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Disparaties in the Agricultural Productivity in Deoghar District of Jharkhand: A Geographical Analysis

Jitendra Kumar Choudhary
Research Scholar,
Deptt. of Geography,
Ranchi University,
Ranchi, Jharkhand

Abstract

Agricultural productivity may be defined as the total agricultural output per unit of cultivated area, per unit of agricultural worker or per unit of input in monetary values. Agricultural productivity is the result of various physio-cultural aspects. This research paper aims of examining variations in crop productivity and relative changes that have occurred in agricultural productivity in two time periods (1990-91 to 2013-14) and identifying the deficient villages and formulating a policy to increase their productivity in the study area. The present study is based on primary and secondary data. For calculating agricultural productivity, Yang's Crop Yield Index method has been applied in this study. Agricultural productivity has increased in this study area during given period because of higher percentage of net irrigated area to the net sown area, use of chemical fertilizers and high yielding variety of seeds but the yield rate of crops mainly food crops show very little change in that period. The Deoghar district is characterized by an agrarian economy. The population of the villages of district is increasing Rapidly. So there is an urgent need to develop appropriate planning and strategy for its active implementation for sustainable development of agriculture and agro-based economy of the district.

Keywords: Agricultural Productivity, Disparity, Irrigation, HYV Seeds, Employment.

Introduction

Agriculture of a region is the outcome of complex interaction of several factors like available human resources, nature of land, fertility of the soil, availability of rainfall, suitability of temperature, demand of agricultural output as well as the application of tools and techniques. As the availability of all these factors are not uniformly distributed, the cropping pattern and yield vary from region to region. Agricultural geographers and economists have long been engaged in study of correlation between the said factors and level of productivity in various parts of the world (Yang, 1965; Kendal, M.G.1939; Shafi, M.1960; Sapre, S.G. & Deshpande, V.D.1964 and Bhatia, S.S.1967). Several methods have evolved during the course of time to measure as well as to interpret the agricultural productivity in developed and developing countries (Kendal, M.G.1939& Bhatia, S.S. 1968).

To compute the agricultural productivity Yang's 'Crop Yield Index' method has been applied by Siddiqi et al. (1999) and Hifzur Rahman et.al. (2008) for computing the agricultural productivity in different parts of India. In this research paper five major crops of the region such as, paddy, wheat, gram, potato and mustard have been taken for computing the agricultural productivity. The productivity indices of crops were calculated following the statistical method formulated by Yang in 1965 (Table 1). The index represents the yield of all crops in a villages compared with the average crop yield of the district.

Study Area

Deoghar district is located in the north eastern part of Jharkhand state. Deoghar town is the administrative headquarters of this district. This district is known for the BaidyanathdhamJyotirlingashrine. This district is part of Santhal Pargana Commissionary. The district extends between 24^{o}02'N to 24^{o}36' N latitude and 86^{o} 27'E to 87 ^{o}04' E longitude. The study area are bounded by Banka and Jumai district (Bihar) in north, Dumka in east, Jamtara in south and Giridih in west of Jharkhand state. The Deoghar district covers an area of 2478.61 sq. km. It has population of 14, 91,879 persons (census-2011). Administratively the study area is divided into ten community development (C.D.) blocks viz, Madhupur, Sarath,

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Margomunda, Karon, Sarwan, Sonaraithadi, Deoghar, Mohanpur, Devipur and Palojori and two important towns viz. Baidyanathdham and Madhupur.

The district has a dissected surface represented by an old land surface uplifted during Tertiary times. It is true that the earliest geological formations of the area had been reduced to peneplain but later structural disturbances have created unevenness in land surface. Most of the area has an elevation exceeding 200m with a great part rising above about 550m above the mean sea level. There is also river valley which is only 120m high. The climate of the district is humid tropical with moderate rainfall (100-125cm annually) mainly from south-west monsoon wind.

The transport system in the district comprises on many modes varying from traditional bullock-cart to the modern railway system. However, road transport predominates in the district. The existing transport system suffers from many problems. Excepting a few main roads, the district has no good all-weather roads. Most of the villages are not well connected with main roads throughout the year. After broad observation of the study area we have selected 5 villages for detail study which are: Chormara, Dorhi, Lakarbindha, Jagmanidih and Madhwadih.

