

Agricultural Productivity, Agricultural Productivity Index and Changes in Chhatrapati Sambhaji Nagar District - A Geographical Study

Dr. Sachin Himmatrao More

Asst. Prof. & Head, Department Of Geography

Rajarshi Shahu Arts, Commerce and Science College, Pathri,

Tq - Phulambri, Dist – Aurangabad - 431111

Abstract

India is an agricultural country and the economy of India is mainly based on agriculture. Agriculture produces food crops and feeds the population. Economic development is boosted in regions where agricultural production is high. India ranks second in agricultural crop production. Agriculture is the largest industry in India and plays an important role in the socio-economic development of the country. Productivity is important in agricultural production as it measures the average yield of crops compared to the area sown. Therefore, if the productivity in a region is low compared to the cultivated area, the cropping system can be improved in that region.

In the present research paper, a comparative study of the total agricultural productivity and its change in Chhatrapati Sambhaji Nagar district has been done on a tehsil wise basis.

Key Words

Agriculture, productivity index, change, per hectare

Introduction

Agriculture is the major occupation of India. Agriculture plays an important role in the economy of India. 54.6% of the total workforce is engaged in agriculture and allied sector activities and the country's Gross Value Added for the year 2021-22 is near about 19%. Therefore, the study of agricultural productivity is important in agricultural studies. Chhatrapati Sambhajnagar district is a major district of Marathwada region. As the region falls in the rain shadow region, the average agricultural yield is low.

The present research paper has studied the agricultural productivity and its change in Chhatrapati district.

Objectives

The present research paper has been completed with the help of following main objectives.

- 1) To conduct a tehsil-wise study of total agricultural productivity and productivity index per hectare in Chhatrapati Sambhaji Nagar district.
- 2) To study the change in agricultural productivity and productivity index per hectare in Chhatrapati Sambhaji Nagar district on a tehsil wise basis.

Data Source and Methodology

The information used for the present research essay is mainly based on secondary sources. Information related to the subject is compiled from Chhatrapati Sambhaji Nagar District Agriculture Office, Agriculture Report – 2014 and 2024. It is also compiled from pre-published research essays and articles related to the topic.

The method of Mohammad Shafi (1983) has been used to derive the Agricultural Productivity Index. The following formulas are used to calculate agricultural productivity per hectare and agricultural productivity index.

Productivity Index = $(Y \div Y_n) \div (T \div T_n)$

Y = Production in one area, Y_n = Production in whole area, T = Crop area in one area,

T_n = Crop area in whole area

Productivity (Per Hecter in Kilogram) = $(P \div A) \times 1000$

P = Agricultural production, A = Area under crop cultivation

The analysis of the information presented is based on the data between the years 2014 and 2024. The statistics obtained with the help of formulas are shown in the table and its distribution in the map. Also the change is indicated with the help of bar graph.

Study Area

Chhatrapati Sambhaji Nagar district is located in almost north-central part of the state of Maharashtra. It is a district in the administrative division of Chhatrapati Sambhaji Nagar and the axial extension of this district is 19° 23' North to 20° 39' North while the longitudinal extension is between 74° 36' East to 75° 57' East longitude. Chhatrapati Sambhaji Nagar district consists of nine tehsils in total (Table No. 1). According to the 2011 census, the total population of the district is 3701282 and the male population is 51.99% and the female population is 48.01%. The district is bordered by Jalgaon district to the north, Jalna district to the east, Beed district to the southeast, Ahmednagar district to the south and Nashik district to the west.

Agricultural Productivity Per Hectare and Changes in Chhatrapati Sambhajnagar District (in kilograms)

The table presents the tehsil-wise distribution of agricultural productivity in Chhatrapati Sambhaji Nagar District, measured in kilograms per hectare, for the years 2014 and 2024. It also shows the change in agricultural productivity during the period 2014–2024.

