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A STUDY OF SPATIO TEMPORAL CHANGE IN AGRICULTURE PRODUCTIVITY OF JUNNAR TAHSIL, OF PUNE DISTRICT, MAHARASHTRA

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Abstract

Agriculture accounts for one-fifth of India's gross domestic product and considered as economic lifeline of India and will continue to be agriculture. However, regional differences in productivity and development in agriculture need more research. Agriculture productivity is calculated with the help of Sapre. S. G. and Deshpande. D. introduced the weighted rank index The Junnar tahsil is northernmost tahsil of the Pune district and characterized by diverse physiography and climatic condition which causes variation in agriculture productivity. The research shows that agricultural production has changed over time. The Weighted ranked index for the Junnar tahsil was calculate for the year 1995, 2005 and 2015., out of 183 villages of the tahsil 181 inhabited villages were selected for the calculation of agriculture productivity. The index values were categories into five classes namely very high, high, medium, low and very low agriculture productivity. The lower index value of the weighted ranked index of the Sapre and Deshpande indicate high agriculture productivity while the higher index value points towards the lower agriculture productivity.

Key words – Agricultural, Productivity, Weighted Rank Index,

Introduction

Agricultural productivity is influenced by a variety of factors including physical factors such as relief, altitude, climate, and soil, socioeconomic factors such as holding size, tenancy system,

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population occupational structure, literacy level, and technical factors such as irrigation, chemical fertilizers, high yielding varieties of seeds, and mechanization. Due to this Spatial-temporal variance in agricultural output, all of the aforementioned components are extremely variable and dynamic both in space and time (Munir, 1995).Several researchers have characterized agricultural production using their particular perspectives and disciplines. According to their goals, geographers, agronomists, agriculturalists, and economists have interpreted it in various ways. It is a dynamic notion that

Study Area

Junnar, the northernmost tahsil of the Pune district, is situated between 19^0 08' 52.72" N and 19^0 21'26.62" N latitude and 73^0 40' 18.07" E to $74^0$18'54.27" E longitude, having an area of 1383 square kilometers, at an average elevation of 838 meters above mean sea level. Tahsil measures 62.31 km east-west and 29.19 km north-south. This roughly oblate shaped tahsil is ranked 3rd in terms of area and literacy, and 4th in terms of population and sex ratio. As per Census 2011, there are 1 town and 183 villages within Junnar tahsil. Junnar Municipal Council is the headquarter of the tahsil.

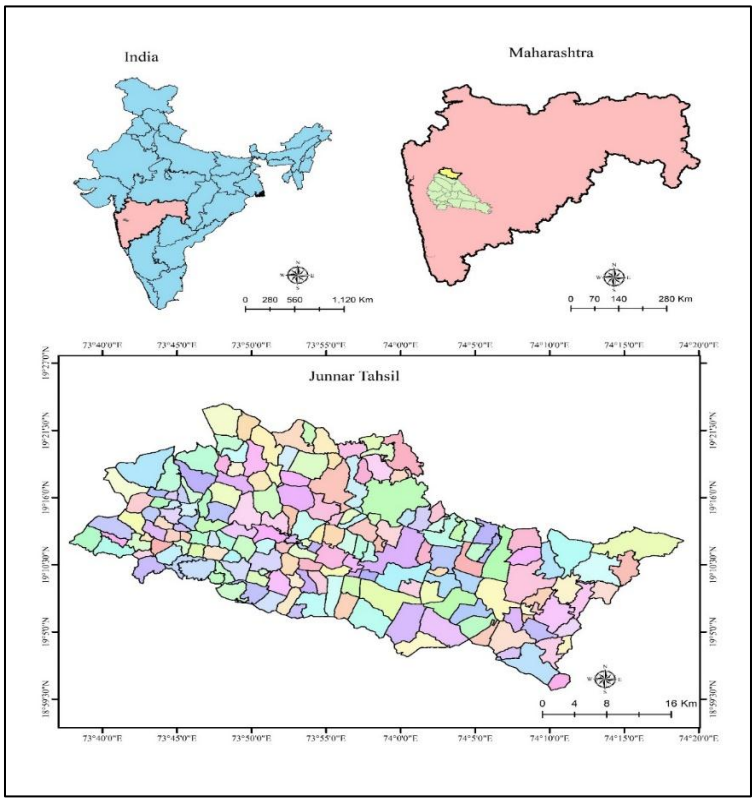

Figure1: Location of Study Area

Methodology

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Sapre. S. G. and Deshpande. D. introduced the weighted rank index which was a modified version of the Kendall's 'ranking coefficient' technique in 1964 to address some of the shortcomings of a simple average of ranks. In this method Sapre and Deshpande have used the percentage of land under each crop is proportional to the weighted rankings of selected crops. The weighted average of rank was calculated by taking into account the harvested land of a crop that matters in production, as well as the hectarage yield, which is linked to harvest crop cutting. The following formula is used to calculate the agriculture productivity using Sapre and Deshpande's Weighted Rank Index.

