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Original Article

Impact of Agricultural Technology Change on Agricultural Development in Ahmednagar District- A Geographical Study

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Abstract

The present study is to find out the impact of Agricultural technological change on agricultural development. Indeed, the use of new applied technologies and good scientific methods in recent decades has had a major impact on the agricultural sector. This has not only made farming more sustainable and profitable, but has also rapidly reduced the traditional workload for many farmers. Primary and secondary data is collected from farmers of Ahmednagar district to evaluate the impact of agricultural technological change on agricultural development. One of the most important issues of the 21st century is the impact of agricultural technology on agricultural productivity, development, and the environment. Accordingly, how the use of modern agricultural technology affects the growth of agricultural production, poverty levels, and the development of society.

Overall, the following analysis an attempt has been made to bring out the level of agricultural development in Ahmednagar district at tahsil wise level and it is essential to the measuring and mapping the regional imbalances and further to identify backward and advanced areas in terms of agricultural developments. There are distinct technologies used by varies intensities leading to variations in agricultural efficiency per unit of time and space in study area. Result shows there is positive and significant impact of agriculture technological change on agricultural development.

Keywords: *Agricultural development, Agricultural technological, Agricultural efficiency, Intensity, Sustainable, Environment, Regional imbalance*

Introduction

Agricultural development is multidimensional in nature. Agro-technical determinants like irrigation, fertilizers, high yielding varieties of seeds, agricultural mechanization, and others together from a developed kind of agricultural landscape and provide a frame of parameters to measure the level of agricultural development of a region (Rajapati Ram, 1989). It is crucial importance in order to delineate agriculturally development implies maximum economic utilization of land and this means land has to be provided with adequate water and fertilizer which in combination with multi-cropping land to increased yield and income from the land (Shinde, 1980).

Study Area:

The present study has been selected of Ahmednagar district . It extends between 18° 20′ and 19° 59′ north latitudes and 73° 40′ to 75° 43′ east longitudes located in part in the upper Godavari basin.The Godavari, Bhima River is the two main rivers in this district with the major tributaries are Pravara, Mula, Sina, Dhora, Kukdi etc. Total 17,048 square km geographical area with administration divided into 14 tahsils. 578.8 mm is average annual rainfalls and mean daily maximum and minimum temperatures is 39°C and 11.7° C. Respectively. 71.10 percent area under cultivation area out of them 32.40 percent is irrigated and 67.60 percent rain shadow area. In 2011 census population is 45, 43,083. and 266 persons per square kilometers was density of population

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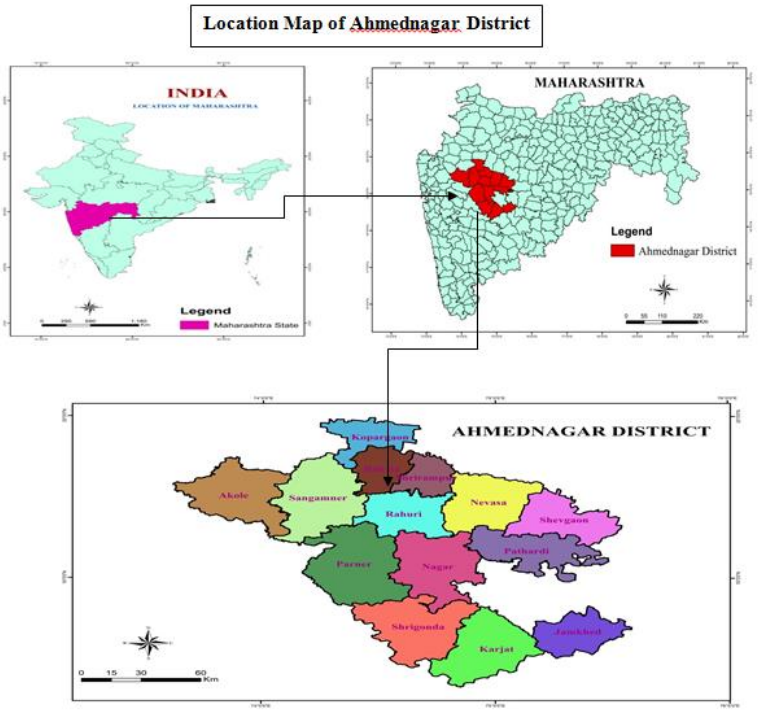

Fig.1.1

Objectives:

1. To Study the Spatio-Temporal Pattern of Level of Agricultural Development.
2. To Analysis the Absolute Change in Level of Agricultural Development.
3. To find out the Impact of Agricultural Technology on Agricultural Development.

