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IMPACT OF NET IRRIGATED AREA ON AVERAGE PER HECTARE YIELD OF HORTICULTURAL CROPS IN OSMANABAD DISTRICT

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assessment of production or output in terms of the inputs applied to the productive process (Siddiqui A and Jat B.C., 2009). The concept of productivity is a relative and cannot be uniformly applied all over the world some have viewed productivity as the overall effectiveness of productive unit, while some have confined use of the term productivity to denote the ratio of output to the corresponding input of labor. However, all these apparently conflicting the different interpretations have one common characteristic i.e. productivity is some one's ability to produce more economically and efficiently. Therefore, agricultural productivity could be defined as the ratio of output to input in relation to land, capital, and overall resources employed in agriculture (Noor Mohmad, 1995). Agricultural productivity is a measure of the efficiency with which inputs are used in agriculture to produce an output. A precise measure of productivity is the ratio of

ABSTRACT

Watson Longman English dictionary (1976) defines the word 'agriculture' as science or the art or the practice of large scale soil cultivation in order to produce crops. In modern sense agriculture consists of horticulture, fish farming, pig farming and poultry. Horticulture is the most important type of agriculture. It is defined as an expensive art or science of cultivating fruits, vegetables, flowers, or ornamental plants. Horticulture is the branch of agriculture dealing with garden crops, generally fruits, vegetables and ornamental plants.

Horticulture has emerged as an indispensable part of agricultural, offering a wide range of choice of farmers for crop diversification. The horticulture sector encompasses a wide range of crops namely fruit crops, vegetable crops, potato and tuber crops, medicinal and aromatic crops, spices and plantation crops (Planning Commission, 2001).

KEYWORDS: Horticultural Crops, science of cultivating fruits, vegetables, flowers.

INTRODUCTION

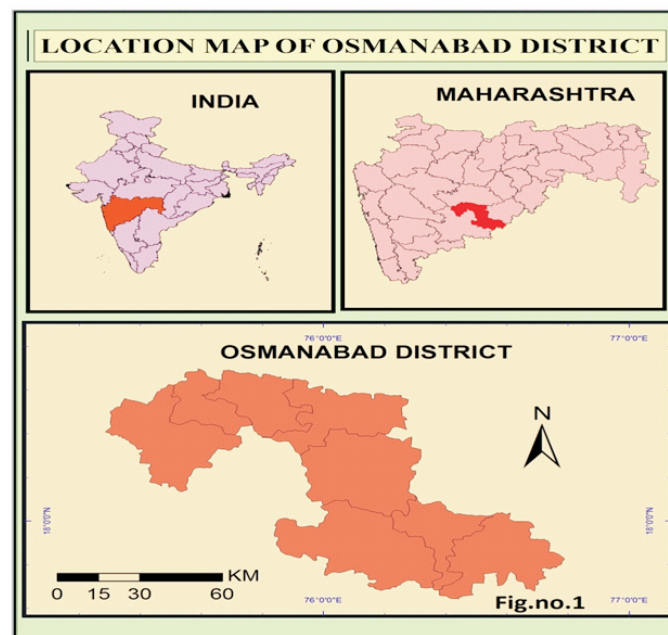
Productivity measurement is an

output to all inputs used in the production process. The computation of such a ratio therefore involves the problem of aggregating a variety of output and inputs into single indexes (Christensen, 1975).

Irrigation is identified as a decisive factor in Indian agricultural land use due to high variability and inadequacy of rainfall. Irrigation is the watering of land by artificial means to foster plant growth (Merriam Webster's Collegiate Dictionary, 2004). Irrigation means the supply of water to the land by means of channels, streams, and sprinklers in order to permit the growth of crops (Susan Mayhew, 2004). Irrigation is basic determinants of agriculture because its inadequacies are the most powerful constraints to change in per hectare yield. It is observed that with the growth of irrigated area, per hectare yield in horticultural crops are increased. So it is hypothesized that higher is the growth of irrigated area more is the per hectare yield in horticultural crops. Therefore attempt is made here to assess the impact of net irrigated area on per hectare yield of horticultural crops.

2.3 Study Area:

The Osmanabad district is situated in Marathwada region of Maharashtra state. The absolute location of district is in between $17^{\circ}39'45''$ and $18^{\circ}42'30''$ North latitudes and $75^{\circ}18'30''$ and $76^{\circ}46'15''$ East longitude. It is bounded to the South-West



by Solapur district, to the North-West Ahmednagar and Beed districts, to the East by Latur district and to the South by Bidar and Gulbarga district of Karnataka State. The total geographical area of district is 7512.40 Square kilometers.

