



## CROP COMBINATIONS OF SANGLI DISTRICT: A GEOGRAPHICAL STUDY

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### ABSTRACT

*Agriculture plays a crucial role in the economy of a country and it is the backbone of our economic system. Agricultural regionalization is important step for agricultural development and through which we understand the regional imbalance and disparities. Crop Combination analysis is very important for delimitation of agricultural regions. In the present study an attempt has been made to analyze the cropping pattern and crop combinations in Sangli district. The Sangli district is lies in the south-western part of Maharashtra State. The total cropped area of the district is about 7.68 lakh hectares; out of this 24.76% area is under irrigation, through wells, tube wells, tanks etc. The present study is based on secondary data. Rafiullah's(1965) method known as 'Maximum Positive Deviation Method' has applies to compute crop combinations for the district Sangli and tehsilwise analysis are presented. It is observed that six tehsils named Shirala(Rice), Walwa and Miraj(Oil Crops), Khanapur and Tasgaon(Kharip Jowar) and Kavathe Mahankal(Rabbi Jowar) have mono cropping pattern and two tehsils named Atpadi(Rabbi Jowar & Pulses) and Jat(Rabbi Jowar & Oil Crops) have two crop combinations of the district Sangli.*

**Keywords:** Land use, Cropping Pattern, Crop Combination

### INTRODUCTION

Agriculture plays a crucial role in the economy of a country and it is the backbone of our economic system. In the year 2001-02, the agricultural sector of India had contributed around 22.39 per cent share of GDP and it is reduced up to 15.79 % in the year 2013-14 (Source : Central Statistical Organisation (CSO). It happens so the importance of agricultural sector remains constant till today and the developing country like India had made remarkable development and achievements in secondary and tertiary sectors in last few decades it leads today high contribution of these sectors in GDP. However the agricultural sector is a major economic activity on which about 70% population of the country is till dependent and the agricultural sector provides employment, food and raw material for various agro industries. However, in the period of globalization, agriculture of India is facing several problems along with the inadequate and erratic nature of rainfall, in the country.

The state of Maharashtra is a most developing state of the country, which makes remarkable development in the industrial front along with the agricultural sector and the agricultural activity remains fundamental one, though the Sangli district is located in the rain shadow zone of the Maharashtra. The western zone of Maharashtra is highly developed in the agriculture through irrigation development. The frequent occurrence of the droughts affected the nature of agriculture and the cropping pattern.

Agricultural regionalization is important step for agricultural development and through which we understand the regional imbalance and disparities. There is increasing sophistication in the principle and techniques which are used to define and delimit agricultural regions respectively. The

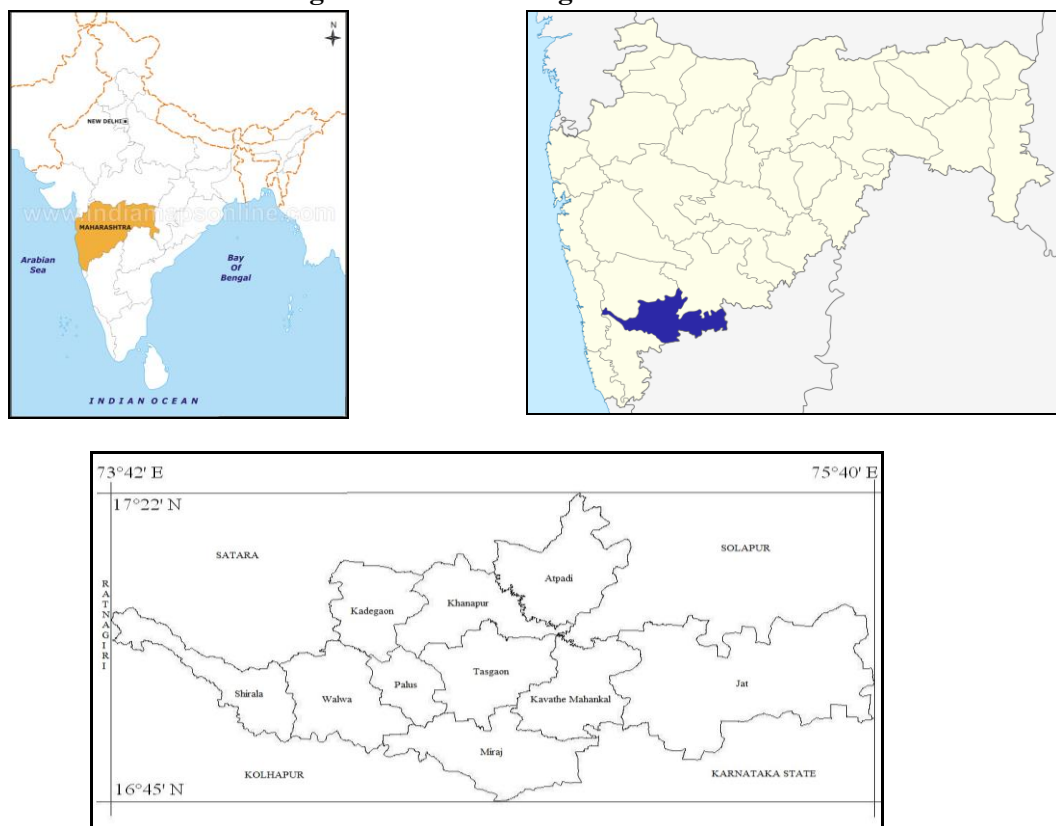
agricultural elements should be considered for agricultural regionalization. There are various techniques which have been used for the delimitation of agricultural region. Through which, *Crop Combination* analysis is very important for delimitation of agricultural region. Weaver (1954) proposed the objective statistical technique of combinatorial analysis to establish crop, livestock and enterprise combinations involving both the qualitative and quantitative aspects of crop raising, livestock husbandry and functioning forms of agriculture. As per Weavers opinion, various crops are cultivated combinatorial.

