



An Assessment Of Crop Concentration In Sangli District Of Maharashtra: A Geographical Perspective (2024)

Dr. Tushar T. Waghmare¹, Dr. Amol V. More² & Dr. Prakash T. Waghmare³

¹Assistant Professor, Dept. of Geography Srimant Babasaheb Deshmukh Mahavidyalaya, Atpadi.

²Professor & Head, Dept. of Geography Srimant Babasaheb Deshmukh Mahavidyalaya, Atpadi.

³Assistant Professor & Head, Dept. of Geography Shri. Shiv-Shahu Mahavidyalaya Sarud.

Corresponding Author – Dr. Tushar T. Waghmare

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Introduction:

A crucial idea in agricultural geography is crop concentration, which describes changes in a particular crop's density within a region at a certain moment in time. It aids scholars and planners in comprehending the spatial specialization of agriculture, pinpointing the regions where particular crops flourish and the reasons for their dominance. In essence, a high crop concentration suggests that a certain crop has a "comparative advantage" in that region because of advantageous socioeconomic or environmental circumstances. Important crops like rice, wheat, jowar, bajara, maize, sugarcane, groundnuts, pulses, fruits, vegetables, and soybeans are grown in the Sangli district.

Crop concentration and rain-fed agriculture are closely related in agriculture since whether crops can dominate a given landscape depends on the availability of water, the most important input. Rain-fed agriculture refers to a

system in which the spatial density of a crop is solely governed by natural precipitation, whereas crop concentration assesses that density. Rain-fed agriculture is a farming method that does not use artificial irrigation, such as tube wells or canals, and instead depends entirely on natural rainfall for water. It generates more than 60% of the world's cereal grains and makes up around 80% of the world's cropland.

The geographical and temporal arrangement of crops on a plot of land is referred to as the cropping pattern in rain-fed agriculture, when water is the main factor restricting crop development. Rain-fed cropping patterns are determined by the "vagaries of the monsoon" and natural soil moisture, in contrast to irrigated systems where water is regulated.

Study Area:

Sangli district of Maharashtra which is situated in southern part of the state.

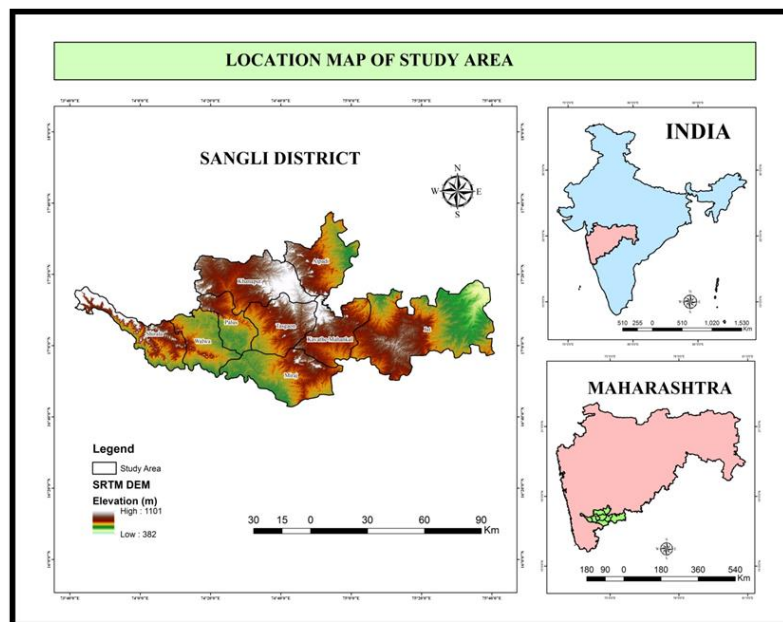


Fig.1 Location map of study area.

Objectives:

1. To study the spatial distribution of major crops cultivated in Sangli district.
2. To analyze the crop concentration index in different tehsils of Sangli district.
3. To identify the dominant crops and its regional variation within the district.

