DRIP IRRIGATED AREA AND ECONOMIC STATUS OF FARMERS: A CASE STUDY OF VILLAGE KAVHE VILLAGE OF MADHA TAHSIL

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Abstract:

Role of irrigation in agricultural productivity is very important in drought prone area. Irrigation is the watering of land by artificial means to foster plant growth Drip irrigation is designed to water the crop and not to the whole area on which the crop is planted. Drip irrigation is irrigation methods, which save water, fertilizer. In the present day drip irrigation is most essential technological factor due to shortage of water resources. Drip irrigation method is one of the important inputs, which is useful to increase area under irrigation and to save water resources as well as to increase agricultural production. Therefore an effort is made here to examine impact of drip irrigated area on income of farmers. The paper is mainly based on primary data sources. To examine the impact of drip irrigated area on income of farmers the Karl Pearson's coefficient of correlation techniques, Coefficient of determination and regression equation technique has been employed. The study reveals that increase of one hectare drip irrigated causes for increase of income of farmers 85500 rupees per year in village Kavhe.

Key wards: Drip irrigation, Correlation, regression.

Introduction:

The Agricultural productivity is a combine effect of physical and manmade factors. Among the role of irrigation in agricultural productivity is very important in drought prone area. If agricultural is only rain fed, it resulted into crop failure. The crop failure resulted into poor economic condition of farmers as well as lower economic status in turn resulted into suicide of farmers. The economic status of farmer is improved only after if farmers cultivate crops with irrigation and doing animal husbandry as well as poultry as a sideline for farming. Irrigation is identified as a decisive factor in Indian agriculture due to high variability and inadequacy of rainfall. Irrigation is imperative for successful agriculture particularly in the arid, semi arid and sub humid areas, which are

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prone to drought and famine conditions due to partial failure and delayed arrival or early withdrawal of Monsoon (Reddy & Reddy, 1992). Irrigation is the watering of land by artificial means to foster plant growth (Merrium Webster's Collegiate Dictionary, 2004, p.663). 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, P. 280). In drought prone area drip irrigation is better than flood irrigation. Drip irrigation is designed to water the crop and not to the whole area on which the crop is planted. Drip irrigation is irrigation methods, which save water, fertilizer by allowing water to drip slowly to the roots of plants, either into the soil surface or directly on the root zone, through the network of valves, pipes, tubing and emitter.

In the present day drip irrigation is most essential technological factor due to shortage of water resources. Drip irrigation method is one of the important inputs, which is useful to increase area under irrigation and to save water resources as well as to increase agricultural production. Irrigation particularly drip irrigation method gives assure agriculture production. The labour requirements for drip irrigation are low; the system is easily automated or could be operated manually with little effort with proper design. It promotes improved plant growth and productivity, larger yield, better crops are important benefits to the grower, whose livelihood depend on the irrigation system. Drip irrigation positively affects on income of farmers so it can be hypothised that higher the drip irrigated area more is the income of farmers, therefore attempt is made here to study impact of drip irrigated area on income of farmers.

Study Region:

The study area is located in North East part of Madha tahsil. The absolute location is 17^0 15' 35" North latitude and 75^0 45' 42" East Longitude. The study area is 11 Kilometer from Kurduwadi city and just 22 Kilometer from Madha tahsil head quarter. The geographical area of the study area is 2392 hectares, Out of them 90.47 per cent is under Cultivation. The population of the village is 6536. The percentage of cultivators and agricultural labours are 65.2 and 28.2

