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# Assessment of Agriculture Productivity Using GIS Techniques in Chhatrapati Sambhajinagar District.

**M. V. Suryawanshi[1], J. D. Wetal[2], C. U. Bhore[3], S. H. More[4]**

## *Abstract*

*With an emphasis on nine important crops, this research uses GIS tools to assess agricultural production in the Chhatrapati Sambhajinagar area for 2020-21. Optimizing resource allocation, guaranteeing food security, and promoting sustainable agricultural growth all depend on an understanding of geographical differences in productivity. Crop production levels in various tehsils are to be evaluated in order to divide them into zones of low, medium, and high productivity. Finding these differences gives policymakers important information to improve agricultural productivity.*

*The methodology uses the yield and concentration index integration method developed by Jasbir Singh in 1976. The inputs required to calculate productivity indices are obtained from secondary data sources, such as the Chhatrapati Sambhajinagar District Handbook and the Department of Economics and Statistics. To examine geographical differences in agricultural performance among the tehsils, a ranking coefficient approach is used.*

*Significant differences in agricultural production are revealed by the findings. Because of their excellent agricultural techniques, irrigation systems, and good agroclimatic conditions, Paithan, Vaijapur, and Soegaon are known for their high levels of production. Sillod and Kannad, on the other hand, exhibit low output due to limited irrigation and poor soil conditions. Zones of moderate production provide room for advancement through improved technical interventions and resource management.*

*In order to close production disparities, the conversation focuses on specific actions like more irrigation, better soil management, and precision farming. In order to ensure long-term sustainability and regional food security, the study emphasizes the need of GIS-based spatial analysis in agricultural planning.*

*Key Words: Crop Area, Productivity, Crop Area, Crop Concentration*

## *Introduction*

*Agriculture, the backbone of the Indian economy, is essential to the lives of almost two-thirds of the people as well as to food security and economic stability. Despite advancements in seed science, irrigation, and farming methods, regional disparities in agricultural output persist. These differences result from differences in climate, soil fertility, infrastructural development, and availability to contemporary farming methods. In order to develop data-driven strategies that can improve overall productivity and resource efficiency, it is imperative to recognize and analyze these variances. According to J.D. Wetal et al. (2024), the purpose of these findings is to assist policymakers in improving high-productivity zones for sustainable agricultural expansion while addressing the problems of underperforming regions. The production difference across areas may be further closed by implementing climate-resilient techniques, encouraging precision farming, and bolstering agricultural extension services. A quantitative measure of agriculture's ability to generate crops is called agricultural productivity. It is not the same as soil fertility, which describes a soil's capacity to supply nutrients to plants. According to Shafi (1967), productivity is the idea of how effectively inputs are used in agricultural output. It gives an estimate of farm output per unit of input by calculating the ratio of the index of agricultural outputs to the total inputs used in farm production (Pandit 1965). Productivity, according to Saxon (1965), is the physical link between output and the input that generates it. Since just one input or a collection of inputs have been considered for determining farm productivity, the measures of agricultural productivity that have been widely used in various regional studies of agriculture are often those of partial productivity (Shafi 1971). Farm inputs are divided into three primary types by Herring (1964): capital, labor, and land. Adopting a composite measure that incorporates all of these agricultural components may be challenging for two reasons.*

First off, compared to assessing total productivity, the data needed to measure productivity as a single input is more likely to be accessible. Second, the impacts of compositional changes may be obscured by the sum of the inputs.

Land has gained spatial relevance in regional agricultural research as it is the input that is most permanently fixed. It should come as no surprise that a large number of productivity metrics rely on the land component of agricultural inputs. In the absence of any measures for the cultivation of overall productivity, it is important to realize that the choice of productivity measures would mostly depend on the objective for which their assessment is required. Regional differences in productivity and agricultural production are greatly influenced by factors including land use patterns, terrain, and soil fertility. The long-term sustainability of agriculture is also influenced by land management measures, such as crop rotation, effective irrigation, and soil conservation methods. Researchers may create region-specific strategies to maximize land usage and boost production by having a thorough understanding of these spatial factors. Furthermore, combining geospatial technologies like remote sensing and GIS can offer more in-depth understandings of agricultural productivity and land suitability, assisting decision-makers. Farm technological advancements and land reforms will be impacted. Where it is desirable to know the income of the people involved in agriculture, the notion of labor productivity might be used. Taking into account the capital component of agricultural inputs might help one better understand the cost-benefit scenario of farming. However, it should be mentioned that capital investment systems are frequently so intricate that it is challenging to calculate and understand capital-based productivity.

Development is a multifaceted phenomenon that gives society both quantitative development and qualitative improvements. It has been suitably conceived as a procedure that raises people's standard of living (Siddiqui et al., 2010). A balanced regional developmental process must be ensured in order to advance society's progress in a sustainable way. Large inter- and intra-regional inequalities exist throughout the regions as a result of the unequal distribution of people and physical resources as well as socio-institutional factors, which is a major problem for both developed and developing countries worldwide today. In both emerging and developed nations, regional inequities have emerged as one of the most significant, obvious, and expanding issues (Sharma & Kumar, 1993).