Database & Methodology:

Both Primary and Secondary sources of data served as the foundation for the entire investigation. Primary data was collected through Purposive sampling techniques. The

Physiography, Climatic Condition, Economic Condition of the district was taken into account. Four criteria have been applied in the selection of villages. Some villages are chosen from hilly regions, some are picked from irrigated region, some are chosen from the drought-prone region, and some are chosen from river basin Region.

District gazetteers, the district statistical department, the district's socio-economic evaluation and statistical abstract, reference books, and other sources have provided secondary data.

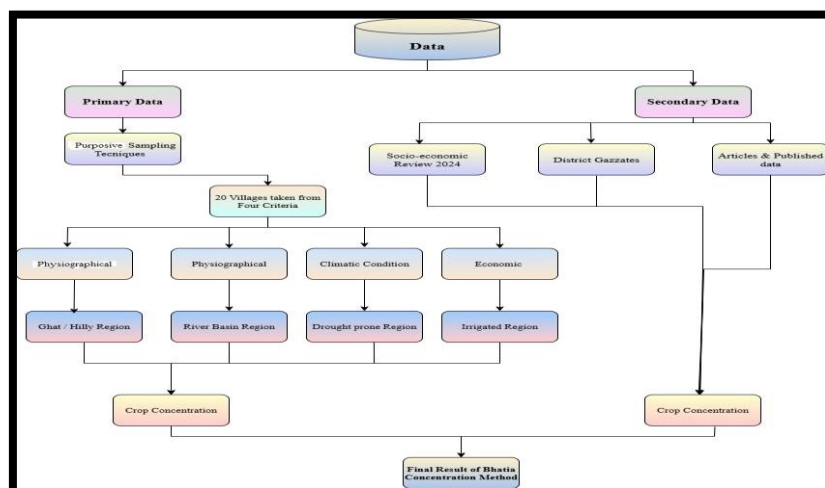


Fig.2 Systematic flow chart of research methodology

Bhatia's location quotient method (1965) is applied in this crop concentration investigation.

For the district's high (More than 1 index value), medium (0.50 to 1), and low (Less than 0.50) crop concentration regions, statistical methods like mean and standard deviation have been applied. The concentration of crops in each of the Sangli district's 10 tehsils is calculated using the formula below. It should be noted that

high concentration is indicated by higher index values, and vice versa. The aforementioned method has been used to determine the crop concentration indices for main crops such as Rice, Wheat, Jowar, Bajara, Maize, Vegetables, Sugarcane, Fruits, Groundnuts and Soybeans in the research region. These classes-high, moderate and low crop concentrations are developed and thoroughly examined.

Index for Crop Concentration of crop A=

$$\frac{\text{Area of crop A in the areal unit}}{\text{Area of all crops in the areal units}} \div \frac{\text{Area of crop A in this district}}{\text{Area of all crops in the district}}$$

Result & Discussion:

Table 1: Distribution of Area under different crops in Sangli District, 2024 (in per cent)

Tehsils	Rice	Wheat	Jowar	Bajara	Maize	Pulses	Sugarcane	Fruits	Vegetables	Groundnut	Soybean
Shirala	87.56	3.01	1.66	0.00	1.35	1.83	7.79	0.30	1.16	13.97	10.00
Walwa	10.07	20.32	1.98	0.00	1.50	8.93	24.34	3.87	9.89	26.08	25.29
Palus	0.93	7.70	0.35	0.00	0.64	4.05	9.99	3.80	1.47	6.57	6.44
Kadegaon	1.28	10.61	5.46	0.04	7.64	6.00	12.90	0.99	14.76	14.69	11.38
Khanapur	0.00	6.13	3.51	0.19	11.86	8.60	11.48	1.77	15.37	6.51	3.46
Atpadi	0.00	4.86	7.87	13.28	6.07	2.65	2.44	13.66	10.57	0.39	0.03
Tasgaon	0.00	11.32	13.55	0.00	5.32	9.33	6.64	21.33	3.47	16.03	11.07
Miraj	0.15	10.92	12.44	0.54	18.38	11.50	12.63	19.88	21.68	5.43	16.14
K-M	0.00	3.83	10.41	14.15	17.82	7.83	3.71	10.01	5.69	1.57	0.40
Jat	0.00	21.29	42.77	71.80	29.42	39.28	8.08	24.39	15.94	8.76	15.79
Total District	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Calculation based on Socio-economic Review of Sangli District, 2024