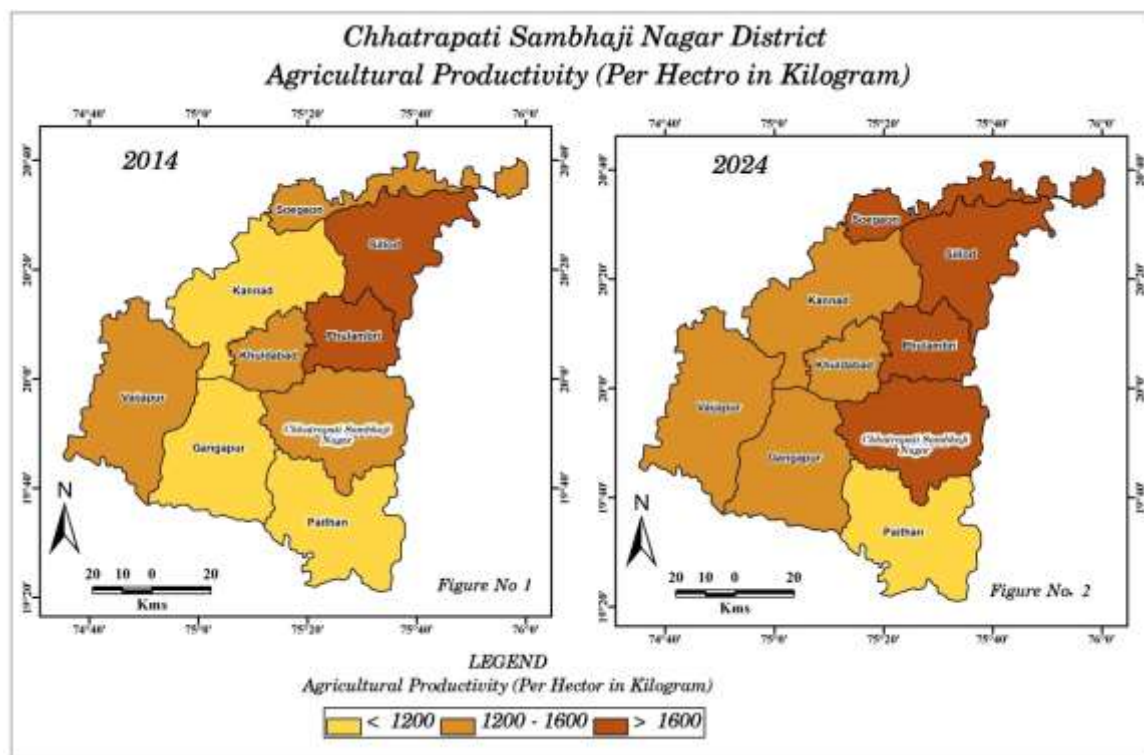
Table No. 1

Chhatrapati Sambhaji Nagar District - Agricultural Productivity Per Hectare and Changes (Year 2014 and 2024)

Tehsil	Year 2014	Year 2024	Change 2014 to 2024
Kannad	1022	1468	446
Soygaon	1459	1864	405
Sillod	1906	2025	119
Phulambri	1963	2028	65
Chhatrapati Sambhaji Nagar	1354	1741	387
Khultabad	1408	1547	139
Vaijapur	1299	1425	126
Gangapur	903	1298	395
Paithan	918	968	50
Total	1359	2463	1104

Source – Chhatrapati Sambhajnagar District Agriculture Office and Agriculture Report 2014–2024

In 2014, considerable variation in agricultural productivity was observed among the tehsils of Chhatrapati Sambhaji Nagar District. Chhatrapati Sambhaji Nagar Tehsil recorded the highest agricultural productivity at 2,354 kg per hectare, followed by Phulambri (1,963 kg), Sillod (1,906 kg), Soygaon (1,459 kg), and Khultabad (1,408 kg). In contrast, Paithan recorded the lowest productivity at 128 kg per hectare. Gangapur, Kannad and Vaijapur recorded 903 kg, 1,023 kg and 1,222 kg per hectare, respectively. Thus, agricultural productivity in 2014 showed considerable spatial variation among the tehsils.



In 2024, agricultural productivity increased in all the tehsils. Chhatrapati Sambhaji Nagar Tehsil continued to record the highest productivity at 2,741 kg per hectare, followed by Phulambri (2,028 kg), Sillod (2,025 kg), Soygaon (1,864 kg), Vaijapur (1,845 kg), Khultabad (1,547 kg), Kannad (1,468 kg), Gangapur (1,228 kg), and Paithan (168 kg). Thus, although agricultural productivity improved across the district, significant differences among the tehsils continued to exist. Chhatrapati Sambhaji Nagar, Phulambri and Sillod remained the comparatively high-productivity tehsils, whereas Paithan remained at the lowest level.

Change in Agricultural Productivity, 2014–2024

During 2014–2024, all the tehsils recorded a positive change in agricultural productivity. The highest increase was observed in Vaijapur Tehsil, with an increase of 623 kg per hectare. This was followed by Kannad (445 kg), Soygaon (405 kg), Chhatrapati Sambhaji Nagar (387 kg), and Gangapur (325 kg) per hectare. Comparatively lower increases were recorded in Khultabad (139 kg), Sillod (119 kg), Phulambri (65 kg), and Paithan (40 kg) per hectare. Therefore, Vaijapur, Kannad and Soygaon experienced relatively greater improvement in agricultural productivity during the study period, while Paithan and Phulambri showed only marginal improvement. The overall increase in agricultural productivity may be associated with improved irrigation facilities, better water management, and use of improved seeds, modern agricultural technology, fertilizers, and changes in cropping patterns. However, the persistence of substantial tehsil-wise differences indicate that the benefits of agricultural development have not been distributed uniformly throughout the district.

