

**A Study of Geographical Information System of land use pattern of
Harsul Village in Trimbakeshwar Tahsil**

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Abstract

This analysis of research paper a study of Geographical Information system of Land use Pattern in Harsul Village in Trimbakeshwar Tehsil that is found (19°56'23.73"N to 19°55'41.43"N Latitudes and 73°32'18.34"E to 73°31'22.38"E great circle) in Nashik district of geographical area, India. Their rice fields were known through GIS techniques. As, this 3 varieties of crop land pattern distribution were shown victimization Socio-economic knowledge. The secondary knowledge was collected from the Assistant Director's workplace of Agriculture, Panchayat and Trimbakeshwar Tehsil. The cultivated space of various varieties of rice is calculated from every Gram punchayat. Each knowledge of rice space one that has been calculated by Remote Sensing technique and another one that has been collected from enzyme workplace square measure compared. Field knowledge is employed to generate the variation curve of various varieties of rice production within the Harsul Village in Trimbakeshwar Tehsil. it's conjointly shown the step by step dynamical of rice cultivated space during this Trimbakeshwar Tehsil. Finally, it's discovered that each one the geographic queries dole out during this analysis square measure as a result of the accessible dataset. So that, the choice creating bodies will access to data on rice growth and management within the study space.

Keywords: Geographical Condition of the study space, Geographical Information System of Villege .etc

Introduction

Harsul village is one of the revenue situated in the revenue villages situated in the central part of north in the Trimbakeshwar Tahsil. Its location is 37 kilometer from Trimbakeshwar city state highway 43. The village is located at 20° 54' north latitude and 73° 31' east longitude . Village occupies 748.75 hectares of land and has population of 4842 (Census 2011). The population of Harsul is 559 persons per square kilometers (2011), which was 435 persons per square kilometer in 2001. This village is confined by Nachlondi village to the north spatial to the east, Belpadi and Chinchavad to the west and to the South, respectively . This village is accessible by state high way running from Trimbakeshwar city and Nasik Tahsil.

Purpose of study area

There are many reasons to select this for the study area. The study region is the one of the typical and important tract in Nashik District in Maharashtra. There is not a single comprehensive study at a micro level about A case study of Rice Crop in (GIS) Application of Geographical Information System of Trimbakeshwar Tehsil. Major aim of the study is to know realistic picture of existing agricultural Rice crop in the study area. Selection of this area also calls for such an analytical study because there is imbalance in agriculture development and planning, which made all part of backward. Because study area is backward Tehsil the purposed study is know how to agricultural development and planning in Trimbakeshwar Tehsil and response to characteristics of watershed in study area. This is study region has many problems in agriculture. To find out such problems in agriculture and to suggest suitable solution for that, it is one of the reason for the selection of this topic.

Importance of the study area

This study was undertaken in the Trimbakeshwar Tehsil located in the Nasik District in state of Maharashtra. An initial reconnaissance of the study area revealed that this region was affected by the problem

of land degradation, loss of top soil, flooding during rains, reduced agriculture development and lack of adequate infrastructure etc. therefore, there an urgent need for intervention in the agriculture to development a detailed database for use of various line departments and stakeholders as well as holistic land and water resource development and planning taking into account the prevailing socio-economic conditions and felt needs assessment.

Study Area

Trimbakeshwar Tehsil is situated partly in the Dhamanganga basin and partly upper Godavari Basin. It lies between 19°56'23.73"N to 19°55'41.43"N Latitudes and 73°32'18.34"E to 73°31'22.38"E longitude. Trimbakeshwar Tehsil has an area of 95575.74 sqkms. And population 168423 as per the 2011 census book. There are 97 villages and 28 panchayats and three revenue circles are in the Trimbakeshwar Tehsil. The main system of hills is the Sahyadris, which run north-south in the western portion of the district. The main range from the Sahyadris, two prominent spurs stretch out to the east of the study area. In the extreme north are Dhamanganga hills, basin and which approximately forms a boundary between Peth and Trimbakeshwar Tehsil. The Tehsil has three rivers namely Dhamanganga River, Godavari River and Vaitarna River. The Tehsil is surrounded by Thane district to the west, Peth Tehsil to the north, Nashik Tehsil to the east and Igatpuri Tehsil to the south of Trimbakeshwar Tehsil. There are four types of soil in the Trimbakeshwar Tehsil black, red, red and black, light brown, Rice, Sugarcane, Onions, Grapes, Bajara, Nachani and vegetables are the dominant crops of the study region. The climate of the Tehsil is generally dry except during the monsoon season. The average annual rainfall of the district is 1034.5mm. The rainfall in general decreases from west to east. The summer season is moderately hot and the temperature varies from 36^o.0 to 43^o.0. The air is humid during the monsoon season and generally dry during the rest of the year.