**Study Area**

The entire area of Chhatrapati Sambhajinagar District, which is in the central elevated part of the state, is situated inside the Godavari Basin, save for a small section in the north and northwest that is under the Tapi drainage system. The Godavari River and its tributaries delineate the southern portion of the district. Its geographic coordinates are latitudes 19°17'N to 20°40'N and longitudes 74°39'E to 76°40'E. It is surrounded by the districts of Nashik to the west, Ahmednagar to the south and southwest, Jalgaon to the north, and Jalna to the east. Additionally, it has lesser boundaries with Beed district in the south and Buldhana district in the northeast. The district occupies 10,100 square kilometers, or 3.28 percent of Maharashtra's total area. Of this, 98.60% is rural, while just 1.40% is urban. According to the 2011 Census, there are 3,695,928 people living in the Chhatrapati Sambhajinagar district, which is the same number as Liberia. In India, it is rated 72nd out of 640 districts.

**Location Map**

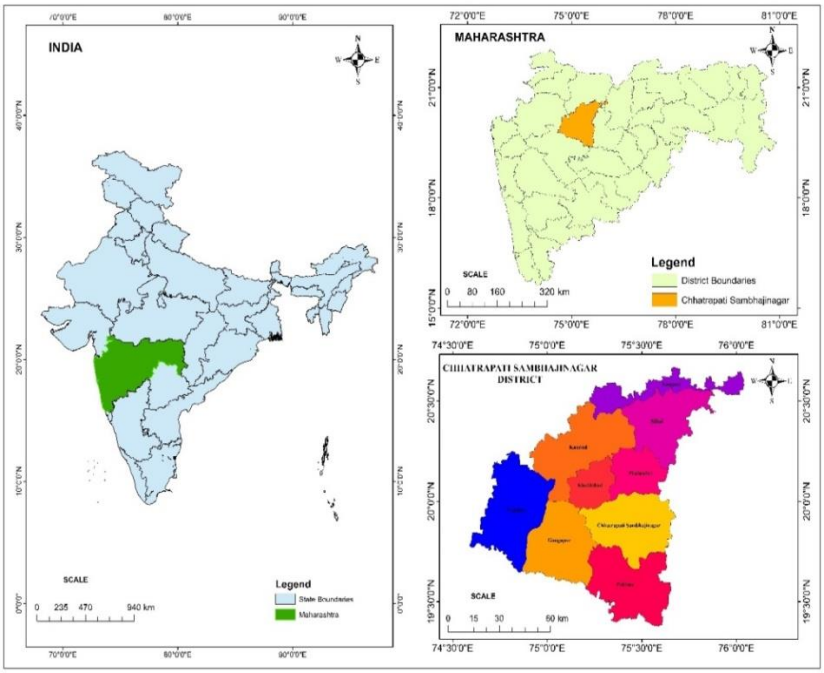


**Fig. No. 1**

**Objective**

Here are two major objectives for the research study.

1) To evaluate the productivity levels of crops in the study region.
2) To identify and classify the tehsils within the district into categories of low, medium and high agriculture productivity.

**Material and Methods**

The primary objective of this research is to assess the district's agricultural productivity during the years 2021–2022. To do this, nine of the primary crops cultivated in the region were chosen for close inspection. The data utilized in this study came from secondary sources. The particular sources of the data used for the study were the district's socioeconomic overview, the Chhatrapati Sambhajinagar District Handbook, and the Department of Economics and Statistics. These materials ensure a solid foundation for the research by offering in-depth studies of the agricultural performance and productivity of the selected crops. This approach aims to offer an accurate assessment of the district's agricultural output throughout the specified period. With an emphasis on important crops in the Oriental World, Jasbir Singh developed a technique in 1976 to assess regional food production and pinpoint less productive agricultural regions. In his method, concentration and crop production indicators are computed, ranked, and then combined to provide an average coefficient. By determining the carrying capacity of the soil, this coefficient calculates agricultural production and provides an unbiased assessment of agricultural efficiency.

$$\mathbf{Yi} = \frac{Yae}{Yar} \times \mathbf{100}$$

Whereas,

Yi = Yield Index of Crop
Yar = Average Yield of Crop ‘a’ in the tehsil
Yar = Average Yield of Crop ‘a’ in the district

$$\mathbf{Ci} = \frac{Pae}{Par} \times \mathbf{100}$$

Whereas,

Ci = Crop Concentration Index
Pae = Percentage of Crop ‘a’ in the tehsil
Par = Percentage Crop ‘a’ in the district

The ranking coefficient for crop yield and concentration indices is calculated by averaging the ranks of yield and concentration for each crop, then rating these averages individually.

Crop yield and Concentration indices Ranking Coefficient For Crop

$$\frac{Crop\ Yield\ Index\ Ranking\ Crop\ 'A" + Crop\ Concentration\ Index\ Ranking\ Crop\ 'A'}{2}$$

**Result and Discussion**

The Jasbir Singh is used in this study to evaluate agricultural crop yield in the region's several tehsils for 2021–2022. Along with crop land area, productivity, and ranking across tehsils, important crops such as cotton, wheat, maize, and legumes are included. A ranking coefficient index, which provides data on the performance of the agricultural productivity, is used to classify tehsils into high, moderate, and poor output levels.