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respectively, as per 2021 census, indicates that farming is the main occupation of the Village.
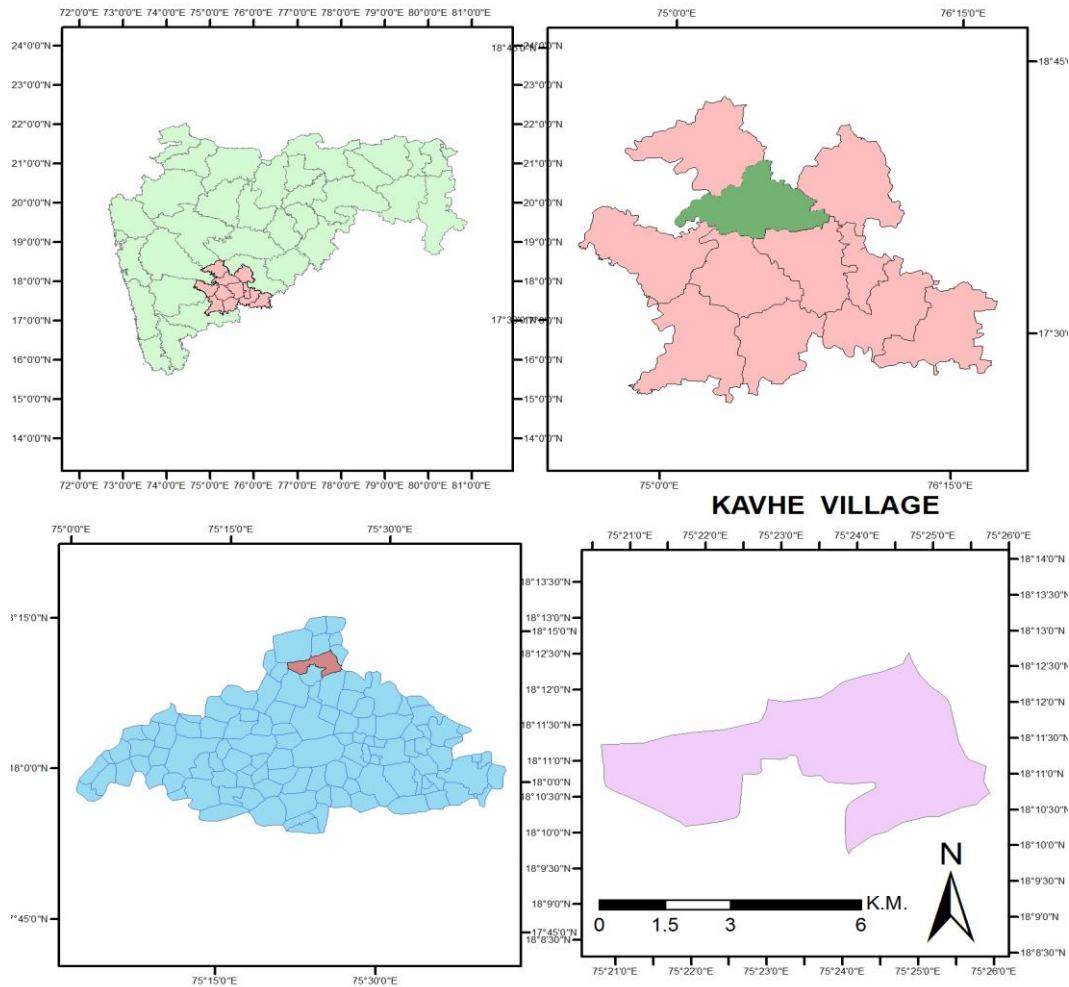
LOCATION MAP OF KAVHE VILLAGE

Fig. No. 1

Objectives:

Following are the main objective of this paper.

1. To examine the influence of drip irrigated area on the income of farmers

2. To estimate the rate of change in income in relation to drip irrigated area.

Data Collection And Methodology:

    In order to meet these objectives the relevant information and data regarding drip irrigated area and income from sugarcane cultivation are

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collected and used for the year of 2018 are mainly based on primary sources. The primary data is the first hand data collected through different sources for which special questionnaires (schedule) were designed. During field survey 65 farmers out of 130 farmers are assessed, which constitute 50 percent of total farmers those have drip irrigation facility. Systematic sampling method is applied for the collection of primary data, every second farmer is considered for village Kavhe. It has helped to understand the drip irrigated area and income of farmers from sugarcane cultivation. Information also collected from Talathi office. The information regarding physiography and drainage system also been obtained from Toposheet. After the collection of data different statistical techniques have been employed. To examine the impact of drip irrigated area on income of farmers the Karl Pearson coefficient of correlation technique of has been employed. 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 dependant 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. The analysis of the study has been made with the help of the statistical techniques and on the basis of this techniques result and conclusions are drawn.

