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An Impact of Irrigation on Agricultural Productivity in Solapur District with References to Case Studies in Selected Villages: A Geographical Analysis

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Abstract:

This paper seeks to examine the response of agricultural productivity to irrigation and its impact on growth of agricultural productivity in the Solapur district with special references of sample selected villages of case study. In spite of the technological developments in providing improved crop varieties and better management practices in Solapur district, agriculture has been considered a gamble as the agricultural productivity is strongly influenced by the vagaries of the monsoon. The drought prone area in the district on annual rainfall occurs once in five years (Barakade A.J and Sule B.M.). Therefore, irrigation is an important for the agricultural productivity in Solapur district. Use of fertilizers, HVY seeds, use of technology, mechanization is closely based on the availability of irrigation and its impact of the agricultural productivity in a region. Comparing village to village differences of agricultural productivity, a profile of agricultural productivity is examined with a focus on impact of irrigation on agricultural productivity in study area. The availability of irrigation sources for the

crop growing is isolating the effects of HVY seeds-fertilizer technology. It is found that the use of HYV seeds has significant effects on enhancement of agricultural productivity in the selected villages of study area. As a result, two really differentiated scenarios of the changes of agricultural productivity have been observed.

The main objectives of the present research paper are to analyse the importance of agricultural productivity and examine the impact of irrigation agricultural productivity in study area. The Kendall's ranking coefficient method is used for measurement of agricultural productivity to the collected information of sample villages in study area. It has been observed that the spatial pattern of irrigation and agricultural productivity widely unequal from village to village in the study area.

Key words: Agricultural productivity, irrigation, ranking coefficient, HYV seeds.

Introduction:

Agricultural productivity is becoming increasingly important issue as the world population continues to grow. India, one of the world's most populous countries, has taken steps in the past decades to increase its land productivity. Agriculture still forms the backbone of Indian economy, in spite concerned efforts towards industrialization in last three decades. Agriculture contributes a high share of net domestic product by sectors in India. Farmers are growing numerous of crops in the field rather than single crop. Agriculture production is influenced by physical, climatological, socio-economic, and technological and organization factors, farmer's attitude but the availability of irrigation facilities is the most important determinant on the agricultural productivity. Because the inputs of agriculture such as use of HYV, use of fertilizers, use of advanced technology, agricultural mechanization, cropping intensity etc. are totally based on the availability of irrigation and all these

technology influenced on the agricultural productivity. Therefore irrigation is an important determinant of the agricultural productivity. Present study gives an idea of real situation of irrigation facilities and its effects on the variations in the agricultural productivity in the selected villages of study area.

Aim and Objectives:

The present study is undertaken with the specific objectives of the investigation as follows.

- To determine the impact of irrigation on agricultural productivity in the selected sample villages of study area.

Study Area:

Solapur district is situated in the western part of Maharashtra state. The district lies between 17^0 10' to 18^0 32' North latitude and 74^0 42' to 76^0 15' East longitude. It is bounded by Pune and Satara district to the West, Osmanabad district to the east, Sangli district and Karnataka state to the South, Ahmednagar district to the North. The total geographical area of the district is 14,895 sq. km with population of 43.16 lakh of which 22.34 lakh were males and 20.82 lakh females as per 2011 census. The maximum and minimum temperature throughout the year is 40.1^0 C and 16.1^0C respectively with an average rainfall of 561.47 mm annually. In the year 2008-09, the total area under crop cultivation was 10,30900 hectares of which 2,27100 hectare was irrigated and 7,59,900 Hectare was non-irrigated or rainfed area. Jawar, bajara, maize, millets, groundnut and soybean are the major crops grown in *kharif* season, whereas, wheat, potato, gram, tur are the important crops grown in *Rabi* season. Sugarcane is the important commercial crop raised in the district.

