन्सर रूग्णांची संख्या झपाट्याने वाढत आहे, ही भिती सर्वत्र पसरली आहे ती अनाठायी आहे असे प्रतिपादन कोल्हापूर कॅन्सर सेंटरचे संचालक डॉ. सुरज पवार यांनी दिले.

## निष्कर्ष:

१) शिरोळ तालुक्यामध्ये बारमाही नदयांचा पाणीपुरवठा असल्याने आणि पाटाच्या पाणी पुरवठा सोईमुळे येथील जमिनी अतिरिक्त पाण्यामुळे क्षारपड बनलेल्या आहेत.

२) मुळात पंचगंगा व कृष्णा या नदयांचे पाणी प्रदुषण मोठया प्रमाणात झाले आहे.

३) कमी वेळेत, कमी क्षेत्रफळामध्ये जास्तीत जास्त उत्पन्न घेण्याच्या हव्यासापोठी रासायनिक खते व टॉनिक सदृश्य औषधे, किटक नाशके, तण नाशके यांचा मोठया प्रमाणात वापर होताना आढळतो.

४) दुषित पाणी, औषध फवारणीयुक्त भाजीपाला खाल्याने संपूर्ण मानवी आरोग्य धोक्यात आलेले आहे.

५) मानवाची रोग प्रतिकारक शक्ती कमी होत चाललेली आहे.

६) सेंद्रीय खताकडे दुर्लक्ष/ शिरोळ तालुक्यामधील शेतकरी अजुन सेंद्रीय शेतीकडे वळताना दिसत नाही.

## संदर्भ साधने :

*१)* *वृतपत्रे सकाळ पुढारी इ*

*२)* *रायचूर विद्यापीठाचा अहवाल*

*३)* *महाराष्ट्र आरोग्य विभागाचा अहवाल*

*४)* *मा. आमदार उल्हास पाटील यांचे कॅन्सर शिबीर वृत्तात*

*५)* *शिरोळ तालुका गॅझेट*

*६)* *मुलाखती.*

# कृषी पर्यटन: उन्नतीचा एक शाश्वत मार्ग

प्रा. संजयदेवी पवार (गोरे)

असोशिएट प्रोफेसर, भूगोल-पर्यावरण विभाग

श्रीमती सुशीलादेवी देशमुख वरिष्ठ महाविद्यालय, लातूर

**प्रस्तावना :**

भारत हा कृषीप्रधान देश असुन आजही या देशातील ७०% लोक हे ग्रामीण भागातच राहुन शेती करतात. देशाला स्वातंत्र्य मिळुन सात दशक उलटले तरी सर्वांचा उदरनिर्वाह भागवणारी शेती दुर्लक्षीत राहिली. त्यामुळेच आज शेती व शेतकरी पुर्णपणे उध्वस्त होत आहेत. याउलट शहरीकरणामुळे शहर व गाव यातील दरी वाढत आहे. शहरात वास्तव्यास असणाऱ्या पिढीचे आयुष्य गुदमरते आहे. त्यांना मोकळा श्वास नाही, सकस अन्नधान्य की रुचकर सकस आहार नाही आणि सतत मानसिक तणावमुळे लहानथोराचे आयुष्य धोक्यात येत आहे.

**कृषी पर्यटन :**

गाव आणि शहर या दोन्ही बाजु लक्षात घेता शहरवासियांना स्वच्छ मोकळी हवा, गावरान अन्नधान्य, पौष्टीक आहार, स्वच्छदी भटकंती करुन मनमुराद आंनद घेता येईल तो कृषी पर्यटनातुन आणि शेतकरी कुटुंबालाही शेतीतुन पिकविलेले अन्नधान्य, उपब्लधीतुन पर्यकांना त्यांच्या गरजेतुन मदत करता येते . शेती शेतकरी त्याच्या जीवन पध्दती गावाकडील संस्कृती रितीभाती, पशु, पक्षी, प्राणी, पिक पध्दती शेती मशागत इत्यादी विषयी सखोल माहिती मिळेल आणि पर्यटांकाना पुरविल्या जाणाऱ्या सेवा सुविधातुन शेतकरी कुटुंबाचाही शेती सोबतच पर्यटनातुन पुरक व्यवसाय उभारला जाईल .कृषी पर्यटनामुळे शेती सुजलम, सुफलम आणि शेतकरी आर्थिक दृष्टया सबल होतील.