Drip irrigated area and income of Farmers:

The table-1 indicates that the drip irrigated area of farmers in village Kavhe is ranging from 0.2 to 15 percent to total area under sugarcane in 2017-18. There are 13.43 percent farmers those having less than 1 hectare drip irrigated area under sugarcane, 25.37 per cent farmers those having 1 to 2 hectare drip irrigated area. In Village Kavhe, there are 37.31 per cent farmers those have above 2 to below 4 hectare drip irrigated area, 17.91 percent farmers those have 4 to 8 hectare drip irrigated area, while only 5.97 percent farmer those have more than 8 hectare drip irrigated area under Sugarcane.

Table no. 1: Drip irrigate area and income of farmers 2018

Sr. No.	Drip irrigated	Income in Rupees	Sr. No.	Drip irrigated	Income in Rupees
1	2.8	300000	35	8	1200000
2	6	1000000	36	1	300000
3	2.8	400000	37	2	144000

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4	4.8	800000	38	2	320000
5	1.2	200000	39	2	400000
6	2.4	400000	40	8.8	2000000
7	0.6	100000	41	1	250000
8	2.2	500000	42	4	700000
9	0.8	120000	43	6	600000
10	1.2	400000	44	1	100000
11	2.4	800000	45	1	100000
12	2.5	160000	46	1	80000
13	0.8	160000	47	3.6	400000
14	2.4	520000	48	3.2	180000
15	1.6	260000	49	3.6	180000
16	3	500000	50	1.6	70000
17	1.2	200000	51	3.2	140000
18	4	1100000	52	2	300000
19	4	800000	53	1	100000
20	1.77	400000	54	0.8	100000
21	0.77	100000	55	0.8	80000
22	2	400000	56	4.8	60000
23	1	160000	57	1.4	80000
24	1.6	500000	58	2.8	40000
25	3	400000	59	4	60000
26	0.8	240000	60	10	600000
27	2	420000	61	5	150000
28	2	500000	62	14	1000000
29	2.8	470000	63	3	90000
30	0.4	100000	64	5	200000
31	1.2	420000	65	15	800000
32	4.6	1200000			
33	2.8	800000		Ave, Income	85500
34	0.2	360000	r = +0.608056		
Coefficient of Determination= 0.369732					

Source: compiled by author.

The table no.1 indicates that there are 52.24 per cent farmers those have up to 3.225 lakh rupees income from sugarcane cultivation by using drip irrigation method in village Kavhe. The 28.36 per cent farmers have 3.225 to 6.15 lakh rupees income from sugarcane cultivation by using drip irrigation method. In Village Kavhe there are 10.45 percent farmers those have 6.15 to 9.075 lakh rupees income from sugarcane cultivation by using drip irrigation method, while 8.96 per cent farmers those have above 9.075 rupees income from sugarcane cultivation by using drip irrigation method.

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The moderate positive correlation between drip irrigated area and income of farmers. The coefficient of correlation in this regard is +0.608056. The degree of linear association between these two variable obtained by using the coefficient of determination (r^2) is found to be at 0.369732, which reveals that the independent variable (X) i.e. drip irrigated area are explaining 36.97   per cent of the total variations in dependant variable (Y) i.e. income of farmers from sugarcane cultivation in the study area. It is a good explanation because 36.97 per cent of variation in 'Y' income of farmers from sugarcane cultivation to be influenced by the variable 'X' i.e. drip irrigated area and about 63.03 percent of variation is left to be influenced by other variables. The functional form of linear relationship of 'Y' on 'X' found to be at y = 1.58 + 776x. The line of best fist is shown in figure 4.2. The regression coefficient indicates that increase of one hectare irrigated area causes for increase of income of farmers from sugarcane cultivation by 0.776 lakh rupees in study area. By testing the significance of regression coefficient (a test of significance), the validity of this causal relationship has been confirmed,

The equation used $t = (b-\beta) \sqrt{(n-2)\Sigma(Xi-\overline{X})^2 \div \Sigma(Yi-yi)^2}$