**Table No.: 01- Tehsil-wise Crop Productivity and Ranking in the District (2020-21)**

| Crops | Kannad | | Soegaon | | Sillod | | Phulambri | | Chh.atrapati Sambhajianagr | | Khuldabad | | Vaijapur | | Gangapur | | Paithn | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yi | Rank | Yi | Rank | Yi | Rank | Yi | Rank | Yi | Rank | Yi | Rank | Yi | Rank | Yi | Rank | Yi | Rank |
| Wheat | 12.41 | 3 | 10.46 | 6 | 11.70 | 4 | 11.76 | 4.5 | 16.89 | 3.5 | 9.04 | 4.5 | 8.12 | 7 | 11.15 | 4.5 | 8.48 | 6 |
| Jowar | 14.05 | 4.5 | 10.74 | 3 | 17.05 | 4.5 | 12.18 | 7.5 | 9.74 | 4 | 11.48 | 4 | 6.94 | 6.5 | 8.30 | 4 | 9.52 | 3.5 |
| Bajara | 12.17 | 6 | 5.64 | 5.5 | 8.98 | 7 | 17.76 | 4 | 5.30 | 4 | 18.00 | 4 | 15.83 | 2 | 4.90 | 7 | 11.41 | 2.5 |
| Maize | 10.35 | 3.5 | 8.61 | 5 | 9.12 | 4.5 | 13.79 | 3 | 25.67 | 4 | 8.52 | 4.5 | 9.56 | 3 | 7.30 | 7.5 | 7.10 | 8 |
| Pulses | 9.56 | 6 | 11.53 | 4 | 11.85 | 4 | 16.69 | 3.5 | 12.61 | 3.5 | 6.88 | 6.5 | 12.14 | 4.5 | 10.09 | 4.5 | 8.65 | 4.5 |
| Sugarcane | 8.89 | 8.5 | 0.00 | 8.5 | 7.59 | 8.5 | 17.96 | 4 | 12.41 | 6.5 | 14.81 | 5.5 | 13.33 | 5 | 13.33 | 1.5 | 11.67 | 1.5 |
| Cotton | 14.15 | 3 | 11.79 | 1 | 13.96 | 4 | 11.79 | 6 | 1.90 | 6 | 10.66 | 6.5 | 11.77 | 4 | 11.93 | 3 | 12.05 | 3 |
| Spices | 0.00 | 0.5 | 0.00 | 3.5 | 0.00 | 0.5 | 0.00 | 1.5 | 0.00 | 4.5 | 0.00 | 3 | 0.00 | 4.5 | 0.00 | 4.5 | 0.00 | 4 |
| Oil Seeds | 9.17 | 5.5 | 6.11 | 4 | 10.11 | 3.5 | 12.87 | 6.5 | 16.05 | 4.5 | 14.34 | 2 | 9.36 | 4 | 17.32 | 4 | 4.67 | 7.5 |

**Source:** Computed By Researcher

**Table No.: 02 - Crop Concentration and Ranking in the District (2020-21)**

| Crops | Kannad | | Soegaon | | Sillod | | Phulambri | | Chh.atrapati Sambhajianagr | | Khuldabad | | Vaijapur | | Gangapur | | Paithn | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ci | Ranks | Ci | Ranks | Ci | Ranks | Ci | Ranks | Ci | Ranks | Ci | Ranks | Ci | Ranks | Ci | Ranks | Ci | Ranks |
| Wheat | 114.76 | 3 | 26.53 | 8 | 141.17 | 4 | 159.10 | 1 | 82.57 | 5 | 119.13 | 3 | 63.63 | 7 | 93.07 | 5 | 84.00 | 6 |
| Jowar | 58.90 | 7 | 82.01 | 3 | 8.97 | 8 | 5.36 | 9 | 255.42 | 2 | 105.33 | 4 | 74.81 | 5 | 160.75 | 2 | 185.45 | 3 |
| Bajara | 49.45 | 8 | 77.23 | 4 | 15.85 | 7 | 57.70 | 6 | 261.91 | 1 | 90.25 | 7 | 115.50 | 3 | 83.76 | 6 | 185.92 | 2 |
| Maize | 152.36 | 2 | 73.77 | 5 | 144.94 | 3 | 147.65 | 2 | 47.18 | 7 | 130.76 | 2 | 126.79 | 1 | 45.01 | 8 | 10.12 | 9 |
| Pulses | 76.50 | 6 | 60.03 | 6 | 103.58 | 5 | 81.61 | 4 | 136.05 | 3 | 103.85 | 5 | 73.10 | 6 | 104.43 | 4 | 155.34 | 4 |
| Sugarcane | 45.01 | 9 | 1.31 | 9 | 2.90 | 9 | 56.40 | 7 | 15.61 | 8 | 68.56 | 9 | 60.95 | 8 | 226.80 | 1 | 357.92 | 1 |
| Cotton | 79.28 | 5 | 157.71 | 1 | 67.69 | 6 | 79.64 | 5 | 110.16 | 4 | 70.13 | 8 | 108.30 | 4 | 127.40 | 3 | 118.66 | 5 |
| Spices | 260.58 | 1 | 52.18 | 7 | 185.36 | 1 | 146.16 | 3 | 13.48 | 9 | 94.74 | 6 | 36.93 | 9 | 29.10 | 9 | 11.52 | 8 |
| Oil Seeds | 80.51 | 4 | 146.26 | 2 | 164.03 | 2 | 47.91 | 8 | 74.10 | 6 | 150.90 | 1 | 118.97 | 2 | 77.86 | 7 | 51.78 | 7 |