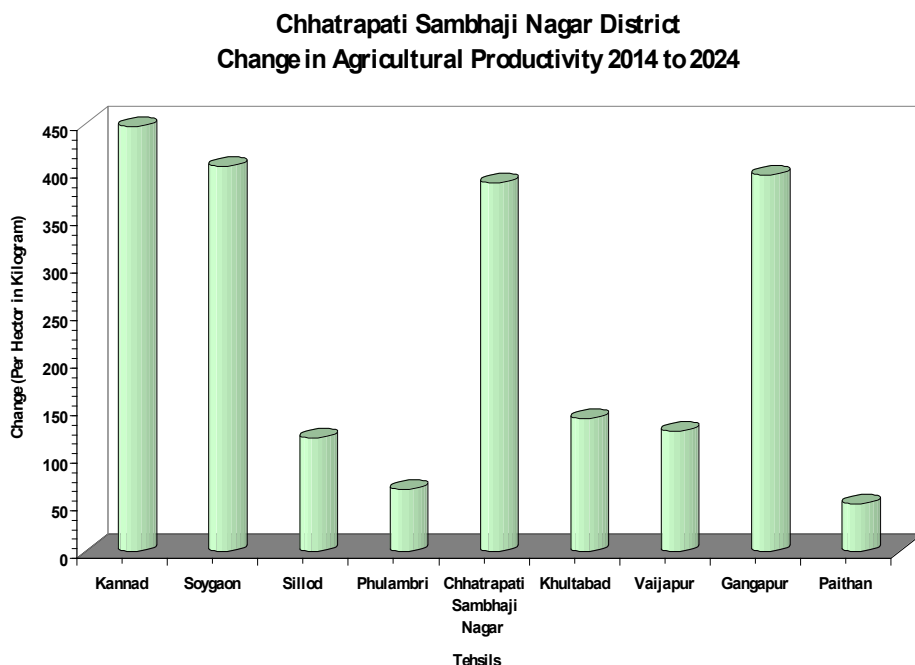


Figure No. 3

Productivity Index in Chhatrapati Sambhaji Nagar District

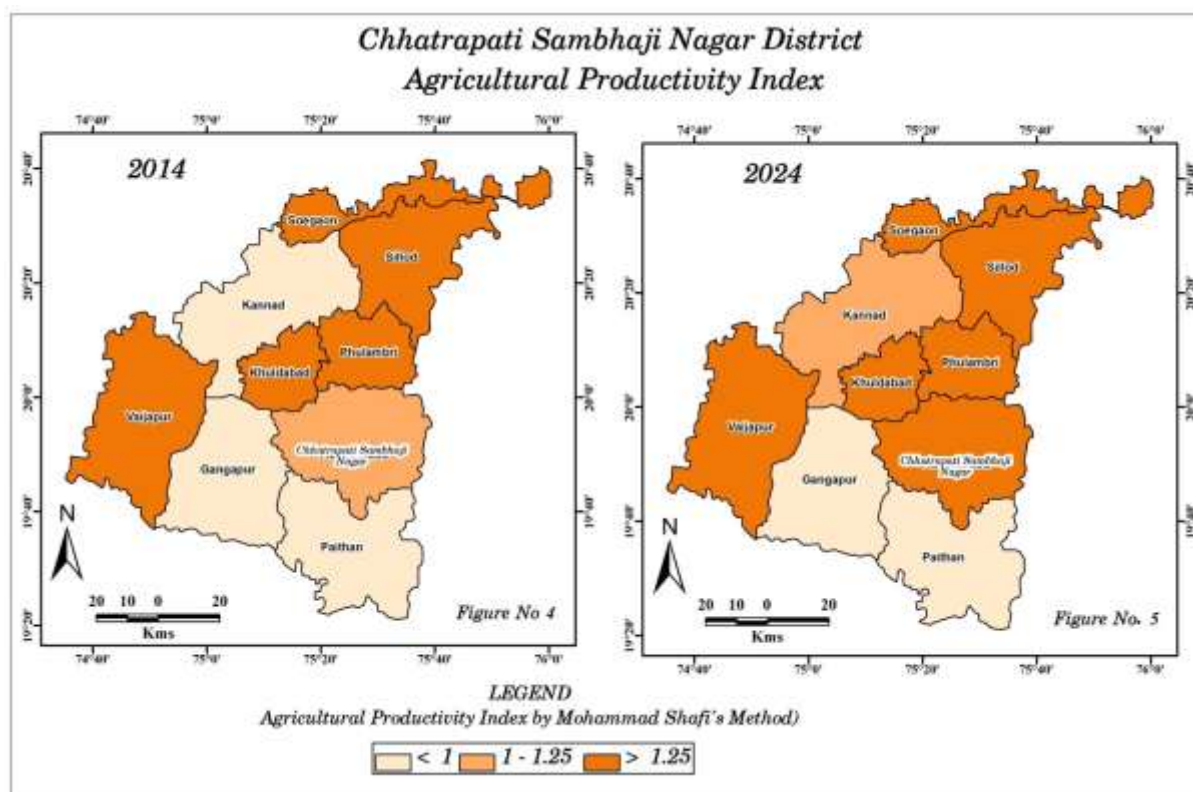
Table No. 2 presents the tehsil-wise Agricultural Productivity Index of Chhatrapati Sambhaji Nagar District for the years 2014 and 2024, calculated using Mohammad Shafi's method. The index values indicate the relative level of agricultural productivity among the different tehsils. An index value above 1.00 indicates comparatively higher agricultural productivity, whereas a value below 1.00 indicates comparatively lower agricultural productivity.

