

SPATIAL VARIATION IN LEVEL OF AGRICULTURAL DEVELOPMENT IN PHALTAN TAHSIL OF SATARA DISTRICT (MAHARASHTRA)

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ABSTRACT

In the Satara district spatial variation in the adoption of improved agricultural practices to ascertain level of agricultural development, the spatial variation is determined with the help of six variables viz. Net sown area, irrigated area, agricultural implements, Agricultural workers Numbered Satara districts central Co-operative banks and crop productivity of yield index of Rice, wheat, Jowar, Bajara sugarcane, and Wheat crops. Besides this the development of circles are taken with their respective categories viz high, medium and low on the basis of scores of standard deviation. These analysis have been carried out by transfer and combining the data relate to 04 variables using Z-score to get composite scores, On the basis of composite Score the circle have been classified into high, moderate and low development categories. As a result of the analysis shows that the modern technological inputs through agro service centres have reciprocal relationship with agricultural development in the study area.

KeyWords: Agricultural Workers, Implements, Hybrid seeds, Crop Productivity.

INTRODUCTION

The growth rates of total food of grain production were less in the last two decades making traditional farming a non-viable agricultural activity. Disparities in productivity across the district and even within crops persist with significant increase in small and marginal land holdings. Agricultural development denotes the equality of agricultural system of the region. It is multidimensional concept which mainly includes development in real strength of cropped area. Farming system and irrigated area, high yielding improved varieties of seeds, chemical fertilizers, insecticides and pesticides and specialization and commercialization of agriculture (Mohammed-1986). The changing scenario of agro-economy drew attention of researcher on diffusion of technological development in agriculture. Major Indian population depends on agricultural produce, so vast rural mass tries to earn their lively hood from agriculture. Fast increasing pressured of growing population on agriculture, tradition methods of techniques of production cannot crop with growing demand. As a result new techniques and com

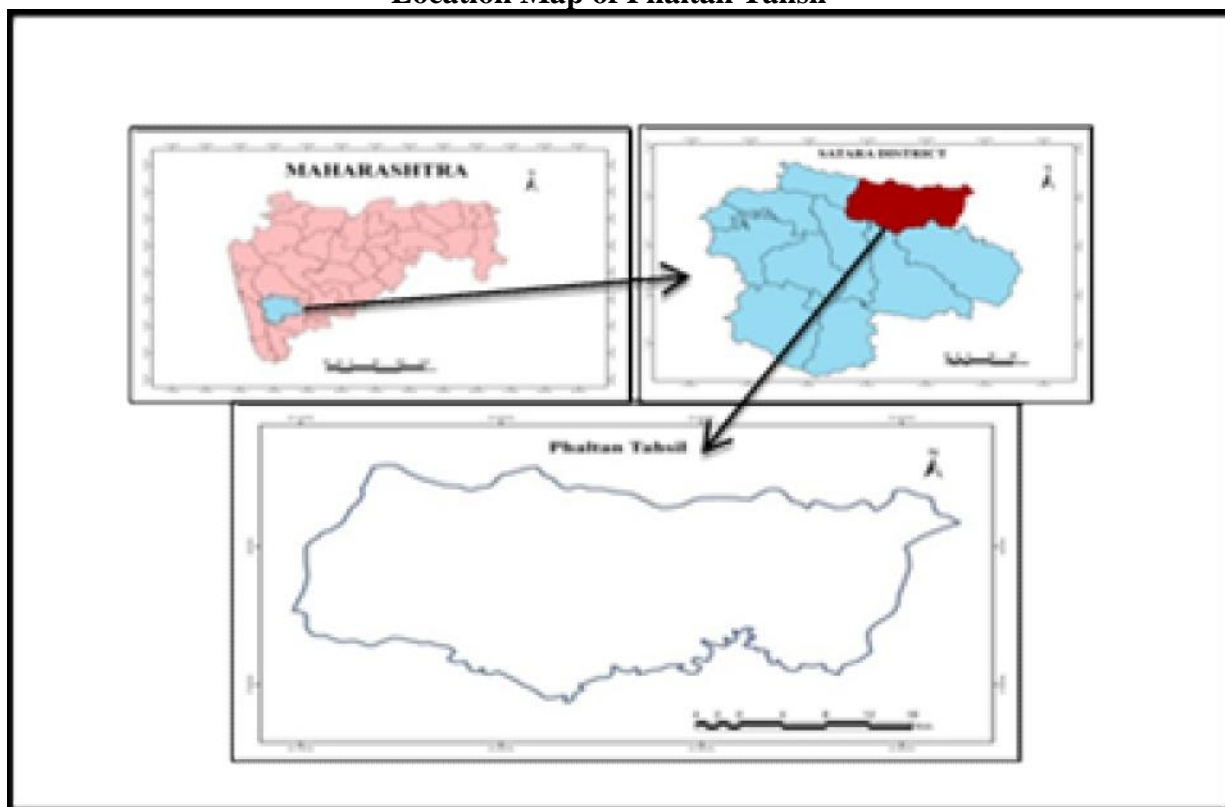
Study Area:

Phaltan Tahsil is selected for the study. Phaltan Tahsil covering the part of Nira river basin is one of the economically prosperous Tahsils of Satara district in southern

Maharashtra. It lies between 17°58' North to 18°5' North latitude and 74°20' East to 74°40' East longitude. It has total geographical area of 1028 sq.km. with 129 villages and one urban settlement. (2011 census) This area is bounded by Nira River in north side. The region attains 750 metres height (M.S.L.) with northward sloping land drained mainly by Banganga, a right bank tributary of the Nira River.

Phaltan Tahsil lies in east of Satara district. It is surrounded by Baramati Tahsil in north side, In southeast side lies Man Tahsil, In southern side lies Khatav Tahsil, in southwest side lies Koregaon Tahsil and in western side lies Khandala Tahsil and Solapur district belongs to east. The study area experiences semi-arid climate. April, May and June are the hottest months with maximum temperature of 40° centigrade. Temperature gradually reduces in December and January with minimum temperature 12° centigrade. The medium black and deep black soil appears within study area. The soil fertility encourages growth of various crops like sugarcane, jowar, bajara, maize, vegetables. According to 2011 Census the area has 3, 42,667 population, out of these 1, 76,250 are males and 1, 66,417 are females and density of population is 333 per square kilometre. State highway, major district and other roads are major routs of transport besides broad-gauge railway route in Phaltan Tahsil. Phaltan is an administrative head quarter of this Tahsil (Fig.1).

Location Map of Phaltan Tahsil



Data base and Methodology:

The assessment of agriculture development secondary data used for the period 2011, collected from District statistical handbook, Socio-Economic abstract of district profile of Satara districts. The crops of the districts are Rice, wheat, Jowar, Sugarcane, Groundnut, and gram. To determining the level of agricultural development various indicators variable have

been used such as Net sown area, Irrigated area, Agricultural Implement Agricultural Workers, Number of SDCC Banks and Crop Productivity Yield index of the different crops. For calculation overall levels of agricultural development and it's even, distribution the data of all variables indicators have been transformed into Z-score techniques. The formula is,

$$Z\text{-Score } (Z_i) = \frac{X_i - X^-}{S.D}$$

Where, Z_i -Z-Score For i' th observation

X_i - Original Value of i' th observation

X^- - Mean value of X' variables

S.D.-Standard Deviation of X' variable

In order to classify taluka according to their levels of development, the composite Z-score have been grouped into high medium and low. The result of the standard score obtained for different indicators were aggregated by composite standard score (CSS). So that regional disparities in the level of development of the study regions may be obtained on a common sale. The composite Z-score may be algebraically expressed as:

The Composite Standard Score may be algebraically expressed as:

$$CCS = \frac{\sum Z_{ij}}{N}$$

Whereas,

CSS- Composite Standard Score

Z_{ij} – Scored of an Indicator J in the Tahsil.

N - Number of indicators.

In order to classify the circles according to the magnitude of development the composite score were divided into three classes that are high medium and low.

1. List of the selected indicators/ variables:

X1- Percentage of Net sown area to total cropped area.

X2- Percentage of Irrigated area to total cropped area.

X3- Number of Agricultural Implements.

X4- Number of Agricultural Workers.

X5- Number of SDCC Banks.

X6- Crop Productivity Yield index of the different crops.

X6a- Jowar

X6b- Bajara

X6c- Wheat

X6d- Sugarcane

Agricultural development is a multi-dimensional activity and key to which is crop productivity. It is one of the vital aspects of rural development. The objective of Agricultural development is to increase the growth of Agricultural output so as to provide livelihood to the growing population.