Database:

The Present Study work is based on Primary and Secondary data. (1991 to 2015). it has been collected from District Gazetteers of Ahmednagar District. Farm implement, fertilizers, pesticides, polyhouse, farm pound, drip and sprinkler irrigation, jalyuktshivar, etc. Collected from the Govt. District Superintendent Agricultural office, and Z.P. (Agricultural Department), Ahmednagar. data regarding cold storage collected from District Industry office. The data of different farm implements and modern agricultural technology are collected from the Directorate of Agriculture Ahmednagar District, Socio-Economic review and Z.P. (ZillaParishad), Ahmednagar District. and the primary data collection in the help of stratified random sampling method. This research paper is Published, unpublished, various journal. The suitable technique map, table, types of Collected data and their interpretation with analyzed which is supporting in research paper.

Methodology:

The following indicators are considered for determining the levels of agricultural development.

1. Percentage of the literate population to the total population.
2. Percentage of the cultivated area to the total geographical area.
3. Percentage of the net irrigated area to net sown area
4. Number of wells per 1000 hectares of cultivated area
5. Percentage of the area under drip irrigation to the net irrigated area
6. Percentage of the area under HYVs of seeds to total cultivates the area.
7. Consumption of fertilizer per 1000 hectares of cultivated area.
8. The number of tractors available per 1000 hectares of cultivated area.
9. The number of tractors operated implements per 1000 hectares of cultivated area.
10. The number of power-operated implements per 1000 hectares of cultivated area.
11. Number of irrigation pump sets per 1000 hectares of cultivated area
12. Number of greenhouses
13. Number of cold storages

To calculate the composite index of agricultural development by the following formula

$$CDVI = \frac{PV}{MPV} \times 100$$

Where, CDVI- the coefficient of development of the variable □I' ; PV- the value of variable □I' and MPV- mean value of the variable □I' in the entire region.

After the calculating the coefficient of development each indicator, we have calculated the Composite Index of Development by using the following formula.

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$$CD = \frac{\Sigma CDVI}{N}$$

Where, CD= Composite Index of Development and N= Number of indicators.

Depending upon the composite Index the indices have also been calculated by taking whole region as 100 (for average composite Index) by following formula.

$$Indices = \frac{Composite\ Index\ of\ Any\ Unit}{Average\ of\ Composite\ Index} \times 100$$

To examine the impact of agricultural technology on agricultural performance and agricultural development the Karl Pearson' s Coefficient of Correlation technique is used. Considering the magnitude of the relationship between agricultural technologies is the independent variable and agricultural performance and agricultural development are the dependent variables. The functional form of the linear relationship is measured by using a regression equation i.e. y = a + bx. The rate of change independent variable is estimated with the help of the □b' coefficient, which is the line of best fit.

Result and Discussions:

A) Spatio-Temporal **Pattern of Level of Agricultural Development**

On the basis of the calculation of weightage of each indicator of the average composite index and indices value are calculated in the study region. The spatial distribution of agricultural development varies from tahsil to tahsil. The district as a whole was divided into four categories on the basis of indices of agricultural development.

As per 1991, the indices of agricultural development is varies ranging from 57.67 to 187.74 indices values in the study region. The table 1.1 and figure 1.2 indicates that the high agricultural development i.e. above 139.61 indices value was recorded in Sangamner and Shrirampur tahsils due to the fertile soil, development of surface irrigation leads to high consumption of fertilizers, high percentage area under HYVs of seeds, high number tractors, and power operated implements resulted into high development of agriculture as compare other tahsils. The moderate agricultural development i.e. ranging from 102.00 to 139.61 indices value was found in Kopargaon, Rahata, Newasa, Nagar and Rahuritahsils. The low agricultural development i.e. ranging from 63.39 to 102.00 indices value was registered in Shevgaon, Pathardi, Shrigaonda, and Karjat tahsils.