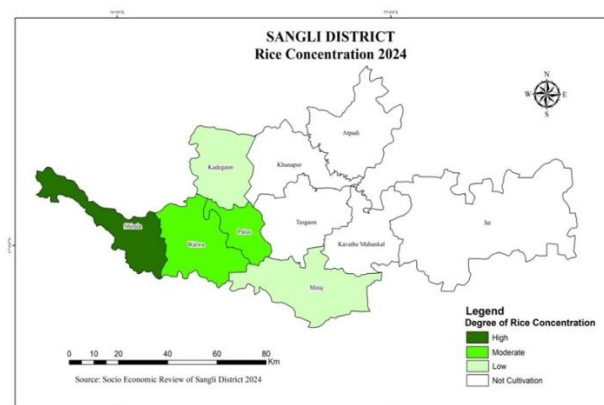
Table 2: Spatial Distribution of Major Crop Concentration Index in Sangli District, 2024

Sr. No.	Tehsils	Rice	Wheat	Jowar	Bajara	Maize	Pulses	Sugarcane	Fruits	Vegetables	Groundnut	Soybean
1	Shirala	14.25	0.49	0.27	0	0.22	0.30	1.27	0.05	0.19	2.27	1.63
2	Walwa	0.85	1.73	0.17	0	0.13	0.76	2.07	0.33	0.84	2.22	2.15
3	Palus	0.21	1.79	0.08	0	0.15	0.94	2.33	0.89	0.34	1.53	1.50
4	Kadegaon	0.17	1.39	0.72	0	1.00	0.79	1.69	0.13	1.94	1.93	1.49
5	Khanapur	0	0.98	0.57	0.02	1.88	1.39	1.85	0.28	2.48	1.05	0.56
6	Atpadi	0	0.87	1.40	2.37	1.08	0.47	0.43	2.44	1.89	0.07	0
7	Tasgaon	0	1.15	1.37	0	0.54	0.95	0.67	2.16	0.35	1.63	1.12
8	Miraj	0.01	0.91	1.03	0.04	1.52	0.96	1.05	1.65	1.8	0.45	1.34
9	K-M	0	0.50	1.36	1.85	2.33	1.02	0.48	1.31	0.74	0.2	0.05
10	Jat	0	0.74	1.48	2.48	1.01	1.36	0.28	0.84	0.55	0.3	0.55
	Mean	1.55	1.05	0.84	0.67	0.98	0.89	1.21	1.00	1.11	1.16	1.039
	SD	4.47	0.46	0.55	1.08	0.75	0.34	0.74	0.85	0.82	0.86	0.71

Source: Calculation based on Socio-economic Review of Sangli District, 2024

Rice Concentration:

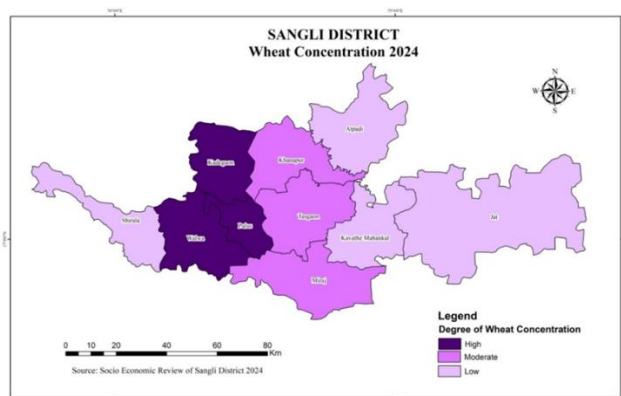
As a whole, rice makes up 2.31% of the district's total cropped land, with different tehsils having different concentrations of rice cultivation. There is only a high concentration of rice agriculture in Shirala tehsil (14.25). The location of Shirala tehsil is in an area with a lot of rainfall, a hot and muggy environment, and loamy & laterite soil, all of which are perfect for growing rice. There is no rice crop farming in the tehsils of Atpadi, Khanapur, Jat, Kavathe-Mahankal and Tasgaon.