Table No. 2

Chhatrapati Sambhaji Nagar District – Agricultural Productivity Index (2014 and 2024)

Agricultural Productivity Index (By Mohammad Shafi's Method)			
Tehsil	Year 2014	Year 2024	Change Year 2014 to 2024
Kannad	0.81	1.23	0.42
Soygaon	1.36	1.56	0.2
Sillod	1.87	1.92	0.05
Phulambri	1.92	2.02	0.1
Chhatrapati Sambhaji Nagar	1.21	1.43	0.22
Khultabad	1.32	1.39	0.07
Vaijapur	1.34	1.36	0.02
Gangapur	0.77	0.81	0.04
Paithan	0.82	0.83	0.01

Source – Calculated by Author



In 2014, considerable spatial variation in the agricultural productivity index was observed among the tehsils. Phulambri recorded the highest index value of 1.93, indicating a comparatively high level of agricultural productivity. It was followed by Sillod (1.69), Soygaon (1.36), Vaijapur (1.34), Khultabad (1.33), and Chhatrapati Sambhaji Nagar (1.29). These tehsils recorded index values above 1.00, suggesting relatively favourable agricultural productivity conditions. On the other hand, Gangapur (0.79), Kannad (0.68), and Paithan (0.63) recorded index values below 1.00, indicating relatively low agricultural productivity. Thus, in 2014, agricultural productivity was concentrated mainly in Phulambri, Sillod and other relatively high-index tehsils, while Paithan, Kannad and Gangapur remained comparatively backward in terms of agricultural productivity.

In 2024, the spatial pattern of agricultural productivity remained broadly similar, although the level of productivity improved in several tehsils. Phulambri continued to have the highest Agricultural Productivity Index at 2.09, followed by Sillod (1.93), Chhatrapati Sambhaji Nagar (1.83), Soygaon (1.45), Khultabad (1.39), and Vaijapur (1.36). These tehsils recorded index values above 1.00 and therefore continued to represent relatively high agricultural productivity areas. Gangapur (0.89), Kannad (1.23) and Paithan (0.63) occupied comparatively lower positions. However, Kannad crossed the index value of 1.00 in 2024, indicating a notable improvement in its relative agricultural productivity. Overall, the 2024 distribution shows that Phulambri and Sillod remained the leading tehsils, while Paithan continued to have the lowest agricultural productivity index.

Change in Agricultural Productivity Index, 2014–2024

The change column indicates that all the tehsils experienced a positive change in the Agricultural Productivity Index between 2014 and 2024. The highest increase was recorded in Chhatrapati Sambhaji Nagar Tehsil, with a change of 0.54, closely followed by Kannad with 0.53. Sillod recorded an increase of 0.24, while Phulambri increased by 0.16. Soygaon and Paithan each recorded an increase of 0.09, whereas Gangapur registered a change of 0.08. Khultabad recorded a relatively small increase of 0.06, while Vaijapur recorded the lowest increase of only 0.02.