**Source:** Computed By Researcher

**Table No.03- Tehsil-wise Ranking Coefficient Index by Jasbir Singh Method (2020-21)**

| Ranking Coefficient Index by Jasbir Singh Method | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Crops | Kannad | Soegaon | Sillod | Phulambri | Chh.atrapati Sambhajianagr | Khuldabad | Vaijapur | Gangapur | Paithn |
| Wheat | 3 | 6 | 4 | 4.5 | 3.5 | 4.5 | 7 | 4.5 | 6 |
| Jowar | 4.5 | 3 | 4.5 | 7.5 | 4 | 4 | 6.5 | 4 | 3.5 |
| Bajara | 6 | 5.5 | 7 | 4 | 4 | 4 | 2 | 7 | 2.5 |
| Maize | 3.5 | 5 | 4.5 | 3 | 4 | 4.5 | 3 | 7.5 | 8 |
| Pulses | 6 | 4 | 4 | 3.5 | 3.5 | 6.5 | 4.5 | 4.5 | 4.5 |
| Sugarcane | 8.5 | 8.5 | 8.5 | 4 | 6.5 | 5.5 | 5 | 1.5 | 1.5 |
| Cotton | 3 | 1 | 4 | 6 | 6 | 6.5 | 4 | 3 | 3 |
| Spices | 0.5 | 3.5 | 0.5 | 1.5 | 4.5 | 3 | 4.5 | 4.5 | 4 |
| Oil Seeds | 5.5 | 4 | 3.5 | 6.5 | 4.5 | 2 | 4 | 4 | 7.5 |

**Source:** Computed by Researcher

**Table No.04- Level of Agriculture Productivity Regions**

| **Crops** | **Ranking Coefficient Index by Jasbir Singh Method** | | | | | |
|---|---|---|---|---|---|---|
| | **Low** | **Tehsils** | **Medium** | **Tehsils** | **High** | **Tehsils** |
| Wheat | < 4 | Kannad, Chhatrapati Sambhajinagar, Sillod | 4.1- 4.5 | Phulambri, Khuldabad, Gangapur | > 4.51 | Soegaon, Paithan, Vaijapur |
| Jowar | < 3.5 | Soegaon, Paithan | 3.51- 4 | Chhatrapati Sambhajinagar, Khuldabad, Gangapur | > 4.1 | Kannad, Sillod, Vaijapur, Phulambri |
| Bajara | < 2.75 | Vaijapur, Paitha | 2.76 – 4 | Phulabri, Chhatrapati Sambhajinagar, Khuldabad | > 4.1 | Kannad, Sillod, Gangapur |
| Maize | < 3.5 | Vaijapur, Phulambri, Kannad | 3.51 – 4.5 | Chhatrapati Sambhajinagar, Sillod, Khuldabad | > 4.6 | Soegaon, Gangapur, Paithan |
| Pulses | < 4 | Phulambri, Chhatrapati Sambhajinagar, Soegaon, Sillod | 4.1 – 4.5 | Vaijapur, Gangapur, Paithan | > 4.51 | Kannad, Khuldabad |
| Sugarcane | < 4 | Gangapur, Paithan, Phulambri | 4.1 – 6.5 | Vaijapur, Khuldabad, Chhatrapati Sambhajinagar | > 6.51 | Kannad, Sillod, Soegaon |
| Cotton | < 3 | Soegaon, Kannad, Gangapur, Paithan | 3.1 – 4 | Sillod, Vaijapur | > 4.1 | Phulambri, Chhatrapati Sambhajinagar, Khuldabad |
| Spices | < 1.5 | Kannad, Sillod, Phulambri | 1.51 – 4 | Khuladabad, Soegaon, Paithan | > 4.1 | Chhatrapati Sambhajinagar, Vaijapur, Gangapur |
| Oil Seeds | < 3.5 | Khuladabad, Sillod, | 3.51 – 4.5 | Soegaon, Vaijapur, Gangapur, Chhatrapati Sambhajinagar | > 4.51 | Kannad, Paithan, Phulambri |

Source: Computed by Researcher

**Wheat**

There are notable differences in wheat productivity amongst the district's several tehsils. With an index value below 4, the low productivity regions include Sillod (4), Chhatrapati Sambhajinagar (3.5), and Kannad (3). Lower wheat yields are a result of issues in these regions, such as poor soil and insufficient irrigation. Tehsils like Phulambri (4.5), Khuldabad (4.5), and Gangapur (4.5) are examples of medium productivity regions, with index scores ranging from 4.1 to 4.5. High

productivity regions include Soegaon (6), Paithan (6), and Vaijapur (7), where the index value is more than 4.51. Higher wheat yields are produced in these areas because of their ideal climate, rich soil, and effective agricultural methods.

