



Research Article

EFFECT OF SOCIO-ECONOMIC DETERMINANTS ON GROSS INCOME OF IRRIGATED FARM IN NANDED DISTRICT OF MAHARASHTRA

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Abstract- Investigation was carried out during the year 2013-14. In all 48 irrigated farms were randomly selected from sixteen villages of two tehsils in Nanded district of Maharashtra. Data were related to cropping pattern and livestock pattern as well as socio-economic determinants. The results revealed that livestock showed highly significant on irrigated farm with regression coefficient of 9837.01. It means that addition of one livestock could cause to increase Rs 9837.01 of gross income on irrigated farm. In next the order, regression coefficient of land holding was 7086.63. It means that addition of one hectare of land holding, would lead to increase Rs 7086.63 on irrigated farm. On the contrary, distance of farm from village showed regression coefficient of -9964.52, which was negatively significant. If addition of one kilometer distance to existence distance, it could adversely affect gross income of Rs 9964.52 on irrigated farm.

Keywords- Irrigated farm, Regression coefficient, Gross income, Linear function

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Introduction

Irrigated farming is the artificial application of water to the land for growing crops and increasing the production. It is the most important critical inputs for enhancing the productivity that is required at different critical stages of plant growth of various crops for optimum production. It plays a pivotal role in enhancing agricultural production and diversification. It is not only encourages the farmers to go for intensive farming but also increase land use efficiency. There is considerable progress in the field of agriculture due to development of irrigation facilities. Irrigation plays a key role in increasing food production to feed the increasing population. About 80 per cent of the total annual rainfall in India occurs from mid-June to mid-October. So it is essential to provide irrigation for production of crops during the rest of the eight months.

Soils of some areas are sandy and loamy and therefore porous for which a major portion of rainwater sinks down very quickly. So, sandy and loamy soils can't retain water like the alluvial soil and the black soil. That is why irrigation is essential for farming in the areas having, sandy and loamy soils. The rain-water flows down very quickly along the slopes of hillsides. So irrigation is necessary to grow crops in such areas.

Materials and Methods

Sampling design

Multistage sampling design was adopted for selection of district, tehsils, villages and irrigated farms. In the first stage, the Nanded district was purposively selected because of mostly existence of irrigated farmings. In the second stage, Himayatnagar and Naigaon tehsils were selected on the basis of higher area under irrigated farms. In the third stage, eight villages were selected from the each of tehsils on the basis of higher area under irrigated farms. From Himayatnagar tehsil villages were selected namely Borgadi, Dhanora, Jawalgaon, Karla, Pawan,

Sarsum, Siranjani and Sonar iwhile from Naigaon tehsil villages were selected namely Aluwadgaon, Balegaon, Benderi, Degaon, Lalwandi, Salegaon, Sangvi and Suilegaon. In the fourth stage, from each village, the list of irrigated farmers along with their holding sizes was obtained. Three irrigated farmers were randomly selected from each of the villages. In this way, from sixteen villages, 48 farmers were selected for the present study.

Analytical techniques

Coefficients of variation

Coefficients of variation (CV) used to measure the comparative variations of socio-economic characteristics. In order to know the dispersion, the standard deviation and coefficient of variation were estimated with the following formula.

$$SD = \sqrt{\frac{\sum (Y - \bar{Y})^2}{(n-1)}}$$

Standard deviation measures the dispersion between the observations.

$$CV = \frac{SD}{\text{Mean}} \times 100$$

Linear multiple regression analysis

$$Y = f(X_1, X_2, X_3, \dots, X_n)$$

$$Y = a + b_1X_1 + b_2X_2 + \dots + b_nX_n + u$$

The equation fitted was as follows.

$$\hat{Y} = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10}$$

Where,

$\hat{Y}$ = Estimated gross income (Rs/ farm)

a = Intercept of production function, b_i = partial regression coefficients of the respective resource variable ($i = 1, 2, 3, \dots, 10$), X_1 = Age of farmer in years, X_2 = Educational level in three quantum scores, X_3 = Family size in members, X_4 = Occupational level in three quantum scores, X_5 = Land holding in hectares, X_6 = Fragmentation of land in numbers, X_7 = Distance of farm from village in kilometers, X_8 = Social category in three quantum scores, X_9 = Bullock pair in numbers, X_{10} = Livestock in standard animal unit.

Results and Discussion

Cropping pattern and livestock pattern on irrigated farm

Cropping pattern and livestock pattern on irrigated farm were estimated and are presented in [Table-1]. The results revealed that area under cotton was 24.84 per cent followed by soybean (19.70 per cent) and wheat (13.06 per cent). It can be concluded that cotton, soybean and wheat crops were dominant crops on irrigated farm. In next order, area under pigeon pea was 9.00 percent followed by chickpea (8.14 per cent) and *rabi* jowar (6.85 percent). In regard to livestock pattern, cow and buffalo were major livestock on irrigated farm. Total livestock was found to be 2.68 standard animal units on irrigated farm. It implied that livestock can provide manure to crops and crops could provide residual fodder to residual fodder to livestock on irrigated farm [3].

