

## **A Spatial Distribution of Crop Diversification in Canal Irrigated Area**

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### **Abstract:**

The research paper highlights the changes of cropping patterns in command area of kukadi Canal Irrigation Project. Irrigation is essential for sustainable agriculture particularly in drought prone areas. Irrigation is basic determinants of agricultural practices. Therefore attempt is made here to examine the impact of canal irrigation on Crop diversification in Command area of Kukadi canal project. The important objectives are to study the principal crops and diversification of crops in command area to find out

**Keywords:** Canal irrigation, Agriculture, Crop diversification

### **Introduction:**

The term Agriculture is originated from the word Ager Meaning there by a cultivation. But now a day, the concept of taking grains from it is changed and it becomes larger concept. Agriculture is most occupation in the rural area. It is a mean of living. Now, agriculture is not only remained for food production but also for business. Now arable land turns under irrigation. The Junner Taluka of Pune District, Parner, Shrigonda and Karjat Talukas of Ahmednagar and Karmala Taluka of Solapur Districts are comes under Command area of Kukadi canal Project.

Crop combination method is applied to compute crop diversification pattern of the region its meaning is to raise verity of crops on arable land. It shows the contemporary competition among crops for an area, scope for rotation, the effect on double cropping, the greater numbers of crops lead to greater competition. The higher is the magnitude of diversification.

In geography, Bhatia S.S. (1965) adopted and introduced crop diversification method in order to understand crop competition in the region followed by Jasbir Singh and Dhillon S.S (1984) modified Bhatia's method of crop diversification with accounting for those crops which occupy at least one percent of the gross cropped area.

### **Aims and Objectives:**

Presuming vital significance of land use pattern for rural development following objectives have been put forth for the present investigation 1. To identify the spatial distribution of crop diversification, in Command area of Kukadi Project. 2. To find out the impact of canal irrigation on crop diversification.

### **Study Area:**

The study region is lies in western Maharashtra, in this **Junner tahsil** lies in 19°12'35'' North latitude to 73°57'32'' East longitudes. There are four main Dams of Kukadi Project as Yedgaon, Pimpalgaon joge, Manikdoh, and Wadaj in this Tahsil. Total population is 24,741 and total geographical area is 13, 8,452 hectares. About 27115 hectare area comes under Kukadi command area. **Parner Tahsil:** is located at west part of Ahmednagar, on 18.32° to 19.19° North latitude and 74.15° to 76.24° East longitude the area occupied by 1,930.28 sq. km. and total population is 248347.25. In this tahsil 14740 hectares area irrigated through kukadi left bank canal. **Shrigonda Tahsil:** Shrigonda is located at the southern part of Ahmednagar. Shrigonda Tahsil situated on 18°-27'-18'' North to 18°-51'-54'' North latitudes and 74°-23'-24'' East to 74°-52' East longitudes in this 30616 hectare area comes under kukadi left bank canal irrigation. **Karjat Tahsil:** Karjat Tahsil is

situated in the south east part of Ahmednagar district. It is located 75 km. from its district city of Ahmednagar. The absolute location of the tahsil is from 19°09' north to 19°46'65'' North latitude and 74°74'9'' to 75°25'8'' East longitude, with the total geographical area of 1503.61 Sq. km. In this 29990 hectare area is benefited through kukadi canal. **Karmala Tahsil:** Karmala tahsil is located in North West part of Solapur district at 18°25'12''N to 18°42' North Latitude and 75°12'0'' E to 75°20'00'' East longitude. It occupies 1609.70 sq. km. area. In Karmala 24562 hectare area comes under kukadi canal irrigation.

**Research Methodology:**

This research is based on field survey method. The data has been collected from different sources. The secondary data collected from Kukadi left bank canal command area as well as irrigation department of Govt. of Maharashtra, district gazetteers, reports, books internet etc. the spatial distribution of crop diversification in 1990-91 and 2010-11 has studied in this research paper.

**Results and Discussion:**

In order to identify spatial pattern of crop diversification in present study, Bhatia's Method has been adopted in modified form. The crops having less than five percentages have been excluded from computation. This modified formula expresses as:

$$\text{Index Of Crop Diversification} = \frac{\text{Percentage of Net Sown Area}}{\text{Number of 'n' Crops}}$$

Where 'n' crops are those which are individually occupy five or more than five percent of crop to Net Sown Area in the five Tahsils of Kukadi canal command area.

**Table 5.1 Patterns of Crop Diversification (1990-91 and 2010-11)**

Diversification		No. of Tahsils		Area in Hectares		Percentage of Area	
Class	Magnitude	1990-91	2010-11	1990-91	2010-11	1990-91	2010-11
Less than 10	High	--	02	--	40750	--	34.07
10 - 15	Moderate	01	02	24127	52883	21.03	44.21
15 - 20	Low	03	01	61855	25969	53.93	21.72
More than 20	Very Low	01	--	28711	--	25.04	--
<b>Total</b>		<b>05</b>	<b>05</b>	<b>114693</b>	<b>119602</b>	<b>100</b>	<b>100</b>

Source: compiled by researcher.