The calculated value of 't' in this exercise is found at 5.62 It is observed that this calculated value is higher than the tabulated value of 't' (2.70) at the 65 degree of freedom (df = n –2, where 'n' is 67) even at 1 per cent level of significance. In order to understand the degree of fit of regression equation and the accuracy level of predicted values (y) income of farmers of Kavhe 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 interval of the predicted values are worked out at Y ± SE (Y) (The SE (Y) for the present exercise is 2.86 and SY is the 3.61). Thus it is assumed that if the values of 'Y' (Y-y) lie within the range of Zero to ± 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. In this context it has been observed that the predicted values (given in table- 2) of 50 out of 67 farmers in the present study lie within

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the range of ± SE, 14 within ± SE to ± 2 SE and 3 above ± 2 SE. Now the obvious inference is that the 74.63 per cent of the total number of observation (n is 65) the regression is a good indicator meaning thereby that the variations in income of farmers in village Kavhe is the function of the variations in drip irrigated area. In the case of other farmers with residuals between > ± SE to ± 3 SE the situation is different because here the regression is a poor indicator. It clearly indicates that these are the farmers whom the influence of variables other than the independent one. The variations in income of farmers in the latter case may be due to the variation in soil, variation in use of fertilizer and variation in consciousness of farmers.

Table No. 2 Residuals from regression of income.

Sr. No.	yi	Yi-yi	Sr. No.	yi	Yi-yi
1	3.75	-0.75	35	7.79	4.21
2	6.24	3.76	36	2.36	0.64
3	3.75	0.25	37	3.13	-1.69
4	5.30	2.70	38	3.13	0.07
5	2.51	-0.51	39	3.13	0.87
6	3.44	0.56	40	8.41	11.59
7	2.05	-1.05	41	2.36	0.14
8	3.29	1.71	42	4.68	2.32
9	2.20	-1.00	43	6.24	-0.24
10	2.51	1.49	44	2.36	-1.36
11	3.44	4.56	45	2.36	-1.36
12	3.52	-1.92	46	2.36	-1.56
13	2.20	-0.60	47	4.37	-0.37
14	3.44	1.76	48	4.06	-2.26
15	2.82	-0.22	49	4.37	-2.57
16	3.91	1.09	50	2.82	-2.12
17	2.51	-0.51	51	4.06	-2.66
18	4.68	6.32	52	3.13	-0.13
19	4.68	3.32	53	2.36	-1.36
20	2.95	1.05	54	2.20	-1.20
21	2.18	-1.18	55	2.20	-1.40
22	3.13	0.87	56	5.30	-4.70
23	2.36	-0.76	57	2.67	-1.87
24	2.82	2.18	58	3.75	-3.35
25	3.91	0.09	59	4.68	-4.08
26	2.20	0.20	60	9.34	-3.34
27	3.13	1.07	61	5.46	-3.96

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28	3.13	1.87	62	12.44	-2.44
29	3.75	0.95	63	3.91	-3.01
30	1.89	-0.89	64	5.46	-3.46
31	2.51	1.69	65	13.22	-5.22
32	5.15	6.85			
33	3.75	4.25			
34	1.74	1.86			

Source: Compiled by Researcher on the basis of field survey

Conclusions:

The study reveals that there is moderate positive correlation between drip irrigated area and income of farmers from sugarcane cultivation in village Kavhe. The coefficient of determination reveals that the independent variable (X) i.e, drip irrigated area is explaining 36.9 per cent of the total variations in dependent variable (Y) i.e. income of farmers from cane cultivation in the village. It is a good explanation because 36.9 per cent of the variations in (Y) income of farmers from cane cultivation to be influenced by the variable (X) drip irrigated and about 63.1 percent of the variation is left to be influenced by other variables i.e variation in soil type, variation in use of fertilizer, variation in high yielding varities and variation consciousness of farmers. The drip irrigated area is found to be more effective than the other variables considering income of farmers. It is found that increase of one hectare drip irrigated area causes for increase of 85500 rupees yearly income of farmers in village Kavhe. Therefore it is to be stated that the high drip irrigated area is helpful to improve economic status of farmers. Public awareness should make regarding use of drip irrigation, water saving to increase yearly income as well as standard of living.

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