Objectives of Study Area

This research paper has been undertaken to make an in-depth and "A Study of Geographical Information System of Harsul Village in Trimbakeshwar Tehsil" by evaluating following objectives:-

- Assessing the Geographical background of study area.
- To assess Application of GIS in the study region.

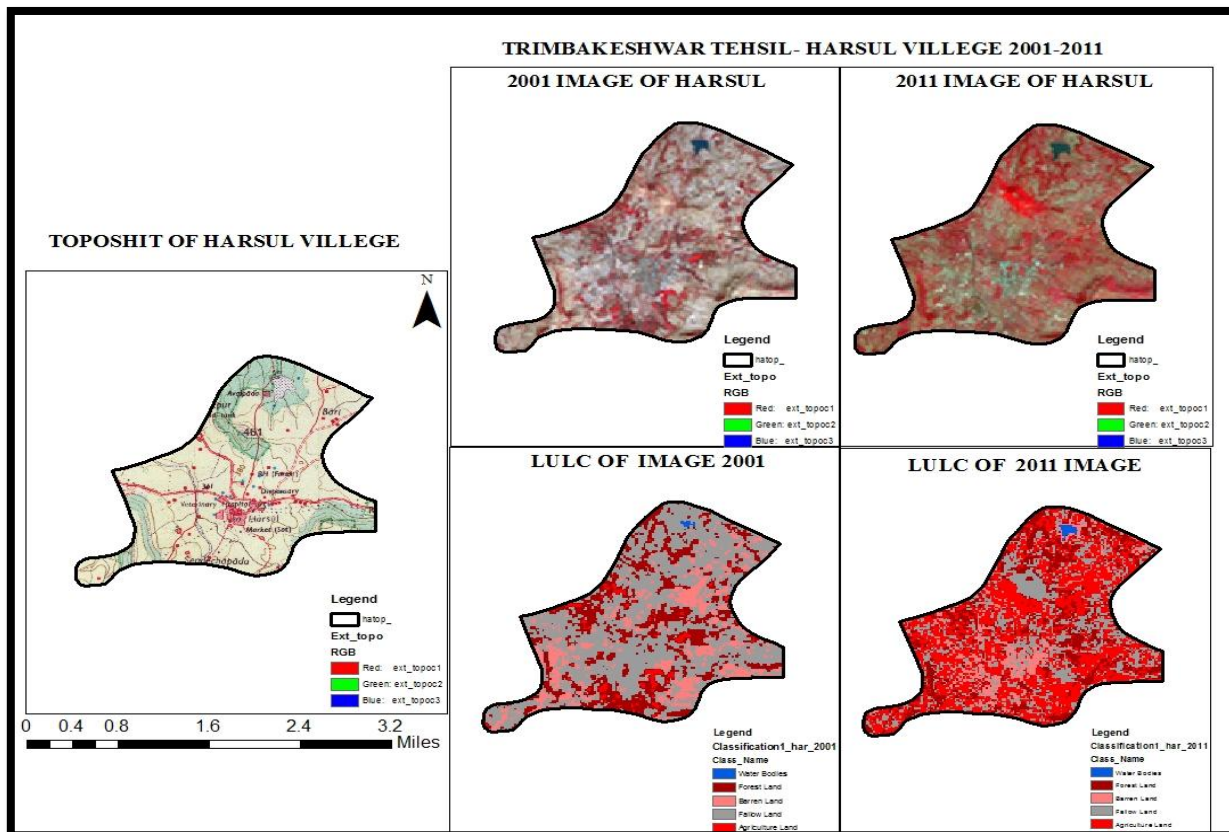
Methodology of Study Area

The present study is based on the primary and secondary source of data. Primary data is collected from the field work (2001-2011) and interviews of 52 farmers from the study region. Secondary data is obtained from the socio-economic abstract of the Nashik district (2015, District census handbook and District Gazetteers). These data obtained to show the production curve of different types of rice and the change of land use pattern of cultivated area in the last five years. The GPS point was taken in Harsul area of Trimbakeshwar Tehsil and put it into the image. Lastly, we have calculated rice crop area from each gram panchayats and comparing the area data which are calculated from RS method with the field collection data.