Table-1 Cropping pattern and livestock pattern on irrigated farm

Particular	Irrigated farm	
	Area (ha) and livestock (no) farm	Per cent
CROPS Kharif		
1. Cotton	1.16	24.84
2. Soybean	0.92	19.70
3. Pigeonpea	0.42	9.00
4. Paddy	0.28	6.00
5. Greengram	0.18	3.85
6. Blackgram	0.15	3.21
7. Kharifjowar	0.13	2.78
8. Sub total	3.24	69.38
Rabi		
9. Wheat	0.61	13.06
10. Chickpea	0.38	8.14
11. Rabi jowar	0.32	6.85
12. Sub total	1.31	28.05
Summer		
13. Maize	0.12	2.57
14. Sub total	0.12	2.57
15. Gross cropped area (Σ 8,12,14)	4.67	100.00
16. Net sown area	3.24	69.38
17. Double cropped area	1.43	30.62
18. Cropping intensity	-	144.13
LIVESTOCK (standard animal unit)		
1. Cow	1.29	48.13
2. Buffalo	1.06	39.56

3. Goat	0.32	11.94
4. Poultry	0.01	0.37
5. Total livestock (Σ 1-4)	2.68	100.00

Mean SD and CV of socio-economic characteristics of farmer

Mean, SD and CV of socio-economic characteristics of irrigated farmer were estimated and are presented in [Table-2]. The results revealed that the age of irrigated farmer was 44.52 years while educational level of farmer was 2.38 scores with coefficient of variation of 55.88 percent. Family size was 5.65 members on irrigated farm with coefficient of variation as 34.51 percent. Occupational level was 1.43 scores and operational land holding was 3.42 hectares on irrigated farm. Fragmentation of land was 1.77 numbers on irrigated farm. Distance of farm from village was 1.71 kilometers. In social category showed 2.42 scores on irrigated farm. Bullock pair was 0.81 in number and livestock was 2.68 standard animal units respectively on irrigated farm [4,5].

Effect of socio-economic determinants on gross income of irrigated farm

Effect of socio-economic determinants on gross income of irrigated farm was calculated and is presented in [Table-3]. The results revealed that coefficient of multiple determination (R^2) was 0.590 that was highly significant and which showed 59.00 per cent effect of all determinants on gross income of irrigated farm. Among all determinants, partial regression coefficient of livestock was 9837.01, which was positive and highly significant.

Table-2 Mean, SD and CV of socio-economic characteristics of irrigated farmer

	Particular	Irrigated farm		
		Mean	SD	CV %
1.	Age of farmer (years)	44.52	± 10.33	23.20
2.	Educational level (3 quantum score)	2.38	± 1.33	55.88
3.	Family size (no)	5.65	± 1.95	34.51
4.	Occupational level (3 quantum score)	1.43	± 0.74	51.74
5.	Land holding (ha)	3.42	± 1.37	40.05
6.	Fragmentation of land (no)	1.77	± 1.05	59.32
7.	Distance of farm from village (km)	2.71	± 1.36	79.53
8.	Social category (3 quantum score)	2.42	± 0.48	19.83
9.	Bullock pair (no)	0.81	± 0.39	48.15
10.	Livestock (standard animal unit)	2.68	± 0.79	29.48

It was clear that, when one more added unit of livestock could cause to increase gross income by Rs 9837.01. Partial regression coefficient of land holding was 7086.63 that were positive and significant at 1 percent level. If one hectare added to land holding that would lead to increase gross income by Rs 7086.63. Partial regression coefficient distance of farm from village were and (-9964.52) were negatively significant. It inferred that when added distances of one kilometer could reduce gross income by Rs 9964.52. It was concluded that on one hand farmer has to increase livestock and land holding and on other hand should reduce distance of farm from village to increase gross income on irrigated farm [1,2].

Table-3 Effect of socio-economic determinants on gross income of irrigated farm

	Particular	Partial regression coefficient(Rs/unit)	Standard error(SE)	't' Value
1.	Age of farmer (years)	1544.47	1071.80	1.44
2.	Educational level(three quantum score)	-9582.27	7131.78	-1.34
3.	Family size (no)	4353.75	3225.00	1.35
4.	Occupational level(three quantum score)	3891.39	3088.41	1.26
5.	Land holding (ha)	7086.63	2134.67	3.31**
6.	Fragmentation of land (no)	-4297.32	3086.41	-1.39
7.	Distance of farm from village (km)	-9964.52	4664.10	-2.13*
8.	Social category (three quantum score)	7342.09	14085.10	0.52
9.	Bullock pair (no)	3236.96	3019.40	1.07
10.	Livestock (no)	9837.01	2039.10	2.82**

Intercept (a).....12504, R^20.59, F-Value.....6.73**, n.....48

Note: Gross income (Y) was Rs 428185/farm

* Significant at 5 per cent level

** Significant at 1 per cent level

Conclusion

In *kharif* season, cotton, soybean and pigeon pea were major crops. Cow and buffalo were major milch animals on irrigated farm. Mostly, Farmer is in middle age group with high school level education. Livestock and land holding can positively affect gross income on irrigated farm. On the contrary, distance of farm from village can affect gross income negatively. Hence, livestock, land holding and distance of farm from village are important socio-economic determinants to increase gross income of irrigated farm.

Conflict of Interest: None declared

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