### STUDY REGION

The Sangli district is lies in the western part of Maharashtra State. It is stretches from 16°45' N to 17°22' N latitude and 73°42' E to 75°40' E longitude. The total area of Sangli distict is 8572 Sq. km. Administratively the Sangli district is divided into ten tehsils namely Miraj, Walva, Palus, Shirala, Kavathe-Mahankal, Khanapur, Kadegaon, Tasgaon, Jath and Atpadi. The study region is bounded from the North by Satara & Solapur district, Southern by Kolhapur, Belgaum & Vijaypur district, Eastern by Vijaypur district, and Western by Ratnagiri district (Fig.1.1). Sangli district as per terrain, climate and rainfall divided into three physical parts i.e. 1) Western Hilly & high rainfall region, 2) Plains alongside river & Medium rainfall region and 3) Eastern Plateau and coarse soil & Low rainfall region. In general the rainfall is decreases from west to east. The climate of the district is generally dry. From central part to eastward region faces severe drought conditions. The average annual rainfall of the district is 620.20 mm. in year 2013.

The district headquarter is Sangli, 728 villages and 7 towns are in the district. Total population of Sangli district is 28,22,143 in 2011, in which rural population is 74.51% and urban population is 25.49% Total cropped area of district is 7,12,592 hectares. Districts total 8.61 lakh hectares areas near about 19% area is occupied by uncultivable land i.e. forest, barren land, always wasteland, infertile and pasture land and 8% area is fallow land. Remained 73% area is cultivable. Out of this 78% is net sown area.

**Fig. 1.1 Location: Sangli District**



**OBJECTIVES**

- 1) To study the agricultural land use of the study area.
- 2) To study the cropping pattern and crop combination in study area.

**DATA BASE & METHODOLOGY**

The present study is based on secondary data collected from Department of Agriculture Sangli District, District Statistical Office. Socio-Economic Reviews of Sangli District, District Census Hand Book, etc. were also referred for collecting relevant information. Statistical techniques like percentage, average have been used in the study. The tehsil is considered as aerial unit for investigation and analyses. The district Sangli posses total ten tehsil units but the newly formed tehsils i.e. Palus(1999) and Kadegaon(2002) have not given yet separate identity in the statistics in the Governmental records. So, the analysis presented considering the old tehsils of district in this research paper.

To analyze the crop combination of the study area, following Raffiullha's Maximum Positive Deviation Method has been used.

$$d = \sqrt{\frac{\sum Dp^2 - Dn^2}{N^2}}$$

Where

d = deviation

Dp = is the positive differences

Dn = is the negative differences from the median value of the theoretical curve value of the combination

N = No. of crops in the combination

Since it is the relative rank of the value of deviation which is needed, the under root sign may be ignored to save laborious calculations and the formula may be used in the following form :

$$d = \frac{\sum Dp^2 - Dn^2}{N^2}$$

The various crops are cultivated in the district which are grouped in to 13 major crops and the results are obtained by using above Rafiullah,s formula and analysis are presented.

**DISCUSSION AND ANALYSIS:****General Land Use:**

Total geographical area of the Sangli district is 8.61 lakh hectares. Out of this near about 22% area occupied by Forest, land not available for agriculture (non-agricultural land & non-cultivable land) and non-cultivated area with fallow land. Besides this 4.3% area is fallow land which included current fallow land & other fallow land. Remaining geographical area of the district i.e. about 74% is net sown area. Out of the total geographical area of the tehsilwise have largest net sown area in Jat (83.8%) and lowest in Shirala (61.6%), (Table No.1.1).