MAP 1

Objectives

The objectives of the present study are as follows:

1. To find out the pattern in variations in crop productivity and relative changes in agricultural productivity in the villages of Deoghar district that have occurred in two time periods i.e. 1990-91 to 2013-14.
2. To assess the spatio-temporal variation in agricultural productivity in the Deoghar district.
3. To identify the deficient villages and to formulate a policy to increase their productivity in the Deoghar district.
4. To asses correlations between productivity and different related variables.

Significance of the Study

Deoghar is an agrarian district of Jharkhand. About 80 percent of working populations are engaged in agricultural sector either as cultivators or as agricultural labours. Agriculture in this district is backward in comparison with that of the other districts of Jharkhand. In spite of high cropping intensity, Deoghar district is still lacks far behind in agricultural productivity in comparison to the other districts of Jharkhand. No comprehensive work in this regard has yet been initiated. As such the agriculture sector of the villages of the district needs the attention of appropriate planning for improvement.

Sources of Data

The database used in the present study has been collected from primary as well as secondary sources. The required data of the villages for the year 1990-91 and 2013-14 have been obtained through questionnaire scheduled survey by authors from namely Chormara, Dorhi, Lakarbindha, Jagmanidih & Madhwadih situated in the different parts of the district. The district level data have been collected from District Agriculture Office, Deoghar, Krishi Vigyan Kendra Sujani, Deoghar, Agricultural Technology Management Agency (ATMA), Deoghar, District Statistics Office, Deoghar etc.

Methodology

Agricultural productivity is generally defined as output of per unit input. There are more than twenty methods to find out agricultural productivity, but in this paper Yang's Crop Yield Index' method (1965) has been used. The area and average yield of crops have been taken into account to find out agricultural productivity. This has been further elaborated with the help of maps, charts and diagrams. In this paper co-relation has also been found out between agricultural productivity and No. of tractors/1000 acre GCA, no. of spraying machines /1000 acre GCA, use of chemical fertilizers in kg/acre and area under HYV seeds to GCA.

Yang's Crop Yield Index Method of Agricultural Productivity (1965)

For the present study of agricultural productivity of the villages of Deoghar district, Yang's crop yield index method has been applied. The agricultural productivity indices of crops were calculated following the statistical method formulated by Yang in 1965 which has been shown in Table 1. The index represents the yield rate of different crops in a villages compared with the average crop yield of the Deoghar district.

Table-1
Method for Calculating Crop Productivity Index for Chormara Village, 1990-91

Name of the Crop	Average Yield in the District (Quintal/Acre)	Average Yield in the Village (Quintal/Acre)	Area of Crops in the Village (in Acre)	Crop Yield in the Village as Percentage of the District (Col.3/Col.2) x 100	Percentage Multiplied by Area in Acre (Col.4 x Col.5)
1	**2**	**3**	**4**	**5**	**6**
Rice	10.8	10	170	92.59	15740.30
Wheat	6	6	17	100	1700
Gram	2.2	4	8.5	181.81	1545.39
Potato	30	30	3.50	100	350
Mustard	2.2	2.5	2.55	113.63	289.76
Total	-	-	201.45	-	19625.45

Crop yield index of Chormara village = **19625.45/201.45 = 97.42**

Table-2
Agricultural Productivity in Sample Villages

S. No.	Villages	Productivity (1990-91)	Productivity (2013-14)
1.	Chormara	97.42	137.02
2.	Dorhi	98.14	129.40
3.	Lakarbindha	70.33	109.11
4.	Jagmanidih	90.76	162.70
5.	Madhwadih	81.90	125.60

Source: Personal survey, 2013-14

Agricultural Productivity of the Study Area

Table 2 shows that the agricultural productivity has increased in the study area over the given period. This has happened, because of availability of increase in the irrigational facilities, use of adequate amount of fertilizers, and high yielding variety of seeds. In the year 1990-91 the highest agricultural productivity index (98.14) was found in Dorhi where as lowest productivity index (70.33) was noted in Lakarbindha village. The highest agricultural productivity index is 162.70 in 2013-14 recorded in Jagmanidih village. The reasons behind the highest productivity in this village is recent development of irrigation facilities, intensive cultivation, use of chemical fertilizers, high yielding variety of seeds, availability of good agricultural inputs and awareness among the farmers, whereas low productivity index 109.11 has been found in Lakarbindha village due to unfavourable conditions of agriculture, such as, poor irrigational facilities, tanr and barren lands, kankari soil, unawareness and lack of capital among farmers.