Table-1
Standard Score for Agricultural Development

Sr.No.	Revenue Circles	X1	X2	X3	X4	X5	X6				Composite Index
							X6a	X6b	X6c	X6d	
1	Phaltan	-1.20	-1.12	-1.40	-1.03	-0.23	0.16	-1.31	-0.87	-0.03	0.78
2	Barad	1.55	1.54	0.57	1.62	1.62	-0.63	0.08	0.42	-0.91	0.65
3	Vidani	-0.37	0.14	-0.41	-0.03	-1.15	-1.07	-0.26	-0.13	-5.14	0.93
4	Taradgaon	0.03	-0.57	1.24	-0.54	-0.23	1.54	1.48	1.74	6.09	1.19

Source: Computed by Researcher.

2. Distribution of variables/ indicators:

(1) Net sown area (X1):

The Net sown area can be defined as the total area sown in a year. Higher will be the crop production and this will be reflect in Agricultural development. Amongst the four circles, the top position is occupied by Barad circle (1.55) which is evident from Table-6.5. Taradgaon circle falls in the medium group which ranges from 1.00 to 0.00 with a score of (0.03). The low group ranges below 0.00. There are two circles under this category, Vidani circle (-0.37) and Phaltan circle (-1.20).

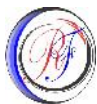
(2) Irrigated area (X2):

Irrigation is very vital for any kind of Agricultural development and is a prerequisite for the success of modern technology in agriculture. Irrigation plays a significant role in the entire agriculture sector. The changing trends in intensity of irrigation depicts dynamic attempt to overcome environmental limitations to transform the potential of the area into agricultural resource (Singh, 1974). The total irrigated area has been calculated as the percent of the total sown area and further the Z-score of total irrigated is calculated (above 0.10).

In the present study, high level of irrigation has been observed in Barad circle (1.54) and medium level of irrigation has been observed in Vidani circle (0.14). There are two circles which indicate low levels of irrigation i.e. Taradgaon circle (-0.57) and Phaltan circle (-1.20).

(3) Agricultural Implements (X3):

Advanced agricultural technology doesn't only mean the usage of hybrid seeds and other modern inputs, but it also incorporates new agricultural practices. Mechanization of certain agricultural operations has successfully addressed to the problem of shortage of labours during the peak season and also to some extent has decreased the labour cost by engaging less no. workers in the agricultural activities. Therefore, such agricultural implements are the key to the modern agricultural development. The backwardness of the Indian agricultural implements has been recorded in Vidani circle (-0.41). Medium level of



agricultural implements is shown in Barad circle (0.57), while the lowest agricultural implements are observed in Phaltan circle (-1.40) and Vidani circle (-0.41).

(4) Agricultural Workers (X4):

Agricultural workers are also important factors for agricultural development like chemical fertilizers, HYV seeds; machineries etc. there are many activities in the field in which they perform. The highest number of agricultural labour has been found in Barad circle (1.62). Apart from Barad circle, the rest all show lowest i.e. below (0.00) level of development in the number of agricultural labours, Vidani circle (-0.03) and Taradgaon circle (-0.54) and Phaltan circle (-1.03).

(5) Satara District Central Co-Operative Bank (X5):

Satara District Central Co-Operative Bank plays a very important role in the agricultural development. The phenomenal growth in the consumption of chemical fertilizers and other modern inputs can be made possible largely because of liberal provision of credit or loan to the cultivators by the co-operative banks of government. These banks provide loan and subsidies to the farmers in terms of cash or machines and tools like tractors and pump sets. With the help of these facilities, farmers accelerated the productivity of different crops. It is found that the number of branches of SDCC Bank is not equally distributed in the study region. The level of Z-score of SDCC Bank has been high in Barad circle (1.62), and low levels below (0.00) are recorded in Phaltan circle (-0.23), Vidani circle (-1.15) and Taradgaon circle (-0.23).

(6) Crop Productivity Yield Index (X6):

Agricultural productivity determines the level of agricultural development in any region. It refers to per acre or hectare of yield in a unit (Kgm/ quintals) of any crops of field. In order to increase the productivity of crop, farmers try to adopt various types of techniques which is required for overall development (social as well as economic). The agricultural productivity yield index and Z-score is calculated for selected crops.

