

**A GEOGRAPHICAL ANALYSIS OF CHANGING LAND USE AND CROPPING
PATTERN: A CASE STUDY OF KOPERGAON TEHSIL IN AHMEDNAGAR
DISTRICT (M.S.)**

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Abstract

Agriculture is prime source of food to feed a population and base of all economic activity in the world. The picture of Indian agriculture changes from time to time. Physical, socio-economic and technological factors are responsible for these changes. These changes are also changing cropping pattern from time to time. This means that, what is cropping pattern in the selected study area is governed by above said factors. Kopergaon tehsil in Ahmednagar district is drought prone, so physical factors like rainfall affect the cropping pattern. As per data available, with the help of Doi's method, Kopergaon tehsil in Ahmednagar district has two crop combination i.e. Bajara and Jowar crops in 1990-91 and it changes towards Five crop combination i.e. sugarcane, oilseed, wheat, other cereal and pulses in 2015-16. In 2023-24, there is again changing in crop combination and result is three crop combination.

Keywords- drought prone area, cropping pattern, crop combination etc.

Introduction

Agriculture is not only growing of crops but also rearing of animals (Agriculture Geography, Majid Husain) India is basically an agricultural oriented country, the role of agriculture is very vast as it is the most important enterprise in Indian economy.

Land use is an important aspect of geographic studies particularly relevant to agricultural geography. Cropping pattern is the proportion of area under various crops at a point of as it changes over space and time. The cropping patterns of a region are closely influenced by the geo-climatic, socio-economic, historical and political factors (Hussain, M. 1996) patterns of crop land use of a region are manifestation of combined influence of physical and human environment. Differences in attitude towards the rural land in the level of prosperity and technology have produced changes in emphasis. Their effects on both landscape and land use studies are likely to be far reaching (Coppock, 1968). Ahmednagar district is known as the draught prone region. Present studies focusing upon the land use and cropping pattern in Ahmednagar district. The relationship between cropping pattern and responsible geographical condition for it, is explaining in the present study.

Study Area

According to area extent, Ahmednagar is the largest district of Maharashtra State with geographical area of 17418k.m, which is 5.66% of area of Maharashtra State. Out of total areas 391.5 sq.km. is urban area and remaining 16,656.5 sq.km. is rural area. Ahmednagar is centrally located in western Maharashtra. In Ahmednagar district there were 14 blocks or talukas and 1,581 villages and 1,308 gram sabhas. Kopergaon tehsil is one of them.

Kopergaon tehsil is laid between $19^{\circ} 54''$ North latitude and $74^{\circ} 33''$ East longitude, and is bounded on the north west and north by Nasik district, on the north east and east by Aurangabad district. In the south west by Sangmner tehsil and on the south by Rahata tehsil and in the south west by Shrirampur tehsil. The region with irregular shape and have 725.16 square kilometers area and having population of 276937 persons in 2011. In study region density was 420 persons per sq. km. The sex ratio was 965 females per thousand males; literacy was 85.08 percent. The study region has 686.47km^2 agricultural area. This is 94.66 percent to the total area. Average rainfall receives nearly above 400 mm. The mean daily maximum temperature is 39°C . and means daily minimum temperature is 11.7°C . The deep black soil, medium black soil, appear in study region.

Map No. 1 Location Map of the study area**Database and Methodology: -**

Data collected from socio economic review, Ahmednagar District.1991 and 2016. Doi's technique of crop combination method is applied to determine cropping pattern of the study area.

Aims and objective-

To find out land use and cropping pattern of Kopergaon tehsil in Ahmednagar District.

Result and Discussion-

In the present paper the following categorization of land utilization has been made in different groups, these are

1. Area under Forest
2. Area not available for Agriculture.
3. Other than fallow

4. Fallow Land

5. Net Sown Area

Temporal Changes in General Land Use Pattern: (1990-91 to 2023-24)

The general land utilize of any region undergoes the changes in any particular period of time is called as a temporal change. The temporal changes in land use pattern of Ahmednagar district have studied for the period of twenty five years. The study period 1990-91 to 2023-24 find out the trends of changes in general land use and to discover the reasons of the changes. The main objective of this chapter is to emphasize the spatial- temporal changes in general land use categories are based on census classification. The temporal changes in general land use for Kopergaon tehsil in Ahmednagar district is shows in Table No. 1.

Table No. 1-General Land Use Pattern

Sr.No.	Type of land use	1990-91		2023-24		Change in %
		Area in '00'Ha.	Area in %	Area in '00'Ha.	Area in %	
1	Area under forest	11	1.02	00.00	0	-1.02
2	Area not available for Agriculture	81	07.56	48.69	6.90	-0.45
3	Other than fallow	91	08.49	40.22	5.70	-2.79
4	Fallow Land	29	02.71	103.79	14.70	+11.99
5	Net Sown Area	860	80.22	513.43	72.70	-7.52
6	Total Geographical Area	1072	100	706.13	100	

Source: Socio-Economic Review and Statistical Abstract of Ahmednagar District- 1991-92, 2024-25.

1) Area under forest

The Table No. 1 clearly indicates that there is a continuous decrease in the forest land. As per standard 33 percent area needed under forest cover to maintain environmental balance but in the study area in 1990-91 there is only 1.02 percent area under forest which was further decreasing became 0 percent. This indicates alarming imbalance of environmental condition. Less green cover less rainfall because evapotranspiration through green leaves. Green leaves of plants provide additional source of humidity which is helpful to occurs rainfall.