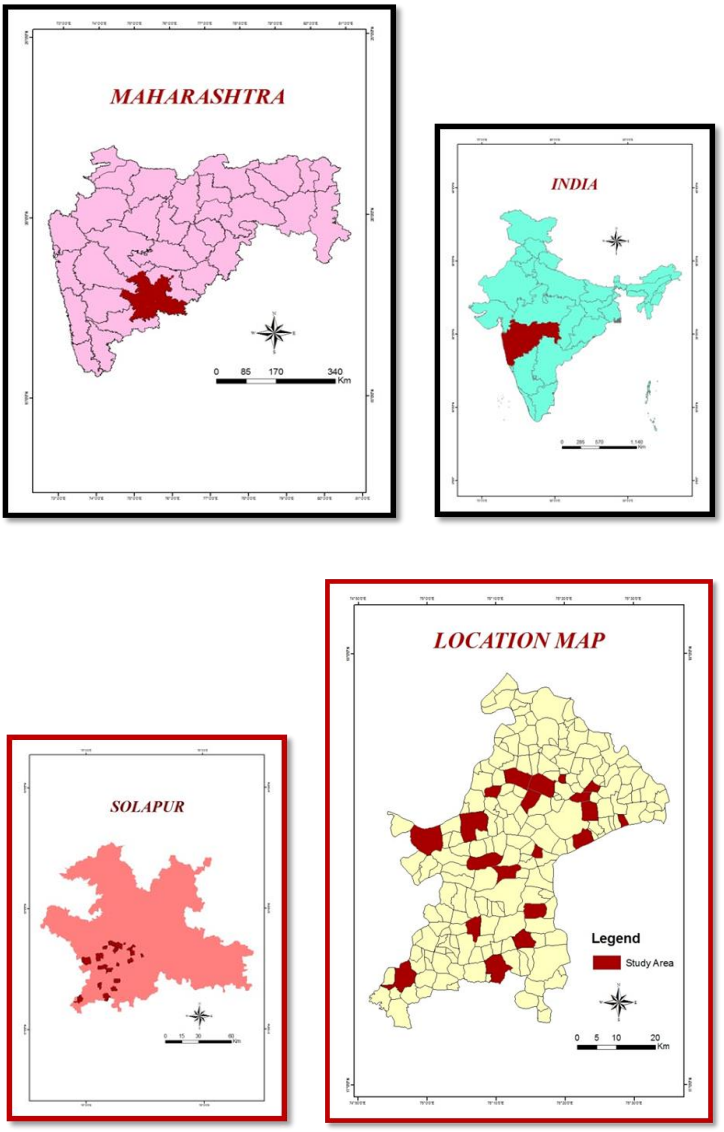

Figure 1: Location Map of Study Area

Data Base and Methodology:

Present study mostly relies on the primarily data collected through questionnaire and personal interview method to the farmers in the selected different villages in the case studies.

Methodology:

The detail study of agricultural productivity is conducted to understand the variations in the study area. In this concern agricultural productivity are applied for the identification of variations in the village to village. The collected area under different cropping production is tabulated, arranged in proper format and statistical methods are applied for the obtaining results. A comparative analysis is made among 20 villages with 20 farmers to each village to understand the agricultural productivity condition of the present situation due the variations in the irrigation facilities. The identification of agricultural productivity in the selected villages of case studies on the basis of spatial distribution of irrigation facilities.

To study the agricultural productivity there are Kendall's Ranking Co-efficient Methodused for provides truthful results.

Kendall's Ranking Coefficient Method:

In this technique the component areal units are ranked according to the per hectare yields of crops and the arithmetical average rank called the ranking coefficient for each unit is obtained. It is obvious that a component areal unit with relatively high yields. He had applied the following formula for the calculation of index of agricultural productivity.

$$Ranking\ Co-efficient\ Index = \frac{\Sigma R}{n}$$

Importance of Agricultural Productivity:

The agricultural productivity of a region is an important for many reasons. A side from providing more food, increasing the productivity of farms affects the region's prospects for growth and competitiveness on the agricultural market, income distribution and savings, and labour migration. An increase in

a regional agricultural productivity implies a more efficient distribution of scarce resources. As some farmers adopt new techniques and differences in productivity arise, the more productive farmers benefit from an increase in their welfare while farmers who are not productive enough will exit the market to seek success elsewhere.

As a region or area of farms become more productive, its comparative advantage in agricultural products increases, which means that it can produce these products at a lower opportunity cost than can other regions. Therefore, the region becomes more competitive on the world market, which means that it can attract more consumers since they are able to buy more of the products offered for the same amount of money.