$$\boldsymbol{Weighted\ Ranked\ Index} = \frac{(\boldsymbol{R1} * \boldsymbol{C1}) + (\boldsymbol{R2} * \boldsymbol{C2}) + (\boldsymbol{R3} * \boldsymbol{C3}) \ldots\ldots (\boldsymbol{Rn} * \boldsymbol{Cn}))}{\boldsymbol{C1} + \boldsymbol{C2} + \boldsymbol{C3} + \cdots \ldots\ldots\ldots \boldsymbol{Cn}}$$

Where,

R= Ranking of yield of individual crop

C= Area under particular crop in percentage.

The Weighted ranked index of Sapre and Deshpande seems to have an inherent flaw as a result of not accounting for the harvested regional strength of crops. Harvest crop cutting is connected to harvested land of crops that matters in production and yield of a hectare. As a result, agricultural production is calculated using harvested rather than cultivated land.

Data Based

The agriculture productivity of the Junnar tahsil is calculated on the basis of the agriculture Census Data District socio-economic abstract and village level agriculture data for the year 1995, 2005 and 2015

Sapre and Deshpande's Weighted Rank Index - 1995

Sapre and Deshpande's Weighted Rank Index for the year 1995 The Sapre and Deshpande's Weighted Rank Index was calculated for the Junnar tahsil for the year 1995. According to the Sapre and Deshpande's Weighted Rank Index, seventeen villages, about 9.39 percent of the total villages of the tahsil had very high productivity, whereas, seventy-five villages, nearly 41.44 percent of the total villages of the Junnar tahsil has high agriculture

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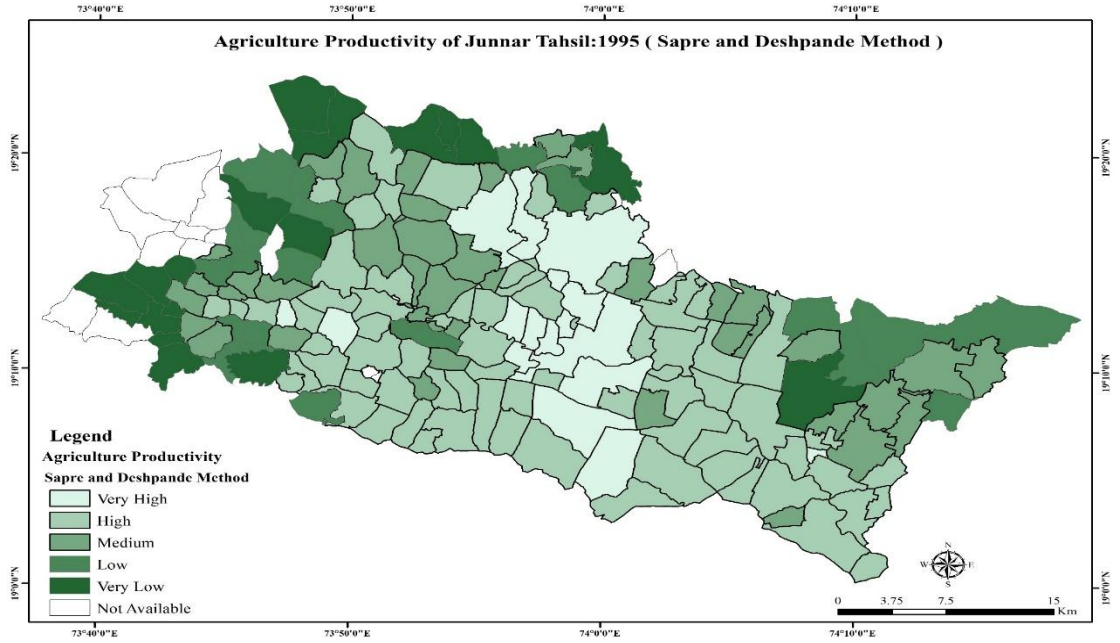
productivity. Medium agricultural productivity was shown by forty-one villages which is about 22.65 percent of the total villages of the tehsil. While, twenty-one villages, about 11.60 percent of the total villages of the tahsil had low agriculture productivity and nineteen villages, nearly 10.50 percent of the total villages had very low agriculture productivity. Eight villages of the tahsil are there for which the data of yield per hectare is not available.