Result and Finding Physiography, Climate and Soil

Harsul is situated at 530.50 meter above mean sea level. The general slope of the village is towards north. This village has extensive plain region having gentle slope. This village experiences dry climate and suffers from scarcity of water. It receives rainfall from southwest monsoon. The annual average rainfall in this village is 650 mm. Monsoon begins in the month of June and lasts up to October. The soil of this village is classified into four groups, namely, sandy loam, sandy clay loam, clay loam and clay (fig.1.2). Clay soil covers 7 % of total geographical area in north-central part along the stream where wheat, onion, vegetables and sugarcane are cultivated in this soil. Clay loam soil has spread on 15 % area in central part and it is suitable for Bajara and Nachani cultivation on a larger extent whereas onion, vegetables and wheat to some extent are cultivated well irrigation.

Sandy clay loam soil speared over 58 % area in central and western parts. Wheat, bajara, vegetable, sugarcane and onion are grown in this sandy clay loam soil. Sandy loam occupies 20 % area of the village in northern part and small proportion in southeast. most of this part belongs to fallow land, Same part is used for Bajra and Nachani cultivation.



Sources: IRS (LISSIII Image) Department of Dehradun 2001-2011

Temporal Analysis of Landuse (2001-2011)

Exposes temporal of both general and agricultural landuse in Harsul. This village accounts for 61.61 % of net sown area to total geographical area in 2011. It was 65.60 % in 2001 shows slight fluctuating trend during study period . Harsul has 21.78 % fallow land lying northern part running east-west direction lack of irrigation facility and infertile soil are the causes for this fallow land. Land under cultivable waste covers 7.50 %. Land not available for cultivation is 11.96 % showing stable condition from 2001 to 2011 (Table-1.1).

The area under forest has very negligible % (1.07) and it has remained stable. Bajara is first ranking crop in Harsul covering 37.10 % of net sown area. It does not show significant increase in study period due to low fertile soil and lack of irrigation. Bajara occupies 20 % area and it declines its average due to frequent occurrence of drought. Wheat has its concentration in central part on 18.84 % area. Sugarcane is irrigation. Onion and vegetables cover 9.56 % and 8.12 % to the sown area respectively. Pulses and oil seeds are cultivated on minor scale accounting both less than 5 % area in Harsul (fig.1.1)

Spatial Landuse Pattern

Agriculture of Harsul is influenced by soil types and amount of rainfall. Thirty five hectares of land in central and south parts support for sugarcane, onion, vegetables, and wheat cultivation. Nachani is grown in central and east parts and to some extent in north part on sandy clay loam soil. Bajara is spered on 20 % of net sown area. Onion and vegetables are taken in small patches. This cultivation is based on irrigation (fig.7.5).

Landuse and Population

Table-1.2 shows that the land resources with respect to population in Harsul. According to 2011 census the population of Harsul is 4842. there are 1165 land holders. Among them 56 % belong to small farmers, 40 % medium and only 25 % large farmers. Per head land available is 2.36 hectares in Harsul (Table 1.2). Precipitate double cropped area accounts for 0.31 hectares which is very less because only 0.06 % area to the net sown is irrigated.

Table :-1.2 Land use and Population in Harsul

Sr.No.	Land use Categories	Area in Hectares	Land per head of population
1	Total Village Area	749	2.36
2	Net Sown Area	1279	2.22
3	Gross Cropped Area	268	0.25
4	Double Cropped Area	328	0.31
5	Irrigated Area	60	0.06

Source : Village Revenue Record, Harsul

Occupational Structure

Occupational breakup of the population is shown in Table 1.3. Among the working population, cultivators account for 48.79 % indicates an increase of 41.08 % in 2001 with respect to 2001. Agriculture labour also shows an increase of 0.72 % in this village.

Table-1.1: Harsul Temporal Variations in Landuse (2001-2011)

Year	GENERAL LANDUSE IN PERCENT TO TOTAL GEOGRAPHICAL AREA				AGRICULTURAL LANDUSE IN PERCENT TO NET SOWN AREA													
	N.S.A.	C.W.	F.L.	A.N.C.	Forest	Sugar cane	Onion	Rice	Wheat	Oilseed	Fodder	Bajra	Pulses	Vegetable	Fruits	Nachani	Rai	
2001-2002	55.75	4.90	8.23	9.85	24.35	0	12.43	10.85	12.57	1.52	6.23	58.24	6.52	15.65	0	25.23	1.06	
2003-2004	35.35	5.30	8.15	9.53	24.35	0	13.53	15.31	10.85	3.23	5.32	52.32	5.00	25.32	0	25.14	5.12	
2005-2006	31.42	5.11	8.41	8.41	24.35	0	23.26	10.9	10.84	2.39	15.23	65.23	3.23	21.65	0	23.45	12.23	
2007-2008	21.27	6.45	8.21	9.25	24.35	0	25.55	13.56	22.25	2.94	12.21	66.12	2.98	29.78	2.32	11.54	4.23	
2009-2010	44.55	5.06	8.46	9.47	24.35	0	25.12	22.02	31.31	4.25	8.74	67.12	3.22	23.36	1.25	12.23	5.56	
2011-2012	58.08	5.51	8.74	9.74	24.35	12.35	32.85	36.12	31.80	1.36	5.65	57.1	2.26	19.98	2.14	23.25	5.23	