Increases in agricultural productivity lead also to agricultural growth and can help to alleviate poverty in poor and developing countries, where agriculture often employs the greatest portion of the population. As farms become more productive, the wages earn increased by those who work in agriculture. At the same time, food prices decreases and food supplies become more stable. Labourers therefore have more money to spend on food as well as other products. This also leads to agricultural growth, people see that there is a greater opportunity earn their living by farming and are attracted to agriculture either as owners of farms themselves or as labourers.

However, it is not only the people employed in agriculture who benefit from increases in agricultural productivity. Those employed in other sectors also enjoy lower food prices and a more stable food supply. Their wages may also increase.

Measurement of Agricultural Productivity:

The measurement of production and inputs required for the production that output is known as agricultural productivity. Agricultural productivity is the inter play of a multitude of many factors, such as environmental, socio-economic and

technological factors. Among them the availability of irrigation is an important determinant to the influenced on the agricultural productivity. The agricultural productivity is closely based on the irrigation and its impact on the use of chemical fertilizers, use of HYV, used of mechanization etc. and its impact on the per hectare yields, whereas the agricultural efficiency is much more than agricultural productivity and conveys a more comprehensive meaning. Agricultural productivity is the actual performance of the land in terms of per hectare yield, whereas agricultural efficiency is a ratio between the achievement in terms of agricultural production and the actual potential of the land productivity.

Ranking of Coefficient Index by Kendall's Method:

The co-efficient of agricultural productivity of a village in terms of a single variable is calculated by equation using of Kendall's Ranking Co-efficient method.

Pattern of Agricultural Productivity in Selected Villages:

The pattern of agricultural productivity in study area has been delineated with the help of Kendall's ranking coefficient method. The ranking coefficient value of very high, high, medium, low, very low productivity have been given in following table while the resultant pattern of productivity have been plotted in following table.

1. Very High Agricultural Productivity:

It may be observed from map that the very high agricultural productivity is found in villages of Ozewadi, Gopalpur and Mundhewadi in the Pandharpur tehsil. Sugarcane, Wheat and Maize are the dominant crops in these villages. It is interesting that to note here the major area of the cultivated in this tract because of the availability of irrigation facilities by canal, river, well and tube wells are the important for the higher the agricultural productivity. Therefore, the higher the availability

irrigation there will be higher the agricultural innovations and so the higher the productivity in this areas.

2. High Agricultural Productivity:

High agricultural productivity found in the villages, namely Bhandi Shegaon, Wakhari, Chincholi Bhose and Mahud Bk. concerning in the study area. It has been observed that means high agricultural productivity. Because of availability of irrigation facilities and so the use of HVY, use of fertilizers, maintains the fertility, use of mechanization in this area.

3. Moderate Agricultural Productivity:

The moderate agricultural productivity has been observed in the villages, viz. Anawali, Jainwadi and Gadegaon. There is medium agricultural productivity, because of adequate water for irrigation but highly diversified crops, the farmers are growing assortedcrops ranging from high water requiring i.e. sugarcane to less water requiring crops like wheat, jowar, maize etc.

Table: Ranks and Coefficient of Ranking Index of Major Crops in the Study Area

Sr. No.	Name of Village	Sugarcane	Wheat	Jowar	Maize	Bajara	G.Nut	Garm	Vegetable	Total Rank	Coefficient of Ranking Index
1	Gadegaon	9	5	17.5	6	8	20	5	9	79.5	9.94
2	Tavashi	10	19.5	13	1.5	10	19	11	12	96	12.00
3	Jainwadi	8	3	8	10	11	13	8	8	69	8.63
4	Anawali	13	15	11	12	5	2	4	4	66	8.25
5	Ozewadi	6	2	5	3	3	4	9	2	34	4.25
6	Mundhewadi	2	9	1	9	2	8	2	5	38	4.75
7	Gopalpur	3	7	7	1.5	4	6	7	1	36.5	4.56
8	Wakhari	1	11.5	6	8	6	7	3	3	45.5	5.69
9	BhandiShegaon	7	4	9	4	7	5	1	7	44	5.50
10	ChincholiBhose	5	1	19	17	1	3	6	6	58	7.25
11	Sonand	N.A.	16	15	18	9	12	17	19	106	15.14
12	Javala	12	10	12	14	16	11	20	17	112	14.00
13	Kola	N.A.	13	16	16	19	14	15	18	111	15.86
14	Katfal	N.A.	14	4	7	15	15	16	20	91	13.00
15	Medashingi	11	8	20	15	20	10	12	15	111	13.88
16	Watambare	N.A.	17	10	19	17	9	14	16	102	12.75
17	Mahudbk	4	11.5	3	5	13	1	10	11	58.5	7.31
18	Shivane	N.A.	18	2	11	14	16	18	14	93	13.29
19	Chincholi	N.A.	19.5	14	20	12	18	19	13	115.5	16.50
20	Sangewadi	N.A.	6	17.5	13	18	17	13	10	94.5	13.50