Table 1.1 Composite Index and Indices of Agricultural Development in Ahmednagar District, 1991 and 2011

Sr. No.	Name of Tahsil	Composite Index		Composite Indices	
		1991	2011	1991	2011
1	Akole	59.51	68.19	58.35	64.26
2	Sangamner	142.38	124.25	139.62	117.08
3	Kopargaon	117.75	105.33	115.45	99.26
4	Rahata	130.51	132.37	127.96	124.74
5	Shrirampur	191.48	156.75	187.74	147.71
6	Newasa	108.82	105.09	106.69	99.02
7	Shevgaon	83.53	84.88	81.90	79.99
8	Pathardi	79.44	114.05	77.89	107.47
9	Nagar	130.67	153.21	128.12	144.37
10	Rahuri	139.04	144.93	136.33	136.57
11	Parner	58.99	61.97	57.84	58.39
12	Shrigonda	86.98	86.24	85.28	81.27
13	Karjat	68.50	94.84	67.17	89.37
14	Jamkhed	58.82	53.56	57.67	50.47
Mean		**101.99**	**106.12**	**102.00**	**100.00**
SD		**39.07**	**32.18**	**37.61**	**30.32**

Source: Compiled by the researcher on basis of Z.P. Agricultural Department, 2012 and Socio-Economic Abstract of Ahmednagar District, 1991 and 2013.

The very low agricultural development i.e. below 63.39 indices value was found in Akole, Parner and Jamkhed tahsils due to rugged topography, inferior and shallow soil, leads to low development of surface irrigation, less consumption of fertilizers per hectare, low percentage of area under HYVs of seeds, less use of farm implements as compared to the other tahsils.

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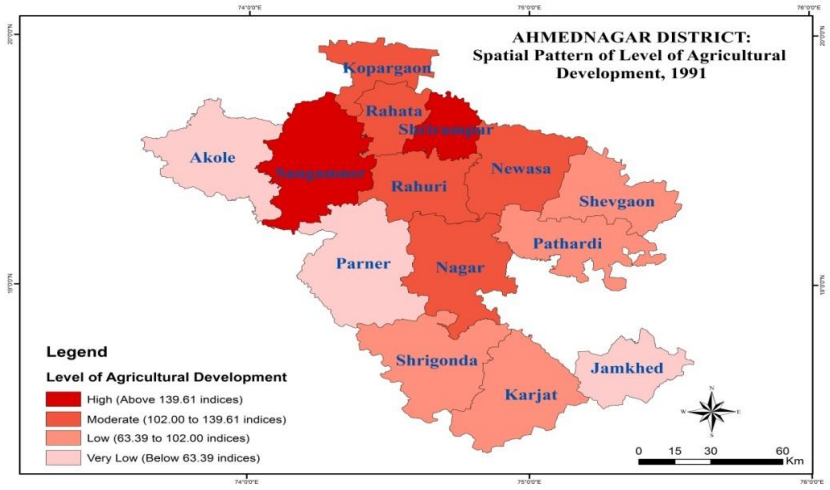