Source: Village Revenue Record, Harsul

Note- CW	Cultivable Waste
A.N.C.	Area Not Available For Cultivation
F.C.	Fallow Land
N.S.A.	Net Sown Area

Table:- 1.3 Occupational Structure in Harsul

Sr.No	Category	Population and %s			
		2001	Percent	2011	Percent
1.	Total Population	1290	100	4842	100.0
	Total main Worker	940	72.86	1550	32.01
	I) Cultivators	530	41.08	2206	48.79
	II)Agricultural Labors	445	34.49	1040	35.21
	III) Other Worker	230	1.78	640	13.21
2.	Non Workers	705	54.65	2971	61.35
4.	Marginal Workers	152	11.78	321	6.62

Source; District Census Handbook, Nashik District

Problems of Harsul

Crop cultivation and production are the result of soil types and low amount of rainfall (563 mm) in Harsul. Harsul and Trimbakeshwar are agricultural market centers. There is medium market in the village itself. Dairy also suffers the problem due to unavailability of local milk collection centre. It is revealed from field survey that, 95 percent households were expressed the views that Grampachyayat should provide job opportunity to rural youth and unskilled labor. Agriculture of Harsul also seeks the financial support for agricultural operations and for making the provision of agricultural inputs.

Conclusion and Suggestion

It is a representative village for monoculture i.e. Bajara crop. The village experiences dry climate and suffers scarcity of water for irrigation purpose. It receives 665 mm rainfall. The soil in Harsul grouped in to four groups, namely sandy loam, sandy clay loam clay loam and clay. Village accounts for 67.35 % net sown area to the total village area. Agriculture is affected by poor soil condition and scarcity of rainfall (665 mm) in the village. Trimbakeshwar are agricultural market places located 37 km away respectively. Agriculture and dairy in Harsul needs financial support and provision of local market.

Harsul has 21.78 % fallow land lying northern part running east-west direction lack of irrigation facility and infertile soil are the causes for this fallow land. Land under cultivable waste covers 7.50 %. Land not available for cultivation is 11.96 % showing stable condition from 2001 to 2011 (Table-8.11)

According to 2011 census the population of Harsul is 4842. there are 1165 land holders. Among them 56 % belong to small farmers,40 % medium and only 25 % large farmers. Per head land available is 2.36 hectares in Harsul.

Physiography has predominate role in landuse pattern in Welunje. 69 % area in this village is under cultivation, area of Welunje relatively more than other sample villages.(26.07 %) under forest cover in this village is under cultivable waste negligible by 1.34 % percent where fallow land has decreased by 1.34 % from 2001 – 2011

Suggestion

As the northern part of the study area is lacking in the irrigational facilities there is wide scope to develop a co-operative lift irrigation facilities in this area. Along with the enhancement of agricultural facilities it will reduce the outgoing migration.

The sugar industry located in the study area is one of the major sources of employment generation. However as this industry provide seasonal employment. An attempt should be made in direction of strengthening other sources of employment.

As considerable numbers of farmers face the problem of over irrigation, a proper action should be taken in this direction so that the problems of over irrigation would be minimized.

Outsider population is very much interested in investing money in agricultural land. The farmers are losing their ancestral assets. In view of changing the mentality of local people after should be made near future to aware the native population.

Though, most of the agriculture in study area is irrigated, majority of the farmers are not interested in adopting modern agricultural 255techniques. Awareness among the farmers about use of these techniques is very much needed.

Soil testing and the knowledge of crop water requirement are of immense importance while planning the crops in existing agro climatic conditions. Therefore farmers should be aware about resource based crop planning.

Sometimes farmers in the study area go for mall practices to get more water for irrigation. This practices leads to the misuse of water resources and also results in to the Stalinization of land. In view of eliminating this problem farmers are required to motivate to go rational use of water resources.

It was observed during field visit that farmers in the study area are not aware of the government schemes those are launch for the betterment of farmers community. An awareness campaign should be implemented in the regard.

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