**कृषी पर्यटन व्यवसाय वृध्दी :**

पुर्वी पासुनच शहरी माणसाला गाव .गावाकडची माती यांची ओढ कायम आहे, परंतु शहरीकरणामुळे याचा विचार पडत चालला आहे. म.गांधीजी म्हणत गावाकडे चला म्हणजे ग्रामीण भागतील कृषी व्यवसाय हा विकसीत होऊन शहरी माणसाची वाढती गरज पुर्ण होईल. पर्यटाकाचा निसर्गाकडे गाव शेतीकडे ओढा वाढत आहे या गरजेतुन कृषी पर्यटन उदयास येऊन त्याची वृध्दी होत असलेली दिसुन येते . परंतु महाराष्ट्रा सारख्या नैसर्गिक आणि सांस्कृतीक वारसा लाभलेल्या गाव खेडायाकडे आजही त्या दृष्टीने पाहिले गेले नाही. शेतकरी व शेती यांची सद्य:स्थिती अत्यंत दुर्लक्षीत असून हरितक्रांतीच्या नावाखाली शेती व्यवसायामध्ये संकरीत बि-बियाण रासायनिक खते, किटकनाशकाचा वापर होत असुन भरघोस उत्पन्नाचा हव्यासा पोटी शेतकरीही आशा प्रलोभनाला बळी पडतो आहे. महाराष्ट्रात अनेक वेळा अनेक ठिकाणी दुष्काळाचे वारंवार चक्र सुरु असल्याने शेती उत्पादने खालावली आहेत. त्यामुळे शेतकऱ्यांना भीषण दुष्काळाला तोंड देणे अशक्य प्राय होत आहे. पर्यटन व्यवसाय विकसीत होत आहे. या अनुषंगाने शेतकऱ्यांना प्रतिष्ठा मिळुन आर्थिक स्थैर्य ही लाभण्यास मदत होऊन गाव संस्कृतीचे जतन प्रत्यक्ष अप्रत्यक्षरित्या होण्यास मदत होते.

**कृषी पर्यटनाचे स्वरुप :**

कृषीतुन पिकविली जाणारी पिके, भाजीपाला, फळे, यांचा अस्वाद, स्वच्छ निरोगी हवा मातीचा सहवास, गावरान मेवा, ग्रामीण रुचकर भोजन, प्रदुषणमुक्त, व स्वच्छ वातावरण बैल, गायी, प्राणी, पशु, पक्षी, विविध धान्य उत्पादने आणि पिके इ.विषयी सखोल ज्ञान मिळते. ग्रामीण सलोखा अनुभवायला मिळतो, त्यामुळे कृषी पर्यटनाचे स्वरुप अत्यंत प्रेरणादायी आणि समन्वययात्क असे आहे.

कृषी पर्यटना करिता वाहतुक सुविधा निवास सुविधा इ.सारख्या बैलगाडीची सफर, देवळे, मंदिरे यातुन सादर होणारे भजन, किर्तन, हरिनाम, सप्ताह, अभंग पुजाअर्चा, प्रार्थना, श्रध्दा इ. गोष्टी पर्यटकांना जवळुन अनुभवता येतात.

**महाराष्ट्रातील कृषी पर्यटनाची सद्य:स्थिती :**

महाराष्ट्रातील कृषी व्यवसायाला चांगले दिवस येऊ शकतील परंतू शासनाचे धोरण बदलत्या हवामान नुसार व सांस्कृतीक पर्यावरणानुसार समन्वय साधन त्या अनुषंगाने महाराष्ट्रा तील कृषी पर्यटनाची वाटचाल सुरु आहे. पर्जन्याचे अत्यल्प प्रमाण अवर्षण अति पर्जन्य गारांचा वर्षाव शेती आणि मातीची हानी होते आहे. वारंवर दुष्काळ पाण्याचे दुर्भिक्ष अशा एक ना अनेक कारणामुळे भरघोस पिके उत्पादनाची शाश्वती नाही. म्हणुन काळाची पावले ओळखुन आजचा तरुण शेतकरी कृषी पर्यटनाकडे वळत आहे. आपल्या राज्यात २०१५ मध्ये ४१८ कृषी पर्यटन केंद्र आस्तिवात होते. त्या पर्यटन केंद्राला ७ लाख पर्यटकांनी भेटी दिल्या त्यातुन १८ कोटी रुपयाचे वार्षीक उत्पन्न महाराष्ट्रातील शेतकरी बांधवाना मिळाले असले तरी महाराष्ट्रा तील सर्व जिल्हामध्ये बहुतांश कोकण आणि पश्चिम महाराष्ट्रा शिवाय इतर जिल्हायात कृषी पर्यटनाचा म्हणावा तेवढा प्रसार झालेला नाही. म्हणुन महाराष्ट्र शासनाने कृषी पर्यटन धोरण आखत असतांना महाराष्ट्रातील सर्व जिल्हयांना न्याय मिळेल त्याची दक्षता घ्यावी.