Fig.1.2

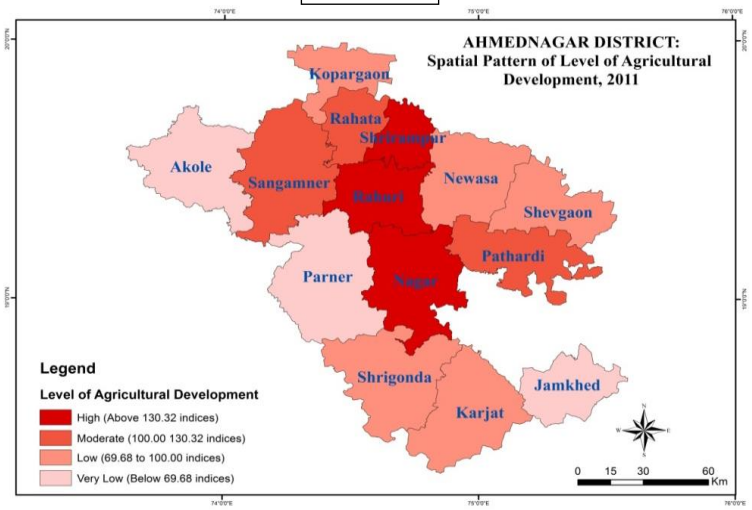

Fig.1.3

In 2011, table 1.1 exhibits that the composite index and indices of agricultural development in the study region. The level of agricultural development is varies ranging from 50.47 to 147.71 indices values in the study region. The figure 1.3 reveals that The high agricultural development i.e. above 130.32 indices value is recorded in Shrirampur, Nagar and Rahuri tahsils due to the flat area, fertile black soil, development of irrigation facilities resulted into high consumption of fertilizers, high percentage area under HYVs of seeds, high number tractors and tractor operated implements resulted into high development of agriculture and agro-base industries as compare other tahsils. The moderate agricultural development i.e. ranging from to 100.00 130.32 indices value is registered in Sangamner, Rahata, and Pathardi tahsils. Table 6.4 indicates that the low agricultural development i.e. ranging from 69.68 to 100.00 indices value was registered in Kopargaon, Newasa, Shevgaon, Shrigaonda, and Karjat tahsils. The figure 6.9 reveals that the very low agricultural development i.e. below 69.68 indices value was found in Akole, Parner and Jamkhedtahsils and causes are the same as mentioned earlier.

B) Absolute Change in Level of Agricultural Development

Table 1.1 indicates that the overall indices of agricultural development in Ahmednagar district. The change in the level of agricultural development is found in the tahsils of Sangamner, Kopargaon, Newasa and Nagar tahsils. Sangamner tahsil is transferred from a high level of agricultural development in 1991 to moderate development in 2011 due to fluctuations in the environmental conditions. Nagar tahsil is transferred from moderate to high development from 1991 to 2011 due to the continuous growth of urbanization leads to high cropping intensity. Kopargaontahsil is transferred from moderate to the low level of agriculture development due to the continuous degradation of leads to the continuous cultivation of sugarcane. Newasa tahsil transfer from moderate to low agriculture development due to fluctuations in the environmental conditions. Pathardi tahsil is transferred

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from low to moderate development and Nagar and Rahuri tahsils from moderate to high development due to the use of modern farm technology and high urbanization. There is no change found in the level of agricultural development in Akole, Rahata, Shrirampur, Shevgaon, Parner, Shrigonda, Karjat and Jamkhed tahsils during the period of study.

C) Impact of Agricultural Technology on Agricultural Development

Here, an attempt is made to assess the impact of agricultural technology on agricultural development (Table 1.2). The positive relationship between agricultural technology (X) and agricultural development (Y) has been found in the Ahmednagar district. The coefficient of correlation in this regard is at r = 0.8280. It indicates that there is a very good positive relation between the variable □X and □Y' . The degree of linear association between these two variable obtained by using the coefficient of determination is found to be at 0.6856, which reveals that the independent variable (X) i.e. agricultural technology is explaining 68.56 per cent of the total variations in the dependent variable (Y) i.e. agricultural development in the study region.

Table 1.2 Impact of Agricultural Technology on Agricultural Development in Ahmednagar District, 2011

Sr. No.	Name of Tahsil	Composite Index of Agricultural Technology (X)	Composite Index of Agricultural Development (Y)
1	Akole	76.56	68.19
2	Sangamner	131.57	124.25
3	Kopargaon	155.23	105.33
4	Rahata	165.89	132.37
5	Shrirampur	213.47	156.75
6	Newasa	121.49	105.09
7	Shevgaon	110.95	84.88
8	Pathardi	144.38	114.05
9	Nagar	109.59	153.21
10	Rahuri	171.26	144.93
11	Parner	68.75	61.97
12	Shrigaonda	89.12	86.24
13	Karjat	105.37	94.84
14	Jamkhed	70.20	53.56
r =		**0.8280**	
r^2 =		**0.6856**	

Source: Compiled by the researcher on basis of Z.P. Agricultural Department, 2012 and Socio- Economic Abstract of Ahmednagar District, 1991 and 2013.