**Table 1.1 General Land Use: Sangli District**

Sr. No.	Tehsil	Geographical Area	Forest Area %	Area Not Available for Agriculture %	Non-cultivated Area with Fallow Land %	Total Fallow Land %	Net Sown Area %
1	Shirala	63417	21	5.09	7.6	5	61.6
2	Walwa	78781	3.7	11.2	2.3	9.3	73.5
3	Khanapur	132602	8.2	10	14	1.7	65.9
4	Atpadi	87171	2.7	12.2	13	1.6	70.3



5	Tasgaon	111259	4.5	9.06	7.2	7.6	71.7
6	Miraj	92624	1.2	11.8	6.3	2.2	78.5
7	K. Mahankal	70673	1.3	16.5	6.7	2.7	72.8
8	Jat	224538	5	4.1	2.5	4.5	83.8
9	Total District	861065	5.5	9.03	7.1	4.3	74.1

Source: District Socio-Economic Abstract (2014)

### CROPPING PATTERN

In this study region out of the total cropped area near about 68% is under food grains, 16% oil crops, 8% sugarcane, 5% fodder crops and remained 3% is under fruits, vegetables, cotton, and tobacco crops. Out of total food grains 54% is under cereal crop and 19% is under pulses. The kharip jowar, rabbi jowar and bajra are the major cereal crops in the district. Along with this the crop rice is cultivated specifically in the high rainfall areas in western part of the district and maize, wheat and other cereal crops are also cultivated where irrigation is available.

In the pulses group of crop grams, kulith, tur, mug, udid and others are mostly cultivated in low rainfall areas of the district specifically in dry farming. (Table No.1.2)

In the category of oil seeds soyabean, groundnut, sunflower, safflower and other oil seeds are cultivated in dry farming as well as in irrigated patches of the district. Nearly 11% area of the district is under cash crops, in which, sugarcane is major cash crop of the district and the sugar belt of this district is famous in the state also. Besides this tobacco, bananas, grapes, pomegranate, guava and other fruits including vegetables are also cultivated various parts of the district. This is possible only because of the irrigation development in the district.

In this study region rice is major crop in Shirala tehsil. Kharip jowar and rabbi jowar are the major crops of the Jat, Kavathe Mahankal, Atpadi, Khanapur and Tasgaon tehsils of the district. The largest area under grapes is observed in Tasgaon tehsil followed by Miraj and Kavathe Mahankal. Mostly the pomegranates are cultivated in the dry zone of the district Jat, Kavthe Mahakal, Atpadi and Khanapur.

**Table 1.2 Tehsilwise Area under Various Crops: Sangli District (%)**

Sr. No.	Crops	Shirala	Walwa	Khanapur	Atpadi	Tasgaon	Miraj	Kavathe Mahankal	Jat
1	Rice	25.40	4.64	0.01	0.01	1.75	0.09	0	0.01
2	Wheat	3.84	3.93	3.95	6.17	5.77	3.53	5.28	2.53
3	K. Jawar	5.74	11.19	36.90	1.80	39.67	14.18	6.33	0.08
4	R. Jawar	3.44	3.30	2.31	55.64	4.39	13.48	38.66	55.97
5	Bajra	0	0.02	6.35	3.32	1.52	7.65	17.99	9.56
6	Maize	5.86	1.21	1.94	1.68	2.69	1.54	0.79	3.62
7	Other Cereals	4.11	0.78	1.36	0.34	0.32	0.18	0.12	0.52
8	Pulses	15.59	11.96	16.89	13.93	16.39	11.47	13.85	8.00
9	Sugarcane	14.46	25.14	4.25	1.71	2.43	12.78	2.00	1.01
10	Fruits	0.54	0.38	4.01	2.31	4.23	1.71	1.33	2.48
11	Other Cash Crops	3.06	2.47	2.21	1.60	2.17	3.21	1.73	2.59
12	Oil Crops	12.23	26.96	15.82	1.06	16.58	26.31	4.12	9.95
13	Fodder Crops	5.73	8.02	4.00	10.43	2.09	3.87	7.80	3.68

Source: District Socio-Economic Abstract (2014)

In this year total cropped area was about 7.68 lakh hectares; out of this 24.77% area is under irrigation, through wells, tube wells, tanks, canal irrigation and lift irrigations developed by co-operative sugar factories in the district. Along with this the Tembhu and Takari Irrigation Project, Mhaisal Irrigation Project and Arfal Irrigation Project are the major sources for canal irrigation in the

district specifically in the drought prone area of the district. Besides this the major and minor irrigation projects in the district also plays important role in the irrigation. In drought prone areas of the district farmers have also developed the farm tank irrigation system and they are using modern techniques for irrigation purpose. (Table No.1.3)