**Jowar**

Jowar production varies significantly between the tehsils in the district. With an index value below 3.5, Soegain (3) and Paithan (3.5) are considered poor productivity zones. The low yields in these regions may be caused by inadequate rainfall and less-than-ideal soil conditions. With index values ranging from 3.51 to 4, the tehsils of Chhatrapati Sambhajinagar (4), Khuldabad (4), and Gangapur (4) are considered medium productive zones. With an index value over 4.1, the tehsils of Kannad (4.5), Silood (4.5), Vaijapur (6.5), and Phulambri (7.5) are considered high productive zones. These regions have far higher jowar productivity because of their ideal climate, sound farming practices, and improved input use.

**Bajara**

Bajara production varies greatly between the tehsils of the district. Regions with poor productivity include Vaijapur (2) and Paithan (2.5), both of which have index values below 2.75. Crop yields are hampered in these regions by issues including low soil quality and insufficient irrigation. With index values ranging from 2.76 to 4, the tehsils of Phulambri (4), Chhatrapati Sambhajinagar (4), and Khuldabad (4) are considered medium productive zones. The average soil fertility and farming methods in these areas probably contribute to their mediocre yields. With an index value above 4.1, the tehsils of Kannad (6), Silood (7), and Gangapur (7) are considered high productive zones. Because of their ideal agroclimatic conditions, efficient farming methods, and improved access to agricultural resources, these regions produce large yields.

**Maize**

Different tehsils in the district exhibit varying levels of maize productivity. With an index value below 3.5, the poor productivity zones include tehsils Vaijapur (3), Phulambri (3), and Kannad (3.5). With index values ranging from 3.51 to 4.5, the tehsils of Chhatrapati Sambhajinagar (4), Sillod (4.5), and Khuldabad (4.5) are considered medium productive areas. Due to a mix of ordinary farming practices and fair soil fertility, these areas exhibit modest yields. With an index value of 4.51, the tehsils of Soegaon (5), Gangapur (7.5), and Paithan (8) are considered high productive zones. Modern agricultural techniques and effective use of resources enable these tehsils to produce maize with remarkable yields.

**Pulses**

Different tehsils in the district have varying levels of pulse productivity. With an index value below 4, the poor productivity zones include Soegaon (4), Phulambri (3.5), Chhatrapati Sambhajinagar (3.5), and Sillod (4). Lower pulse yields are the result of issues these tehsils confront, including as poor soil conditions and insufficient irrigation infrastructure. With index values ranging from 4.1 to 4.5, the tehsils of Vaijapur (4.5), Gangapur (4.5), and Paithan (4.5) are considered medium productive regions. The tehsils of Kannad (6) and Khuldabad (6.5) are examples of high production zones, with index values exceeding 4.51. Improved agronomic techniques, healthier soil, and enough water availability all contribute to these areas' higher yields and more effective pulse production.

**Sugarcane**

Based on index values, the district's sugarcane productivity is divided into three different zones. Tehsils Phulambri (4), Paithan (1.5), and Gangapur (1.5) are among the poor productivity locations, having an index value below 4. With index values between 4.1 and 6.5, the tehsils of Vaijapur (5), Khuldabad (5.5), and Chhatrapati Sambhajinagar (6.5) are considered medium productive areas. These tehsils, which profit from marginally improved resource management and agricultural techniques, have modest sugarcane yields. The tehsils of Kannad (8.5), Sillod (8.5), and Soegaon (8.5) are examples of high productivity zones, as indicated by an index value above 6.51. These locations are the district's top producers of sugarcane because of their exceptional yields, which are a result of their ideal climate, effective water utilization, and cutting-edge agricultural methods.

**Cotton**

Based on the index values, the district's cotton productivity is separated into three groups. With an index value below 3, the poor productivity zones include tehsils Soegaon (1), Kannad (3), Gangapur (3), and Paithan (3). These tehsils struggle with issues including low soil fertility and limited access to contemporary farming methods, which diminish cotton production. Tehsils Sillod (4) and Vaijapur (4) are examples of medium productive zones, with index values between 3.1 and 4. Because of more efficient resource allocation and balanced farming methods, these regions have moderate cotton yield. With an index value exceeding 4.1, high productivity zones include Khuldabad (6.5), Chhatrapati Sambhajinagar (6), and Phulambri tehsils (6).