It is a good explanation because 68.56 per cent of the variation in □Y' i.e. agricultural development to be influenced by the variable □X' i.e. agricultural technology and about 31.44 per cent of variation is left to be influenced by other variables. The functional form of the linear relationship of □Y' on □X' found to be at y = 0.6491 + 25.732. The line of the best fist is revealed in figure 6.10. The regression coefficient indicates that an increase of one composite index of agricultural technology causes the increase of the composite index of agricultural development by 0.6491 in tahsils of the study region.

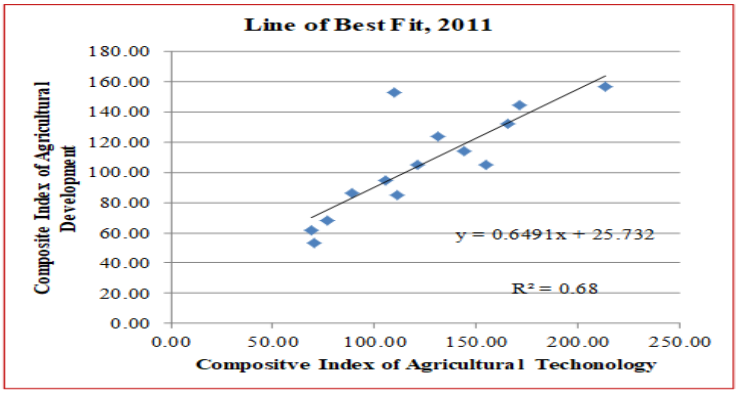

Fig.1.4

Conclusion

The overall discussion the regional variations in the level of agriculture development With multidimensional in nature. In reality, agricultural change cannot be understood separately from the general process of development. For this, a specific, agro-technical factor such as irrigation, fertilizers, High-yielding seeds, agricultural mechanization and others, combined with the developed type of Agricultural landscape, provides a framework of parameters for further development and measurement of the level of agricultural development of a region. And rugged topography, inferior shallow soil, resulted into low development of surface irrigation, less consumption of fertilizers per hectare, low percentage of area under HYVs of seeds, less use of farm implements as compared to the other tahsils. The positive relationship between agricultural technology (X) and agricultural development (Y) has been found in the Ahmednagar district. The spatial analysis of reveals there is an extensive traction of Weaker Zone of unfavorable environmental conditions in the Western part of the study region. But has been poor condition. Finally, in the coming times, especially for the development of irrigation facilities, a holistic approach should be taken to overcome the problems that exist after further study of the problems and understanding of the issues.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

References:

1. Husain, Majid, (2012): Systematic Agricultural Geography, Rawat Publications, Jaipur, Pp. 244-252.
2. Rajpati Ram (1989): Agricultural Development and Planning in India, Driterion Publications, New Delhi, Pp. 1-3.
3. Randhava, M.S. (1974): Green Revolution: A case study of Punjab, Vikas Publishing House, New Delhi. Pp. 112-140.
4. Shali, Habibulla (2005): Farm Equipment and Tractors for the course of Rural Engineering Technician, State institute of vocational Education, Directorate of Intermediate Education Government of Andhra Pradesh, Hyderabad, Pp. 1-4.
5. Shinde, S.D. (1980): Agriculture in underdeveloped Region: A Geographical Survey, Himalaya Publication House, Bombay, Pp. 105-111.
6. Singh Jasbir, Devinder Singh Sandhu and Jai Prakash Gupta (1990): Dynamic of Agricultural Change: An Agricultural Atlas of India, Oxford and IBH, New Delhi, Pp. 292-293.
7. Singh J. and Dhillon S. S. (2000): Agricultural Geography, Tata McGraw-Hill Publishing Company Ltd., New Delhi, Second Edition, Pp. 238.
8. Vaidyanath, V. (1985): Agricultural Productivity in Andhra Pradesh, The National Geographical Journal of India, Vol. 31, Issue 3, Pp. 205-207
9. Singh, Sunita (2012): Agricultural Productivity and agricultural intensity in
Rohtas District, Bihar, Inter- ITERT, Vol.1, pp. 1-11.
10. Ali, Mohammad (1978): Studies in Agricultural Geography, Rajesh Publication
New Delhi, Pp. 128.