The above Table 5.1 shows that four crop diversification regions have been identified as:

- i. Area of high crop diversification
- ii. Area of moderate crop diversification
- iii. Area of low crop diversification and
- iv. Area of very low crop diversification

The four groups of crop diversifications and, its class, magnitude, Tahsils and area shows in Table 5.2 and 5.3

**Table 5.2 Patterns of crop Diversification in 1990-91**

Name of the Tahsil	Index of crop Diversification	Crops in competition for diversification	Area in Hectares	Area in Percentage
Shrigonda	23.98	Jr+Bj+Fd	25321	23.38
Karmala	18.88	Jr+Pl+Bj+Fd	19800	18.28
Parner	16.75	Jr+Bj+Pl+Fd	13068	12.06

<b>Karjat</b>	15.67	Jr+Bj+Pl+Fd	25969	23.98
<b>Junner</b>	14.50	Bj+Su+Fd+Pl	24127	22.28

Source: compiled by researcher.

It is observed from this table that in 1990-91 largest area appears in the low crop diversification it covers a 53.93 percent area in the command area and very low crop diversification class covering 25.04 percent area in command area. The two crops namely, Jowar, Bajra and Fodder crops are in competition for diversification in Shrigonda Tahsil. Jowar, Pulses, Bajra and Fodder crops are in competition for diversification in Karmala. Jowar, Bajra, Pulses and Fodder crops are in competition in Karjat and Parner Tahsils (Table 5.2). While Bajra, Sugarcane, Fodder and Pulses crops are in competition for diversification in Junner tahsil.

**Table 5.3 Patterns of crop Diversification in 2010-11**

<b>Name of the Tahsil</b>	<b>Index of crop Diversification</b>	<b>Crops in competition for diversification</b>	<b>Area in Hectares</b>	<b>Area in Percentage</b>
<b>Karmala</b>	15.02	Jr+Su+Fd+Fr+Wh	21105	18.39
<b>Junner</b>	12.28	Su+Jr+Fd+Bj+Fr+Wh	24172	21.06
<b>Shrigonda</b>	12.22	Su+Jr+Fd+Fr+Wh+Gn	28711	25.02
<b>Parner</b>	9.67	Jr+Fd+Su+Fr+Gn+Wh+Bj	13066	11.38
<b>Karjat</b>	8.96	Jr+Fd+Su+Bj+Fr+Wh+Gn	102473	24.12

Source: Compiled by Researcher

In 2010-11 largest area in the moderate crop diversification class covering 44.21 percent area in the kukadi command area. The five crops namely, Jowar, Sugarcane, Fodder, Fruits and vegetables and wheat are in competition for diversification in Karmala Tahsil.

While sugarcane, jowar, Fodder, Bajra, fruits and vegetables and wheat crops are in competition for diversification in Junner Tahsil. Sugarcane, jowar, Fodder, fruits and vegetables, wheat and Groundnut crops are in competition for diversification in Shrigonda Tahsils. As well as seven crops, namely, Jowar, Fodder, Sugarcane, Fruits and vegetables, Groundnut, Wheat and Bajra are in competition for diversification in Parner Tahsil of command area. And Jowar, Fodder, Sugarcane, Bajra, Fruits and Vegetables, Wheat and Groundnut crops are in competition for diversification in Karjat tahsil (Table 5.3). In 2010-11 high crop diversification covering 34.07 percent area in command area where as 21.72 percent area is under the category of low crop diversification.

**i. Area of High Crop Diversification**

In 1990-91, there is no area under high crop diversification. While in 2010-11 there are two tahsils area under High crop diversification viz.as Karjat and Parner. This category covers 34.07 percent area under high crop combination. The crops in diversification are jowar, Fodder, Sugarcane, Fruits and vegetables, Groundnut, wheat, and Bajra.

**ii. Area of Moderate Crop Diversification**

This category covers 21.03 and 44.21 percent area under moderate crop diversification in 1990-91 and 2010-11. In 1990-91 the area of moderate crop diversification appears in Junner tahsil of command area and covering 24127 hectares area. The crops in diversification are Jowar, Bajra, Sugarcane, Fodder, and Pulses. While in 2010-11the area of moderate crop diversification appears in two tahsils and covering 52883 hectares area. The crops I diversification are Sugarcane, Jowar, Fodder, Fruits and vegetables, Wheat, Groundnut and Bajra. Sugarcane, Jowar and Fodder crops on Radish brown and Deep Black soils. This soil gives high yield per hectare.

### **Area of Low Crop Diversification**

The area of low crop diversification covers 61855 and 25969 hectares (53.93 and 21.72 percent to total area) in 1990-91 and 2010-11 respectively. In 1990-91 the low crop diversification areas appear in the three tahsils viz. Parner, Karjat and Karmala. Jowar, Bajra, Pulses and Fodder crops comes under this diversification. While in 2010-11 the low diversification regions appears in Karjat tahsil. Jowar, Fodder, Sugarcane, Bajra, Fruits and vegetables, Wheat and Groundnut crops comes under this diversification.

### **Area of Very Low Crop Diversification**

There is no area under very low crop diversification in 2010-11. But in 1990-91 the Shrigonda tahsil have found very low crop diversification covering 25.04 percent (28711 hectares) area of the command area. Jowar, Bajra and Fodder crops are in competition in this tahsil.

### **Conclusion:**

The obtained results have been displayed in Table 5.13a and 5.13b shows crops in number, crops in competition, and area in diversification in Kukadi command area. Map 5.14 shows the spatial distributional pattern of crop diversification in the command area. In 1990-91 maximum crops diversification appears in Junner Tahsil (14.50) and lowest at Shrigonda Tahsil (23.98) while in 2010-11 maximum crop diversification appears in Karjat Tahsil (8.96) and very lowest at Karmala Tahsil (15.02).

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