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Table-3
Growth in Agricultural Productivity in Sample Villages (1990-91 to 2013-14)

S. No.	Villages	Productivity (in%) (1990-91)	Productivity (in %) (2013-14)	Per Annum Growth
1.	Chormara	97.37	137.02	1.72
2.	Dorhi	98.14	129.40	1.36
3.	Lakarbindha	70.33	109.11	1.69
4.	Jagmanidih	90.76	162.70	3.12
5.	Madhwadih	81.90	125.60	1.90

Source: Personal Survey, 2013-14

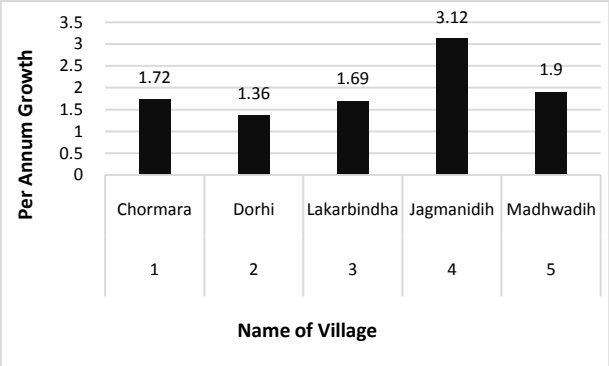

Fig 1: Per Annum Growth in Agricultural Productivity in Sample Villages (1990-91 to 2013-14)

Spatio-Temporal Variation in Agricultural Productivity in the Study Region

The spatio-temporal variation of agricultural productivity for the period of study villages between 1990-91 to 2013-14 has been displayed in the Table 3. It is clear from the Table 3 that the villages scoring higher values of agricultural productivity index have registered maximum increase of it during the period of study villags except Dorhi village which shows marginal increase with lower agricultural productivity. The highest growth of agricultural productivity index (3.12 percent per annum) is found in Jagmanidih village which is due to higher percentage of net irrigated area to the net sown area, use of chemical fertilizers and high yielding variety of seeds; whereas the lowest growth of agricultural productivity index (1.36 percent per annum) has been noted in Dorhi village because the area under irrigation is very less (only 0 to 5%) developed and low soil fertility (red & sandy soil).

Correlation between Agricultural Productivity and Other Variables

In order to assess the association between agricultural productivity and other related variables, coefficient has been calculated by using SPSS Software. No. of tractors/1000 acre GCA, no. of spraying machines /1000 acre GCA, use of chemical fertilizers in kg/acre and area under HYV seeds to GCA are the notable variables that have been used for the above calculation. The analysis gives interesting fact that in the year 1990-91 agricultural productivity in sample villages has positive correlation with means of irrigation only and that too is of low degree. With other variables negative coefficients of correlation have been found and it is an indicator of poor facilities available at the first period (1990-91).

The analysis of the year 2013-14 portrays substantial improvement in agricultural inputs that is why coefficients of correlation of higher magnitude above in all cases. It is strange as well as disheartening that use of chemical fertilizers record negative association with agricultural productivity in both the years. This may happen due to no considerable increased in use of chemical fertilizers compared to other inputs.

Conclusions

In order to determine the agricultural productivity of the villages of Deoghar district, Yang's Crop Yield Index method has been adopted. The study reveals that during the period, variation in agricultural productivity at village level in Deoghar district has been observed. Levels of agricultural productivity have increased during the study period. All the villages selected for study show positive growth in respect of agricultural productivity. The rate of growth is not uniform among the all villages, due to the variation in net irrigated areas, soil fertility, use of chemical fertilizers as well as availability of high yielding variety of seeds and choice of the farmers for cultivating the various types of crops. It means that some villages are characterized by good productivity while others with low productivity. As such notable change in sample villages has also been seen. In order to achieve positive and fruitful association between use of chemical fertilizers and agricultural productivity, there is need of increased scientific use of organic manures and chemical fertilizers in Deoghar district as a whole. This requires village wise soil testing and assessment of specific fertilizers need. Thus the main concern should be to increase the productivity in general and in deficient villages in particular by adopting eco-friendly agricultural practices.

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Photo 1 : Cauliflower Field

Photo 2 : Mustard Field along with a Well

Photo 3 : Wheat Field at Chormara Village

Photo 4 : Paddy Field at Jagmanidih