**Spices**

The district's tehsils varied greatly in their production, with various classifications into low, medium, and high productivity areas. Tehsils with index values below 1.5, such as Kannad (0.5), Sillod (0.5), and Phulambri (1.5), are considered poor productivity zones. Tehsils Khuladabad (3), Soegaon (3.5), and Pathian (4) are medium productive zones,

with index values between 1.51 and 4. Although there is always opportunity for development, these areas show modest output in spices, which may be related to slow advancements in agricultural practices and resource availability. Tehsils with index values above 4.1, such as Chhatrapati Sambhajinagar (4.5), Vaijapur (4.5), and Gangapur (4.5), are considered high production zones.

**Oilseeds**

In the district, the productivity of oilseeds varies, with tehsils categorized into low, medium, and high productivity regions based on their index values. The low productivity regions, where the index value is less than 3.5, include tehsils Khuladabad (2) and Sillod (3.5). These areas struggle with factors such as poor soil quality and limited access to modern farming techniques, leading to lower oilseed yields. Medium productivity regions, with index values between 3.51 and 4.5, comprise tehsils Soegaon (4), Vaijapur (4), Gangapur (4), and Chhatrapati Sambhajinagar (4.5). These regions exhibit moderate oilseed production, which may be due to gradual adoption of better farming practices and improved resource management. High productivity regions, where the index value exceeds 4.51, include tehsils Kannad (5.5), Phulambri (6.5), and Paithan (7.5).

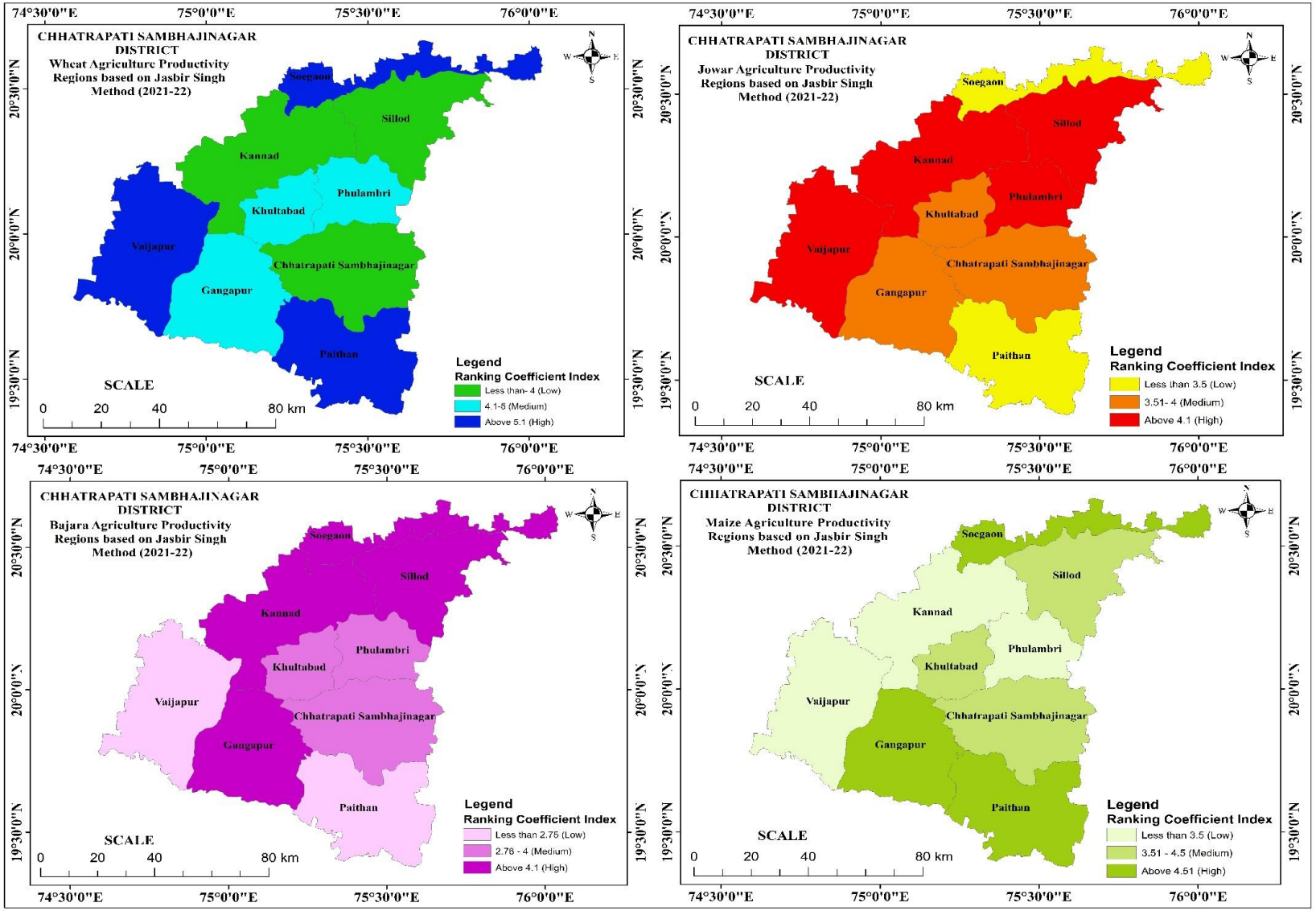
CHHATRAPATI SAMBHAJINAGAR DISTRICT
Wheat Agriculture Productivity Regions based on Jasbir Singh Method (2021-22)
Soegaon
Sillod
Kannad
Phulambri
Khultabad
Vaijapur
Chhatrapati Sambhajinagar
Gangapur
Paithan
SCALE
0 20 40 80 km
Legend
Ranking Coefficient Index
Less than- 4 (Low)
4.1-5 (Medium)
Above 5.1 (High)
CHHATRAPATI SAMBHAJINAGAR DISTRICT
Jowar Agriculture Productivity Regions based on Jasbir Singh Method (2021-22)
Legend
Ranking Coefficient Index
Less than 3.5 (Low)
3.51- 4 (Medium)
Above 4.1 (High)
CHHATRAPATI SAMBHAJINAGAR DISTRICT
Bajara Agriculture Productivity Regions based on Jasbir Singh Method (2021-22)
Legend
Ranking Coefficient Index
Less than 2.75 (Low)
2.76 - 4 (Medium)
Above 4.1 (High)
CHHATRAPATI SAMBHAJINAGAR DISTRICT
Maize Agriculture Productivity Regions based on Jasbir Singh Method (2021-22)
Legend
Ranking Coefficient Index
Less than 3.5 (Low)
3.51 - 4.5 (Medium)
Above 4.51 (High)
74°30'0"E
75°0'0"E
75°30'0"E
76°0'0"E
20°30'0"N
20°0'0"N
19°30'0"N