**कृषी पर्यटन एक अनोखी संधी :**

आज लोप पावत चाललेली ग्रामीण संस्कृतीकृती जपण्याचा प्रयत्न कृषी पर्यटन केंद्रच्या माध्यामातुन होतो, दुष्काळग्रस्त भागात असणाऱ्या पर्यटन केंद्राने आर्थिक स्थैर्य मिळवुन देण्याची अनोखी संधी प्राप्त होते. ज्या प्रदेशात भूरचनेची नैसर्गिक देण आहे. समुद्र किनारा लाभला असेल. तेथे थोडया प्रयत्नात सुंदर असे कृषी पर्यटन केंद्र आकार घेऊ शकते.आणि अशा कृषी पर्यटन केंद्र उभारणीतुन कायमस्वरुपी उत्पन्नाचा अनोखा शाश्वत मार्ग उपलब्ध होतो. म्हणुन नवतरुणाची आपल्या शेतीकडे वळळे आणि नवनवीन कल्पनेतुन कृषी पर्यटनाचा विकास होऊन आर्थिक स्थैर्य होऊन केला तर ग्रामगाडासुध्दा डगमगणार नाही. असे खात्रीदायक चित्र कृषी पर्यटनापासुन निर्माण करता येवु शकते अशी आशा आहे

**कृषी पर्यटन धोरण :**

ग्रामीण पर्यटनातुन चालना देण्याच्या दृष्टीने (स्वतंत्र कृषी पर्यटन धोरण जाहिर करण्यात आले. ) महाराष्ट्रात मे २०१६ नवीन पर्यटन धोरण अस्तिवात आले असुन कृषी पर्यटनाला चालना देण्यासाठी हे कृषी धोरण तितकेच पुरक जाणवले नाही. कृषी पर्यटन व्यवसाय, विकसीत

करण्यासाठी, नवतरुणांना पर्यटन केंद्र विकसीत करण्यासाठी अल्पदरात कर्जरुपाने अर्थसहाय्य होणे, शेतीमालाला किफायशीर भाव निश्चित करणे, गावाला प्रसिध्दी मिळवुन देणे, रस्ते, लाईट, वाहतुक सुविधा, विक्री, केंद्रास सहाकार्य, कृषी ' पर्यटन केंद्र विक्री व्यवस्थेत प्राधान्य बाजारपेठ ग्रामीण संस्कृती व पर्यावरण जतन करण्यासाठी अनेक योजना आखुन त्या राबविणे महत्वाचे आहे.

एकंदरीत शासनाच्या कृषी पर्यटन धोरणाचा आधार घेत शेती व शेतकरी यांचा कृषी पर्यटनातुन विकास साधता येतो, पर्यायाने आर्थिक सुबत्ता आणि सबलता निश्चित निर्माण होऊ शकते. शहरी पर्यटकांना अल्हाददायक शांत व स्वच्छ वातावरण मोकळा परिसर रुचकर आणि सकस भोजन अस्वाद, मनोरंजनातुन मानसिक आरोग्य समतोल सृदृढ निरोगी समाज निर्माण होण्यास शहरवासींयाना ग्रामीण जीवनशैलीचा मनमुराद आनंद व आस्वाद घेता येईल. त्यातुन कृषी पर्यटनदात्याला त्यानी आर्थिक हातभार लागु शकतो. म्हणुन आजच्या ग्रामीण तरुण वर्गाला कृषी पर्यटनाकडे वळविण्याकरिता शासनाने सकारात्मक दृष्टीने कृषी पर्यटन धोरण निश्चित करावे. आणि त्याचा परिणाम म्हण्न तरुण वर्ग आपोआप कृषी पर्यटनाकडे वळेल. त्यामुळे ग्रामीण अर्थव्यवस्था मजबुत होईल अशी संशोधकाला आशा वाटते.