2) Non Agricultural Area/ Area not available for agriculture

Non agricultural area has shows the variation in the study period. In 2023-24 it was a recorded as 48.69 hundred hectare which is 6.90 percent. It was decreased by 0.45 percent. This indicates there is very slow expansion of settlement, industrialisation, transport etc.,

3) Other than fallow

Land under cultivable waste in study region has 91 hundred hectares of the total geographical area of study region in 1990-91 It was 8.49 percent area of study area and 40.22 hundred hectares i.e. 14.70 percent in 2023-24. It was decreased by 2.79 percent. This indicates the area under fallow land comes under utilisation. It comes under cultivation land

because of rural dwellers scattered in rural area because of land fragmentation. So land other than fallow was decreased.

4) Fallow Land

Initially in 1990-91 the fallow land of Kopergaon tehsil in Ahmednagar district was 29 hundred hectares accounting 2.71 percent and it was increased up to 103.79 hundred hectares accounting 14.70 percent of the total geographical area. Throughout the study period from 1990-91 to 2023-24 the fallow land has increased by 11.99 percent of the total geographical area. Increasing in the proportion of fallow land is due to the purchase of land by the investors which are businessmen in city area. They are not doing agriculture so it becomes fallow land. Most of such fallow land found along the highways and roads. Over irrigation caused salinization of the agricultural land also one of the causes for increasing fallow land.

5) Net Sown Area

The temporal change in net sown area from 1990-91 to 2023-24 is shown in table no 1. In 1990-91 the net sown area was 860 hundred hectares accounting 80.22 percent of the total geographical area. In 2023-24 it was recorded as 513.43 hundred hectares which was nearly about 73 percent. In the study period from 1990-91 to 2023-24, it was decreased by 4.57 percent. Decreasing in NSA is not good for agriculture.

Above discussion of general land use clearly indicates that except negative changes in area under forest, there are negative changes for agricultural development. Decrease in other than fallow; increase in non agricultural and net sown area is good indicators for agricultural development.

Crop combination-

For the present study, crop combination is studied by Doi's method applied to delineation the crop combination region of the study area. The Weaver's technique was subsequently modified by Doi (1959). Doi's technique used to be considered to be the easiest for combination analysis prior to the application of computer programming facilities. The Doi's formula may be expressed as :

$$(\sum d^2)$$

The combination having the lowest $(\sum d^2)$ will be the crop combination. In Doi's technique, it is not required to calculate $(\sum d^2)$ for each combination but the crop combination is actually established by One Sheet Table (Table No.2), which represents critical values for various elements at different ranks against cumulative percentage of elements at higher ranks; for an agricultural geographer elements are main crops, livestock, or enterprises. The use of One Sheet Table requires only the summing up of actual percentages under different crops instead of finding the differences between actual percentages and theoretical distributions.

According to Doi's technique all those crops are included in the combination whose cumulative percentage is less than 50; or the critical value for all the crops at different ranks against 50 in zero. Therefore, the scale of cumulative percentage starts from above 50 percent which is contributed by the higher ranks may be the first one, two or three crops, and so on.

Impact Factor: 7.665, Peer Reviewed and UGC CARE I

Rank	1	2	3	4	5	6	7	8	9	10
Crop	Bajara	Jowar	Sugarcane	Wheat	pulses	F & V	O.S.	Fiber	O.C.	Rice
% of total cropped Area	36.20	36.19	8.14	6.79	6.46	3.10	2.48	0.30	0.29	0.00
Cumulative Percentage	-	72.39	80.53	87.32	93.78	96.88	99.36	99.66	99.95	99.98
Crop combination	Two crop combination Bajara ,Jowar crops									

Table No. 2 A. Cropping pattern of Kopargaon 1990-91

Rank	1	2	3	4	5	6	7	8	9	10
Crop	Sugarcane	O.S.	O.C.	Wheat	Pulses	Bajara	Fiber	Fruit	Jowar	Rice
% of total cropped Area	24.56	22.10	12.14	11.62	9.19	6.15	5.28	4.96	4.83	0.00
Cumulative Percentage	-	46.66	58.76	70.38	79.57	85.72	91	95.96	100	-
Crop combination	Five crop combination i.e. sugarcane, oilseed, wheat, other cereal and pulses									

Source: Socio-Economic Review and Statistical Abstract of Ahmednagar District- 1991-92.

Table No. 2 B. Cropping pattern of Kopargaon 2015-16

Source: Socio-Economic Review and Statistical Abstract of Ahmednagar District- 2015-16.

Table No. 2 C. Cropping pattern of Kopargaon 2023-24

Rank	1	2	3	4	5	6	7	8	9	10
Crop	O.S.	O.C.	F & V	Wheat	Sugarcane	pulses	Fiber	Jowar	Bajara	Rice
% of total cropped Area	31.05	25.98	12.65	10.21	8.87	6.70	2.02	1.31	1.20	0.00
Cumulative Percentage	-	57.03	69.69	79.90	88.77	95.47	97.49	98.80	100.00	100.0
Crop combination										

Source: Socio-Economic Review and Statistical Abstract of Ahmednagar District- 2024.

Table No. 2 A, B & C. shows the crops and their percentage to the total cropped area. Applying the Doi's technique of crop combination. After the calculation result shows that two crop combination. In 1990-91 viz Bajara and Jowar was the crop combination. In 2015-16 it shows that five crop combination viz sugarcane, oilseed, wheat, other cereal and pulses.

After nine years i.e. From 2015-16 to 2023-24, there is again changing in crop combination and result is three crop combination. Oil seeds (O.S.) occupying first ranking crop (Soya been) other cereals (O.C.). (Maize) and Fruits and Vegetables second and third ranking crops respectively.

Change in cropping pattern due to the technological advancement in irrigation technology, maximum return from agriculture.

Conclusion

It is universal truth that is technological advancement and maximum return from agriculture is playing key role in the determining crop combination of the study region.

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