**Fig. No. 02**

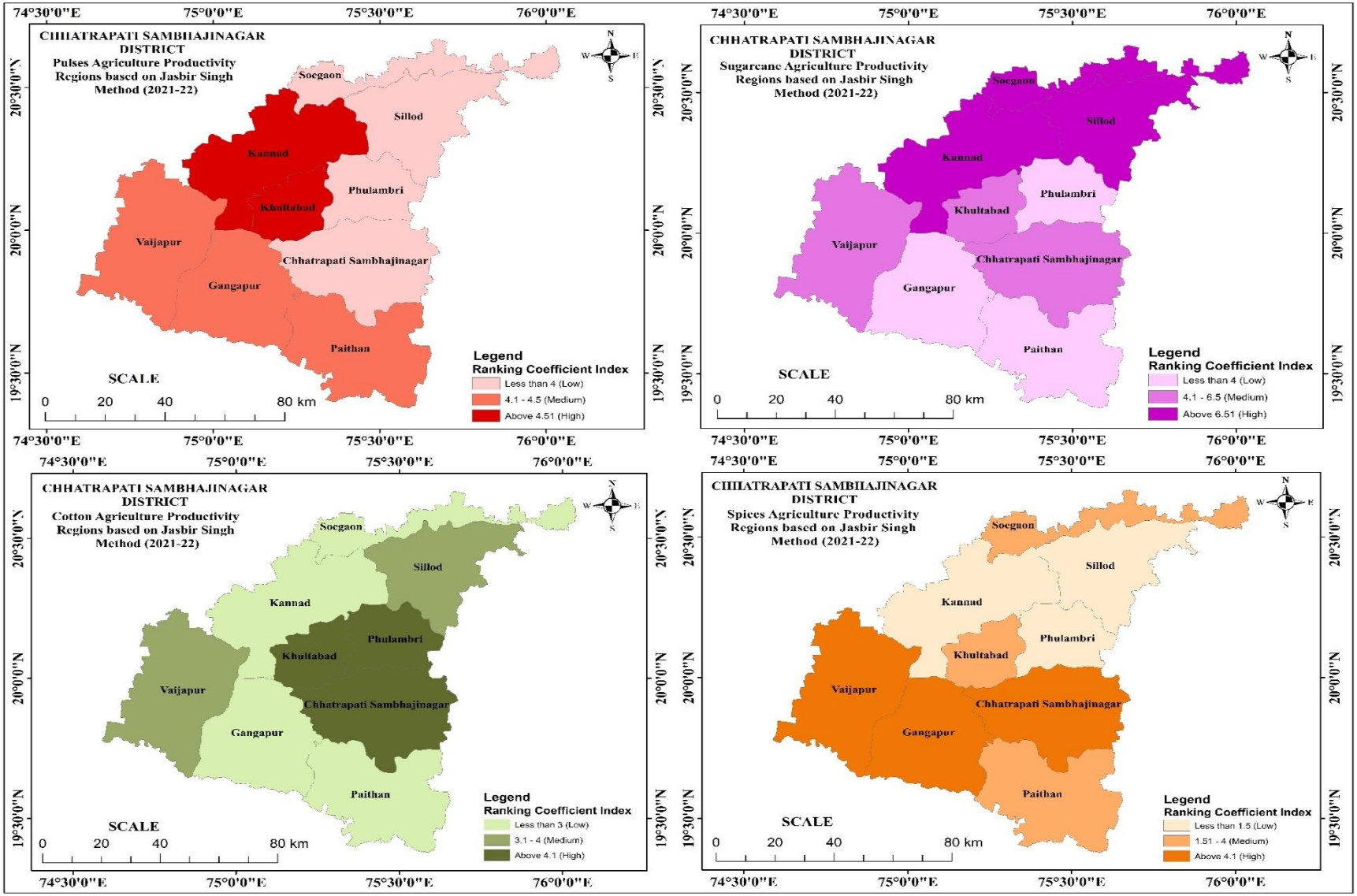
CHHATRAPATI SAMBHAJINAGAR DISTRICT
Pulses Agriculture Productivity Regions based on Jasbir Singh Method (2021-22)
Socgaon
Sillod
Kannad
Phulambri
Khultabad
Vaijapur
Chhatrapati Sambhajinagar
Gangapur
Paithan
Legend
Ranking Coefficient Index
Less than 4 (Low)
4.1 - 4.5 (Medium)
Above 4.51 (High)
SCALE
0 20 40 80 km
CHHATRAPATI SAMBHAJINAGAR DISTRICT
Sugarcane Agriculture Productivity Regions based on Jasbir Singh Method (2021-22)
Legend
Ranking Coefficient Index
Less than 4 (Low)
4.1 - 6.5 (Medium)
Above 6.51 (High)
CHHATRAPATI SAMBHAJINAGAR DISTRICT
Cotton Agriculture Productivity Regions based on Jasbir Singh Method (2021-22)
Legend
Ranking Coefficient Index
Less than 3 (Low)
3.1 - 4 (Medium)
Above 4.1 (High)
CHHATRAPATI SAMBHAJINAGAR DISTRICT
Spices Agriculture Productivity Regions based on Jasbir Singh Method (2021-22)
Legend
Ranking Coefficient Index
Less than 1.5 (Low)
1.51 - 4 (Medium)
Above 4.1 (High)
74°30'0"E
75°0'0"E
75°30'0"E
76°0'0"E
20°30'0"N
20°0'0"N
19°30'0"N