(6 a) Jowar (X6-a):

Jowar is a major crop of Phaltan Tahsil and it is produced in almost every part of the Tahsil. The circle under high category i.e. above (1.00) is Taradgaon circle (1.54). The circle under medium category (1.00 to 0.00) is Phaltan circle (0.16). Low level i.e. below (0.00) of Jowar production is seen in Barad circle (-0.63) and Vidani circle (-1.07).

(6 b) Bajara (X6-b):

Bajara is another major crop of the Tahsil which is produced almost everywhere. The circle under high category i.e. above (1.00) is Taradgaon circle (1.48). The circle under medium category i.e. (1.00 to 0.00) is Barad circle (0.08). While the lowest levels productivity are observed in Vidani circle (-0.26) and Phaltan circle (-1.31).

(6 c) Wheat (X6c):

Wheat is major crop of the Tahsil produced everywhere. Wheat is produced on large scale in Taradgaon circle (1.74) and it falls under the high category i.e. above (1.00). The circle under medium category i.e. (100 to 0.00) is Barad circle (0.42). Lowest level i.e. below (0.00) is observed in Vidani circle (-0.13) and Phaltan circle (-0.87).

(6 d) Sugarcane (X6-d):

Sugarcane is the most significant crop cultivated in the study area where irrigation facilities are available. Taradgaon circle leads in the production of sugarcane due to fertile soil, river basin and availability of irrigation facilities like lift irrigation. A very high level of productivity has been observed in Taradgaon circle (6.09) whereas the rest all under the category of lowest level i.e. below (0.00) Barad circle (-0.91), Phaltan circle (-0.13) and Vidani circle (-0.13).

4. Z-Score value of all variables combined:

To assess the level of agricultural development in Phaltan Tahsil all the four variables have been aggregated. The Z-score value of all variables are transformed and combined with the help of Z-score and Composite Standard Score (CSS) was prepared (Table-6.5). The composite score ranges from Taradgaon circle (1.19) to Barad circle (0.65). Taradgaon circle is the most developed in Phaltan Tahsil and Barad circle is at the bottom. On the basis of composite Z-score the circles have been categorized into two classes i.e. high and low, which clearly show the spatial variation in level of agricultural development in Phaltan Tahsil. CSS of the other two circles i.e. Phaltan circle (0.78) and Vidani circle (0.93) respectively.

5. The Spatial Pattern and Levels of Agricultural Development:

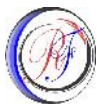
The Spatial distribution of variables and Agricultural development is not uniform in Phaltan Tahsil. It provides very significant information about level of agricultural development. The study highlights that the majority of Tahsil comes under high development of agriculture which is located at middle, northern and north-western part.

Table-2
Phaltan Tahsil
The Spatial Pattern and Level of Agricultural Development

Sr. No.	Z-Score	Levels of Development	Number of Circles	Circles
1	Above 1.00	High	01	Taradgaon circle
2	Below 1.00	Low	03	Phaltan circle, Vidani circle, Barad circle.

Source: Computed by Researcher.

Agriculture is not developed in Phaltan circle, Vidani circle and Barad circle due to non-industrialization, rugged topography and poor irrigation facilities. For the development of these areas, there is a need of urgent implementation of irrigation facilities which is



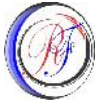
hampering the agricultural development. The study highlights the impact of location and agricultural productivity on agricultural development planning of the study region.

CONCLUSION

The production aspect is an important indicator of agricultural development. Productivity is an important tool required for better planning and development. The figures obtained from this study region indicate that the productivity is higher in plain region and at the base of Shambu Mahadeo hills due to availability of plain land, irrigation, plateau land and intensive cropping pattern. The study of the Productivity of Jowar showed an increasing trend from southern part to northern part of the Phaltan Tahsil. The highest Jowar productivity has been observed in Padegaon village while the lowest was observed in Sasakal village. But an inverse trend has been seen in case of Wheat production. It showed an increasing towards southern side. The highest Wheat productivity has been observed in Padegaon village while lowest was seen in Sasakal village due to silt land. Productivity of Bajara is higher in north-western and eastern part of study area. The highest productivity of Bajara has been recorded in Padegaon village and while the lowest was seen in Dhaval village. The highest Productivity of Sugarcane was seen in Padegaon village and lowest in Sasakal village. This variation in productivity of Sugarcane is a result of various factors like topography, irrigation, farming methods etc. due to small land holdings most of the agricultural practices are done manually without using the modern techniques thereby affecting the productivity in the study region.

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