Weighted Ranked Index	Category	No of Villages	Percentage
Below 7.5	Very High	38	20.99
7.5-16	High	85	46.96
16-24	Medium	29	16.02
24-30	Low	12	6.63
Above 30	Very Low	9	4.97



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Sapre and Deshpande's Weighted Rank Index - 2005

For the year 2005, the Sapre and Deshpande Weighted Rank Index was calculated for the Junnar tahsil. According to Sapre and Deshpande's Weighted Rank Index, twenty-eight villages, or 15.47 percent of the total villages in the tahsil, had very high productivity, while eighty villages, or about 44.20 percent of the total villages in the Junnar tahsil, had high agricultural production. Thirty-one villages, or around 17.13 percent of the total villages in the tehsil, showed medium agricultural production. While twenty villages, or approximately 11.05 percent of the tahsil's total villages, had poor agricultural production, and fourteen villages, or almost 7.73 percent of the entire villages, had very low agriculture productivity. There are eight villages in the tahsil for which yield per hectare data is unavailable.

Weighted Ranked Index	**Category**	**No of Villages**	**Percentage**
Below 7.5	Very High	28	15.47
7.5-16	High	80	44.20
16-24	Medium	31	17.13
24-30	Low	20	11.05
Above 30	Very Low	14	7.73

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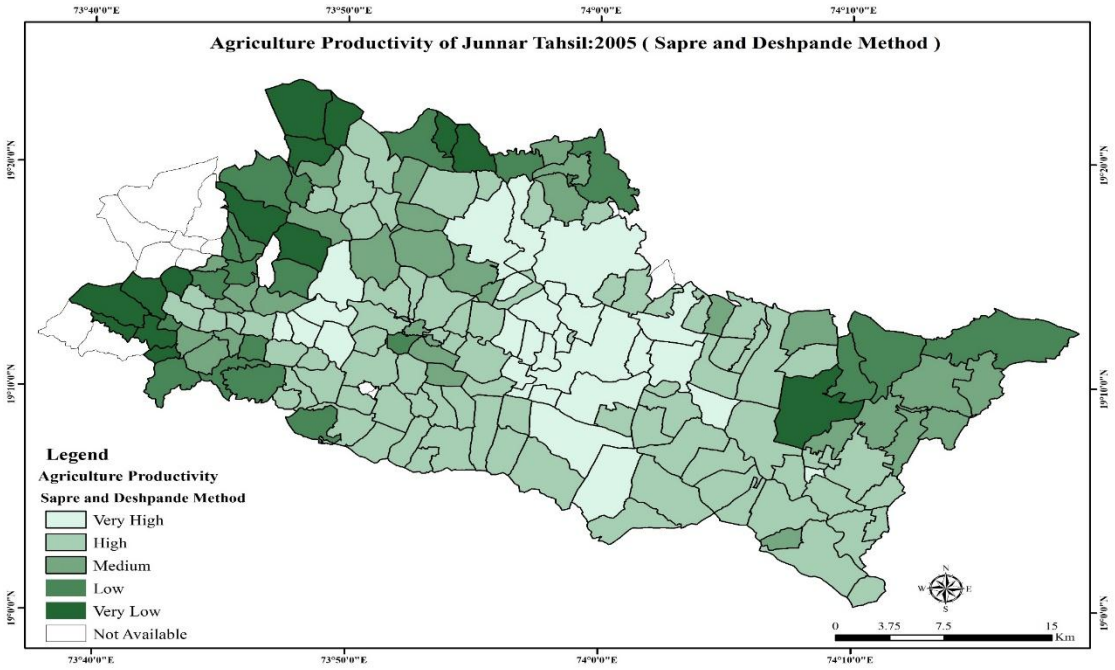

Sapre and Deshpande's Weighted Rank Index - 2015

The Sapre and Deshpande Weighted Rank Index for the Junnar tahsil was calculated for the year 2015 based on the secondary data collected. Approximately 20.99 percent of the total villages in the Junnar tahsil had very high agricultural productivity, while eighty-five villages, or 46.96 percent of the total villages in the tahsil had high agricultural productivity, according to Sapre and Deshpande's Weighted Rank Index. In the tehsil, medium agricultural output was shown in twenty-nine villages, around 16.02 percent of the total number of villages. A total of twelve villages, approximately 6.63 percent of the total number of villages in the tahsil had poor agricultural production, and nine villages, nearly 4.97 percent of the total number villages had very