**Fig. No. 03**

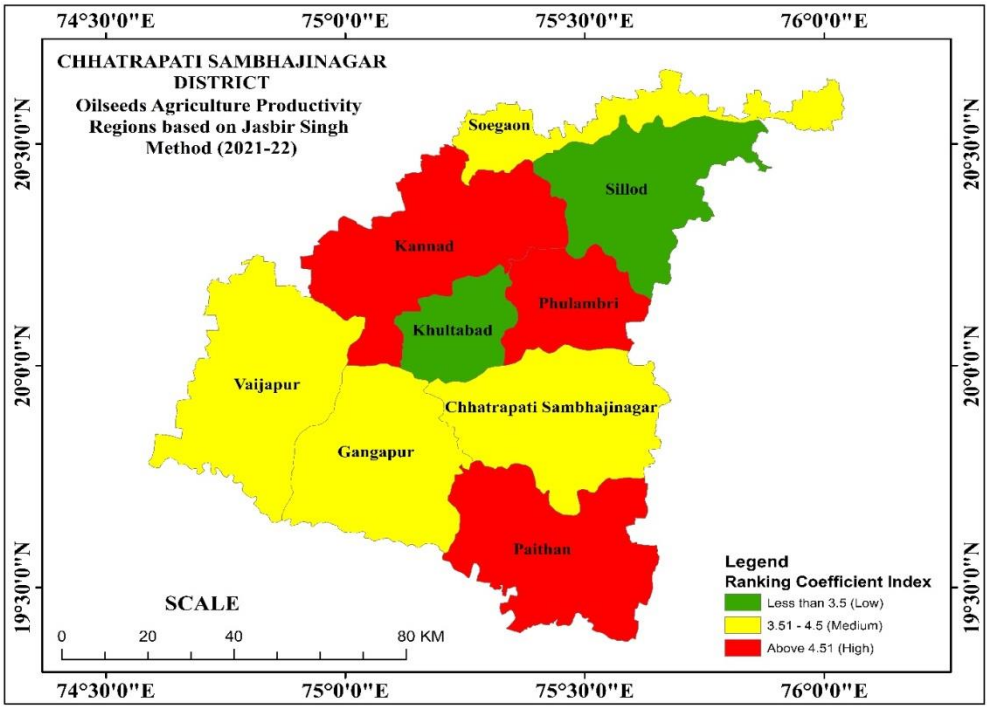


**Fig. No. 04**

## Conclusion

The results of the study show that during 2021–2022, there were notable differences in agricultural productivity among the tehsils in the Chhatrapati Sambhajinagar district. Thanks to ideal agroclimatic conditions and cutting-edge agricultural techniques, tehsils like Paithan, Vaijapur, and Soegaon showed high production, especially for crops like wheat, maize, and sugarcane. On the other hand, because to things like poor soil quality and insufficient irrigation, tehsils like Kannad and Sillod demonstrated poorer productivity. Regions with medium productivity showed modest yields, indicating the need for better agricultural practices and resource management. With certain tehsils succeeding in particular crops while others fall behind, the study highlights the differences in agricultural productivity and focus.

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