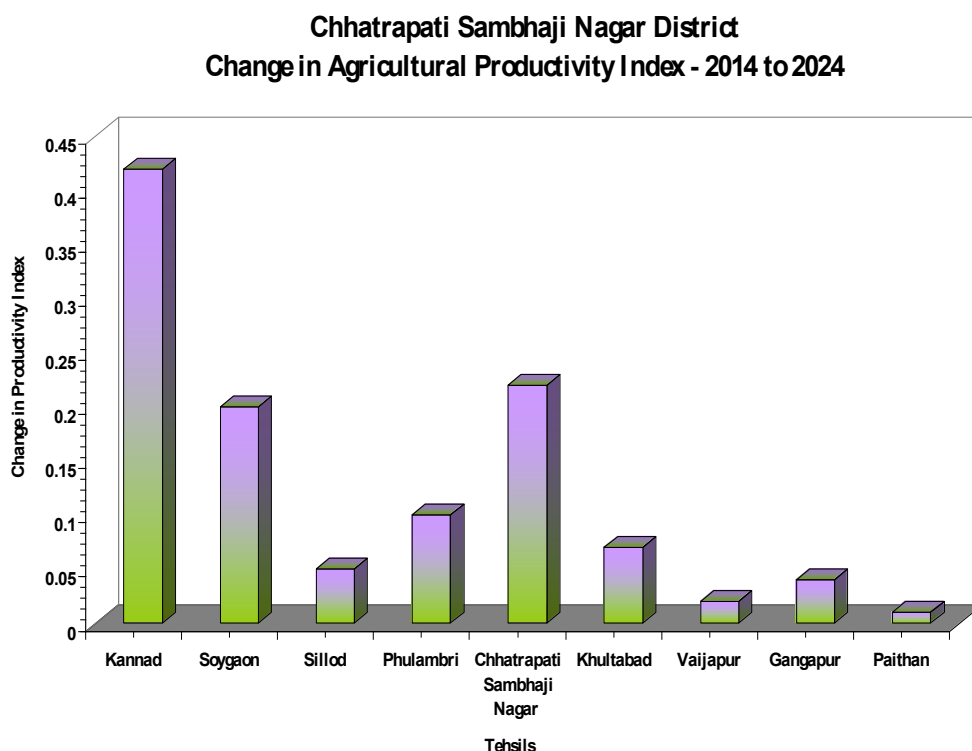


Figure No. 6

The substantial improvement in Kannad is particularly noteworthy because its index increased from 0.68 in 2014 to 1.23 in 2024, enabling it to move from below-average to above-average relative agricultural productivity. Similarly, Chhatrapati Sambhaji Nagar improved from 1.29 to 1.83, strengthening its position among the high-productivity tehsils. In contrast, Paithan showed virtually no improvement in its relative position, as its index remained at 0.63 in both years. This indicates that the benefits of agricultural development were not uniform across the district and that certain tehsils experienced substantially greater improvement than others.

Overall, the table indicates a general improvement in agricultural productivity across most tehsils during 2014–2024, but the spatial disparities in agricultural productivity continued to exist. Phulambri and Sillod emerged as consistently high-productivity tehsils, while Paithan remained the lowest-index tehsil during both years. The marked improvement in Kannad and Chhatrapati Sambhaji Nagar suggests a strengthening of their agricultural performance over the study period. The observed variations may be associated with differences in irrigation availability, rainfall, soil characteristics, cropping patterns, agricultural inputs, adoption of modern technology, and access to agricultural infrastructure. Thus, the Agricultural Productivity Index demonstrates that agricultural development in Chhatrapati Sambhaji Nagar District has progressed during the study period, but its spatial distribution remains uneven.

Conclusions and Suggestions

The analysis indicates that agricultural productivity in Chhatrapati Sambhaji Nagar District improved during 2014–2024. However, considerable spatial variation in agricultural productivity and productivity index continues to exist among the tehsils. Phulambri and Sillod consistently recorded higher productivity, while Paithan remained comparatively low. Chhatrapati Sambhaji Nagar and Kannad showed notable improvement during the study period. The overall increase indicates positive agricultural development, but the benefits have not been uniform across the district. Therefore, balanced and tehsil-specific agricultural planning is essential to reduce regional disparities.

Agricultural productivity can be improved by expanding irrigation facilities, promoting drip and sprinkler irrigation, and strengthening watershed development and rainwater-harvesting measures. Low-productivity tehsils should receive special attention through improved seeds, modern agricultural technology, soil-health management and crop diversification. Strengthening agricultural extension services, storage and marketing infrastructure can further improve farm productivity and farmers' income. A region-specific and climate-resilient agricultural development strategy should be adopted for sustainable and balanced agricultural development across the district.

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