Wheat Concentration

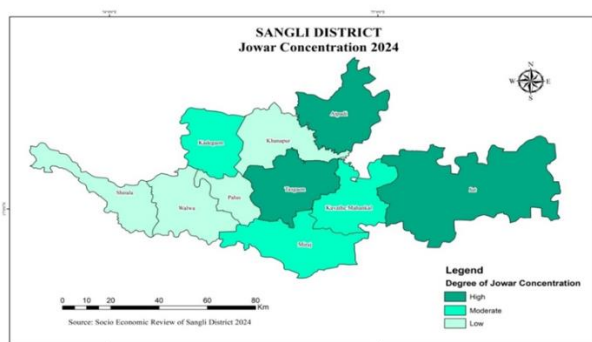
For optimal yield, wheat, a rabi crop, needs a chilly temperature and medium-black soil. About 3.01% of the region's total planted land is made up of wheat. Palus, Walwa and Kadegaon tahsils have a large concentration of wheat due to their fertile black soil and abundant water supply for irrigation. Due to their physical and climatic conditions Atpadi, Jat, K-Mahankal

and Shirala tehsils have low levels of wheat farming.



Jowar Concentration:

Jowar is the region's main food grain crop and the straw from it is fed to the animals. In 2024, it will make up 24.18% of the entire cultivated area. The tehsils of Jat, Atpadi and Tasgaon have a high concentration of Jowar, or greater than 1.35 concentration index, because to their arid climate, moderate rainfall and shallow to medium-deep black soils, which are ideal for growing Jowar crops. As the Shirala, Walwa and Palus tehsils are situated in the Krishna and Warana river basin, they have fertile black soil, plenty of water for irrigation and a comparatively high amount of rainfall, which leads to a high cultivation of cash crops like sugarcane and a low concentration of Jowar crops.



Bajara Concentration:

In the drier portion of the Sangli district, Bajara is a crucial food grain. Typically, this Kharif crop is cultivated in light to shallow, medium-black soil. Bajara has been seen in the region that is located in the district's rain-fed

zone. Bajara makes up for 8.77 % of the region's total cultivated area. Due to insufficient irrigation infrastructure, Jat, Atpadi and Kavathe Mahankal tehsils have a significant concentration of Bajara. Shirala, Walwa, Palus, Kadegaon and Tasgaon tehsil having no cultivation for this crop.

Maize Concentration:

Maize grows best in deep, well-drained alluvial plains and needs between 508 to 762 mm of rainfall. In 2024 about 6.59 % of the total cultivated land under to maize. Maize crops require loamy soils with good drainage. The tehsils of Shirala, Kavathe-Mahankal and Khanapur are known for having a high concentration of maize. There is a low concentration of maize crops in the tehsils of Walwa, Palus, Kadegaon and Tasgaon.

Pulses Concentration:

Pulses are drought-tolerant crops. In study area about 10.31% of the area under pulses cultivation. Many pulses, including gram, udid, tur, mug and others, are farmed in the Sangli district. With the exception of gram, practically all pulses are grown during the kharif season. The environment has an impact on pulses cultivation. Due to heavy rainfall Shirala, Walwa and Kadegaon tehsils have low levels of pulses crop concentration, whereas Due to their favorable climate Jat, K-Mahankal and Khanapur tehsils have the highest concentration.

Sugarcane Concentration:

One significant cash crop that is grown in the study area is sugarcane. As a tropical crop that is irrigated, it needs a lot of water, a hot, humid climate and loamy, deep black soil. Sugarcane makes about 23.32 % of the study region's total planted area. Sugarcane agriculture was found to be highly concentrated in the tehsils of Palus, Walwa and Khanapur. Due to the tehsils' location in a river basin, the black soil, moderate rainfall and sufficient water supply for irrigation led to a significant concentration of sugarcane.