Source: Compiled by researcher.

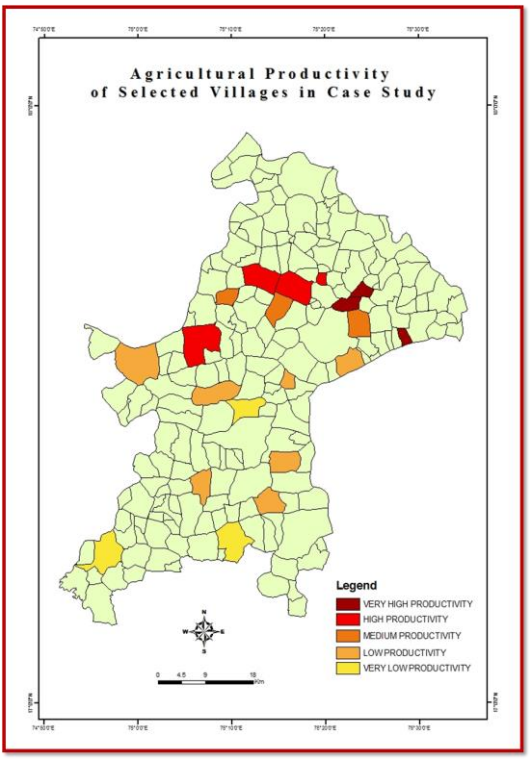

Figure 2: Agricultural productivity of selected villages prepared by Kendall's Ranking Coefficient Method.

4. Low Agricultural Productivity:

The low agricultural productivity has been observed in the villages of Tavashi, Watambare, Katfal, Shivane, Sangewadi, Medshingi and Javal. Lack of irrigation facilities are important factors influenced on the lower agricultural productivity in these villages.

5. Very Low Agricultural Productivity:

The very low agricultural productivity obtained in the villages of Sonand, Kola and Chincholi. Diversity in agricultural production is one key to productivity, as it enables risk management and preserves potentials for adaptation and

change. Monoculture is an example of such a non-diverse production system. In a monoculture system a farmer may produce only one crop, but no livestock, or only livestock and no crop. But this situation is not found in study area.

In short, irrigation is an important determinant influenced on the agricultural productivity and also some other few significant causes are responsible for the changing agricultural productivity in rural land such as a lack of current research information can have a huge impact on the yields, increasing prices of fuel, unavailability of raw materials for agricultural purposes, lack of machines to produce, illegal seeds, illegal chemical spreading and unscientific farming system.

Conclusion:

It has been observed that the farmers in the villages of high irrigated with the higher the agricultural productivity, because of these villages mostly farmers are used of HVY, more use of fertilizers for the cropped, use of innovative techniques etc. so higher the agricultural productivity in these areas. While in the some villages' i.e. low availability of irrigation, the farmers are using much less fertilizer per unit cropped area; fertilizer consumption is low, resulting in poor productivity.

Transfer or adoption of improved production technology in uneven rainfall, ecosystem has not picked up its desired momentum. Therefore, productivity of in this eco-system is considerably poor. The complex ecological situation of rainfall eco-system consisting of upland, shallow low land, semi-deep water and deep water conditions is one of prime reasons for low productivity. It also socio-economic, organizational and technological constraints resulting in low productivity.

Irrigation is an important determinant influenced on the agricultural productivity and also some other few significant causes are responsible for the changing agricultural

productivity in rural land such as a lack of current research information can have a huge impact on the yields, increasing prices of fuel, unavailability of raw materials for agricultural purposes, lack of machines to produce, illegal seeds, illegal chemical spreading and unscientific farming system.

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