As for as area is concerned the district ranks 24th in the state of Maharashtra out of which 248 sq km is urban area (3.21 % of total area) and 7321 sq km is rural area (96.79 % of total area). It is extended with 280 kms from East to West and 240 kms from North to South. It lies on the Deccan plateau at an average height of 600 meter above mean sea level. Large area of the district is covered by Balaghat Ranges and uneven with patches of low level plain. For the administrative purpose the district is divided into 8 tehsils i.e., Osmanabad, Tuljapur, Omerga, Lohara, Kallam, Bhoom, Paranda, and Washi and having 729 villages. (Fig no.1)

OBJECTIVES:

The main objectives of this paper are as following

- 1) To examine the impact of net irrigated area on per hectare yield of horticultural crops.

2) To estimate the rate of change in per hectare yield of horticultural crops in relation to change in percentage of net irrigated area.

DATA COLLECTION AND METHODOLOGY:

The present study is based on primary data source. In order to meet these objectives the relevant information and data regarding irrigated area, per hectare yield of horticultural crops are collected through extensive field survey with the help of schedule, questionnaire, interview and discussion. To collect such data 24 villages have been selected by Stratified Random Sampling method on the basis of physiography and 240 farmers are assessed. On the basis of fieldsurvey tehsilwise average per hectare yield is calculated. Collected rough data are processed. The percentage to net irrigated area is computed to total net sown area.

To examine the impact of irrigated area on per hectare yield of horticultural crops the Pearson’s Coefficient of Correlation technique has been utilized. The degree of relationship by considering growth of irrigated area as an independent variable ‘X’ and per hectare yield of horticultural crops as dependent variable ‘Y’ is measured. The functional form of linear relationship has been measured by using regression equation Y on X i.e. $y = a + bx$. The rate of change in dependent variable has been estimated with the help of ‘b’ coefficient, which is the line of best fit. The ‘t’ test is used with the view to understand the confidence level. Analysis of the study has been made with help of the statistical techniques and on the basis of this results and conclusion are drawn.

DISCUSSION:

Net Irrigated Area and Per Hectare Yield of Horticultural Crops.

In the context of objective the following findings have come to light.

1) The high positive correlation is observed in between percentage of net irrigated area and average per hectare yield of selected crops in tehsils of Osmanabad District. The coefficient of correlation in this regard is +0.774196. The degree of linear association between these two variable obtained by using the coefficient of determination (r^2) is found to be at 0.599379, which reveals that the independent variable (X) i.e. net irrigated area are explaining 59.93 per cent of the total variations in dependant variable (Y) i.e. average per hectare yield of selected crops in tehsils of Osmanabad District.

Table - 1: Percentage of Net Irrigated Area and average per hectare yield of selected crops in tehsils of Osmanabad District

Sr. No	Tehsils	X (% of Net irrigated area to net area sown)	Y (Average PHY of Selected Crops)
1	Paranda	20.18	12.07
2	Bhum	21.20	17.25
3	washi	12.39	12.84
4	Kalam	8.76	10.97
5	Osmanabad	20.66	14.77
6	Tuljapur	35.83	17.65
7	Lohara	20.45	14.24
8	Omerga	20.34	12.35
Coefficient of correlation			0.774196
Coefficient of determination			0.599379

Source: Compiled by Researcher on the basis of Field Survey.

It is good explanation because 59.93 per cent of variation in ‘Y’ average per hectare yield of selected

crops in tehsils of Osmanabad District to be influenced by the variable 'X' i.e. net irrigated area and about 40.07 percent of variation is left to be influenced by other variables.

2) The functional form of linear relationship of 'Y' on 'X' found to be at $y = 9.251 + 0.238x$. The line of best fit is shown in figure 2. The regression coefficient indicates that increase of one percent net irrigated area causes for increase of 0.238 tones average per hectare yield of selected crops in tehsils of Osmanabad District. By testing the significance of regression coefficient (a test of significance), the validity of this causal relationship has been confirmed.

The calculated value of 't' in this exercise is found at 2.98. It is observed that this calculated value is higher than the tabulated value of 't' (2.45) at the 6 degree of freedom ($df = n - 2$, where 'n' is 8) at 5 per cent level of significance.