Fruits Concentration:

Fruit crops have occupied about 7.85 % of the Sangli district's cropping area. The two most common fruits seen in the Sangli district throughout the study period were Pomegranates and Grapes. Since grape cultivation is well-known in Tasgaon and Miraj tehsils, the maximum fruit content was found there. Most farmers in Atpadi tehsil grow fruits for cash crops because the tehsil is known for growing pomegranates.

Vegetables Concentration:

About 0.50 % of the cropping area observed in under the vegetables crop in 2024. Vegetable farming is highly concentrated in the northern belt of Sangli (Kadegaon, Khanapur, Atpadi), Moderate in central parts (Walwa, Palus, Miraj) and Low in eastern & western tehsils (Shirala, Tasgaon, Kavathe Mahankal, Jat). Highest concentration of the vegetables crop was observed in Khanapur tehsil with 2.48 concentration index.

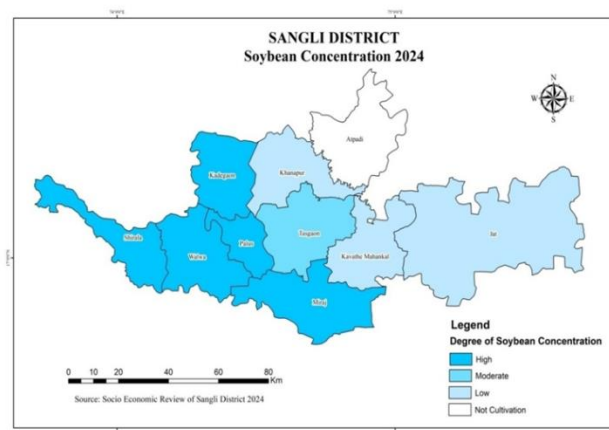
Groundnut Concentration:

The Sangli district's main commercial crop is groundnut. It is mostly grown in rain-fed environments. In 2024, it will make up 4.75 % of all cropped land. Because Shirala, Walwa and Kadegaon tehsils have shallow red soil that is ideal for groundnut farming and irrigation, there is a high concentration of groundnuts there. While eastern part of the district where drought prone condition was observed in that area groundnut cropping area are minimized.

Soybean Concentration:

One of the key oil seeds in the western part of the research area is soybean. Black soil is ideal for growing soybeans. In 2024, soybeans will account for 8.41 % of the study region's total cropped area. Only the Walwa, Shirala, Palus, Miraj and Kadegaon tehsils have high soybean concentrations, because of the heavy rains and deep black soil. According to the study, the

Sangli district's tehsil Atpadi has not grown soybean, due to unfavorable climatic condition.



Conclusion:

The spatial distribution of major crop concentrations in Sangli district reveals significant variability across different tehsils, influenced by factors such as climate, soil type and irrigation availability. Understanding these patterns is crucial for optimizing agricultural practices and enhancing crop productivity in the region. Many acres of land are still used for various crops in the Sangli district, which is traversed by the Krishna and Warana Rivers. The irrigated regions of the Palus, Kadegaon and Walwa tehsils are mostly suited to sugarcane and soybean crops. In the arid regions of the Jat, Kavathe Mahankal, Atpadi and Khanapur tehsils, rain-fed crops like as Jowar, Bajara and Maize are produced. Tasgaon and Miraj tehsils are notable for their Grape growing; there was the highest fruit content. Since Atpadi tehsil is recognized for producing Pomegranates, the majority of farmers there cultivate fruits as cash crops. Due to lack of irrigational infrastructure and drought, the eastern portion of the Sangli district is less developed than the western portion.

Suggestions:

- Expand drip and sprinkler irrigation systems, especially in drought-prone eastern tehsils (Atpadi, Jat, Kavathe Mahankal, Khanapur).

- Promote watershed development projects and rainwater harvesting to reduce dependency on erratic rainfall.
- Reduce over-dependence on sugarcane in irrigated tehsils (Palus, Walwa, Kadegaon) to avoid soil depletion and water stress.
- Promote fruit farming in Jat and Khanapur as profitable alternatives in semi-arid areas.
- Encourage cultivation of less water-intensive but high-value crops such as pulses, oilseeds, and vegetables.
- Special government schemes should target the **eastern tehsils** to reduce the development gap between western and eastern Sangli.

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