**Table 1.3 Irrigated and Non-irrigated Area: Sangli District**

Sr. No.	Tehsil	Total Cropped Area	Irrigated Area	%	Non Irrigated Area	%
1	Shirala	45036	13440	29.84	31596	70.16
2	Walwa	97054	35456	36.53	61598	63.47
3	Khanapur	115370	21664	18.78	93706	81.22
4	Atpadi	48972	12152	24.81	36820	75.19
5	Tasgaon	92667	20527	22.15	72140	77.85
6	Miraj	108013	30798	28.51	77215	71.49
7	K. Mahankal	50594	11425	22.58	39169	77.42
8	Jat	154886	31038	20.04	123848	79.96
	Total District	712592	176500	24.77	536092	75.23

Source: District Socio-Economic Abstract (2014)

**Crop Combinations:**

After the application of Rafiullah’s maximum positive deviation method for analyzing the cropping pattern of Sangli district, it comes to know that six tehsils of the district have mono cropping pattern and two tehsils have two crop combinations (Table 1.3 & Fig.1.2).

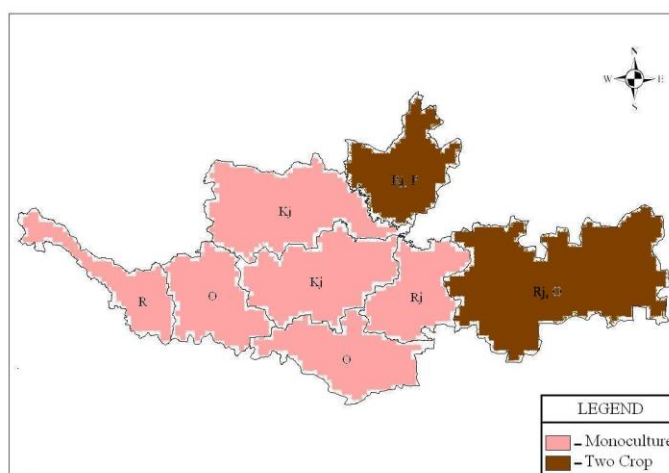
**Mono Cropping Pattern:** The mono cropping patterns is identified in Shirala tehsil with rice is a major crop, which occupies 25.40% area of the tehsil. Along with this major crop sugarcane, pulses and oilseeds are also associated. In the tehsil Walwa and Miraj oilseed is the major crop cultivated in association with sugarcane, pulses and kharip jowar. In the tehsil Khanapur and Tasgaon kharip jowar is a major crop along with the pulses and oilseeds. The Kavathe Mahankal is only a tehsil in the district which having jowar is a major crop in the rabbi season followed by bajra and pulses.

**Two Crop Combination Regions:** Atpadi and Jat tehsils have two crop combinations. In Atpadi tehsil rabbi jowar (55.64%) & pulses (13.93%) are the combinations identified by this method and the third ranking crop of this tehsil is fodder crop due to drought prone conditions of the tehsil leads to animal husbandry. The tehsil Jat have rabbi jowar (55.97%) & oil crops (9.95%) are the crop combinations associated with bajra and pulses.

**Table 1.4 Crop Combinations: Sangli District**

Sr. No.	Tehsil	No. of Crop Combination	Crops
1	Shirala	1	R
2	Walwa	1	O
3	Khanapur	1	Kj
4	Atpadi	2	Rj, P
5	Tasgaon	1	Kj
6	Miraj	1	O
7	K. Mahankal	1	Rj
8	Jat	2	Rj, O

Abbreviations – R=Rice, O=Oil Crops, Kj = Kharif Jowar, Rj = Rabbi Jowar, P=Pulses

**Fig. 1.2 Crop Combinations: Sangli District**

## CONCLUSION

Concluding the features of the land use, cropping pattern and crop combinations of the Sangli district it is observed that,

- Out of the total geographical area of the district about 74% area is net sown area.
- Comparatively the largest net sown area is observed in Jat (83.8%) and lowest in Shirala tehsil of the district (61.6%).
- About 68% area is observed under food grains, 16% oil crops and 8% sugarcane of the total cropped area in the district.
- Mostly the crop rice is cultivated in the high rainfall areas of the district and on the other hand the pulses and oilseeds in association jowar and bajra are crops of the drought prone area.
- About 25% area is irrigated of the total cultivated area in the district where highest percentage of irrigated area observed in the tehsil Walwa followed by Shirala and Miraj.
- In the district Sangli it is observed that six tehsils named Shirala, Walwa, Khanapur, Tasgaon, Miraj and Kavathe Mahankal have mono cropping pattern and two tehsils named Atpadi and Jat have two crop combinations.

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