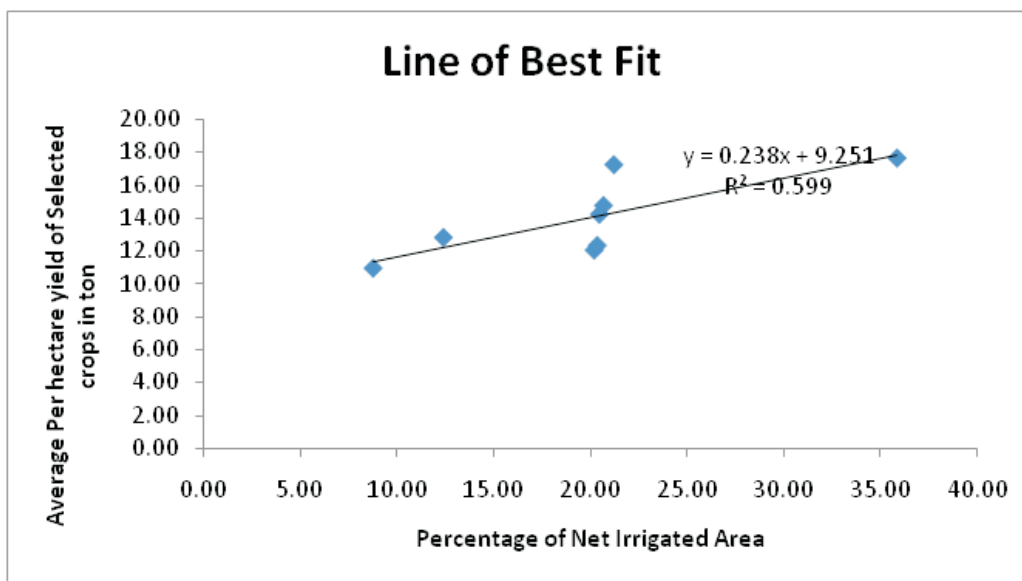


Figure 2

3) In order to understand the degree of fit of regression equation and the accuracy level of predicted values (y) average per hectare yield of selected crops in tehsils of Osmanabad District the standard error (SE) of estimate is being done with the equation $SE(Y) = SY \sqrt{1 - R^2}$, where SE (Y) is the standard deviation of residuals (Y-y); and 'SY' is the standard deviation of 'Y'.

The confidence intervals of the predicted values are worked out at $Y \pm SE(Y)$ (The SE (Y) for the present exercise is 1.1571 and SY is the 2.435). Thus it is assumed that if the values of 'Y' (Y-y) lie within the range of Zero to $\pm SE$, the prediction could be expected to be accurate. In other words, the role of independent variables in explaining the change in dependent variable can be accepted as correct.

The equation used $t = \frac{(b - \beta) \sqrt{n(2) \sum (X - \bar{X})^2}}{\sum (y_i - \hat{y}_i)^2}$

In this context it has been observed that the predicted values (given in table-) of 5 out of 8 districts in the present study lie within the range of $\pm SE$, 2 within $\pm SE$ to $\pm 2 SE$ and 1 $> \pm 2 SE$. Now the obvious inference is that the 62.5 per cent of the total number of observation (n is 8) the regression is a good indicator meaning thereby that the variations in average per hectare yield of selected crops is the function of the variations in net irrigated area. In the case of other tehsils with residuals between $> \pm$

Table -2: Residuals from Regression of average per hectare yield of selected crops

Sr. No,	Tehsils	yi	Yi-yi
1	Paranda	14.05	-1.98
2	Bhum	14.30	2.95
3	washi	12.20	0.64
4	Kalam	11.34	-0.37
5	O. bad	14.17	0.60
6	Tuljapur	17.78	-0.13
7	Lohara	14.12	0.12
8	Omerga	14.09	-1.74

Source: compiled by researcher on the basis of Field Survey.

SE to ± 2 SE the situation is different because here the regression is a poor indicator. It clearly indicates that these are the districts whom the influence of variables other than the independent one. The variations in average per hectare yield of selected crops in the tehsils of Osmanabad district in the latter case may be due to the variation in climatic condition, variation in soil, variation in use of fertilizer & pesticides and variation in consciousness of farmers.

CONCLUSIONS

The forgoing analysis reveals that there is high positive correlation between net irrigated area and per hectare yield of horticultural crops in the tehsils of Osmanabad district. The degree of linear association between these two variable is found to be at 0.599379, which reveals that the independent variable (X) i.e. net irrigated area are explaining 59.93 per cent of the total variations in dependant variable (Y) i.e. average per hectare yield of selected crops in tehsils of Osmanabad District. The percentage of irrigated area is found to be more effective than the other variables considering increase in per hectare yield of horticultural crops. The regression coefficient indicates that increase of one percent net irrigated area causes for increase of 0.238 tones average per hectare yield of selected crops in tehsils of Osmanabad District. Therefore it is to be stated that the increase in percentage of irrigated area is helpful to increase in per hectare yield of horticultural crops. Lack of surface irrigation is main barrier in the study region, therefore it is suggested that government should pay attention to increase minor irrigation projects, Kolhapur Types Wears as far as possible and to complete uncompleted irrigation projects and to increase irrigated area in turn to increase in per hectare yield of horticultural crops.

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