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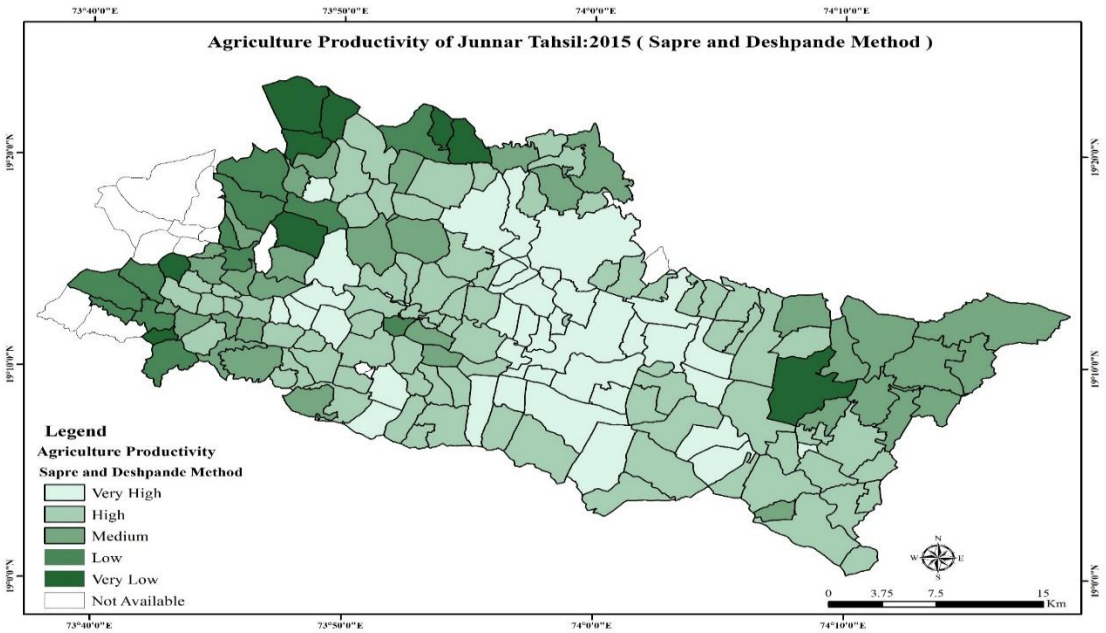
low agricultural productivity. There are eight villages in the tahsil for which yield per hectare is not known



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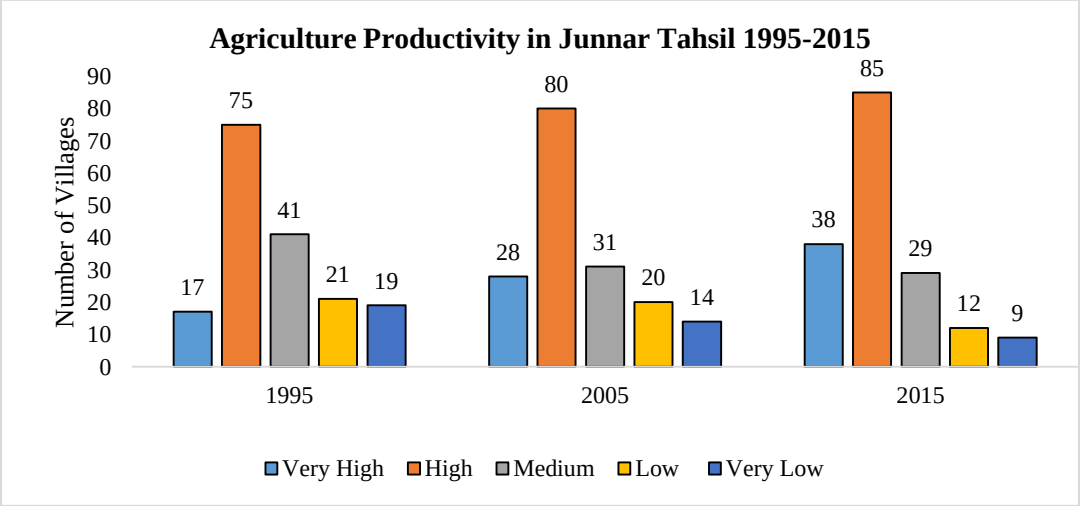
Agriculture Productivity in Junnar Tahsil -1995, 2005, 2015

Using Sapre and Deshpande's Weighted Rank Index, the agriculture productivity of the Junnar tahsil of the Pune district was calculated from 1995 to 2015. By looking at the village index value over time, it can be seen that the number of villages in the tahsil with very high agriculture productivity has increased from seventeen in 1995 to thirty-eight in 2015, with a significant increase of 123.52 percent



in the number of villages with very high agriculture productivity. Seventy-five villages in the year 1995 had high agricultural productivity, which climbed to eighty-five villages in the year 2015, over these 20 years 13.33 percent growth was recorded of villages with high agricultural productivity.

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Conclusion

The number of villages with medium agricultural productivity declined from forty-one in the year 1995 to thirty-five in the year 2015, the number of villages of the medium productivity was declined by -29.26 percent during 1995 to 2015. In 1995, the number of villages with low and very low agriculture productivity were twenty-one and nineteen, respectively, whereas in 2015, the number of villages with low and very low agriculture productivity were twelve and nine, indicating that the number of villages with low and very low agriculture productivity has decreased significantly. Overall, the Sapre and Deshpande's Weighted Rank Index value suggests a rise in the overall agricultural productivity of the Junnar tahsil.

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