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An economic analysis on impact of farm pond's on farmer's economy in Washim district

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Abstract

The present study entitled, 'An economic analysis on impact of farm ponds on farmers economy in Washim district' was undertaken to examine the impact of farm ponds on production of major crops. For the present study, 50 beneficiary farmers having farm ponds and 50 non-beneficiary farmers without farm ponds on their field were selected from Mangrulpir tahasil of Washim district. 10 villages from Mangrulpir tahasil were selected purposively and, from each village sufficient samples of beneficiary and non-beneficiary farmers were taken randomly for comparison. The selected farmers were classified into three category viz., small, medium, large according to their land holding. The primary data was collected from the farmers by survey method and standard cost concepts i.e., cost 'A', cost 'B' and cost 'C' was used for the analysis of data. It is revealed from the study that in beneficiary farmers at overall level average gross returns was ₹ 91898.00, while in case of non-beneficiary farmers it was ₹ 75266.00. In beneficiary farmers at overall level the output-input ratio at cost 'C' was 1.52, while in case of non-beneficiary farmers it was 1.23. It shows that the beneficiary farmers were more profitable than non-beneficiary farmers.

Keywords: beneficiary, non-beneficiary, farm ponds, soybean, returns, output- input ratio

Introduction

Indian economy is predominantly rural and agriculture oriented where the declining trend in the average size of the farm holding possess a serious problem. In agriculture 84 percent of the holding is less than 2 acres. Majority of them are dry lands and even irrigated areas depend on the vagaries of monsoon. In this context, if farmers concentrated on crop production they will be subjected to a high degree of uncertainty in income and employment. Hence, it is imperative to evolve suitable strategy for augmenting the income of the small and marginal farmers by combining to increase the productivity and supplement the income. In an agricultural country like India, the average land holding is very small. The population is steadily increasing without any possibility of increase in land area.

Water is an essential and precious resource upon which our ecosystems and agricultural production depend. However, water a natural resource of the world constitutes, 1,384 million cubic kilometers of which around 97.39 per cent (i.e. 1,348 million cubic kilometers) of water is in the oceans, which is salty in nature. Another 2.61 per cent (i.e. 36 million km³) is fresh water of this 77.23 per cent (27.82 million km³) is in the polar ice caps, icebergs and glaciers.

A farm pond is a large hole dug out in the earth, usually square or rectangular in shape, which harvest rainwater and stores it for future use. It has inlet to regulate inflow and an outlet to discharge excess water. The pond is surrounded by a small bund, which prevents erosion on the banks of pond. The size and depth depend on the amount of land available, the type of soil, the farmers water requirements, the cost of excavation, and the possible uses of the excavated earth. Water from the pond is conveyed to the fields manually, by pumping or by both methods. Farm pond size adopted by the farmers ranges 15×15×3 meter, 20×20×3 meter, 25×25×3 meter, and 30×30×3 meter according to size of land holding of a farmer (Mane *et.al.* 2015) [6].

Farm ponds are small water harvesting structure used for collection and storing runoff water. The present study was carried out to assess the impact of farm ponds on those aspects of the farmers belonging to dry land district of selected area in vidarbha region of Maharashtra state with the objectives to estimate the cost and returns and to estimate the output- input ratio.

Material and Methods

The present study was restricted to Washim district only in Vidarbha region. The 50 beneficiary and 50 non-beneficiary farmers were selected from Mangrulpir tahasil randomly in Washim district. Primary data were collected representing almost all representative area up to

village level in the district for the year 2016-2017. The primary data on input utilization, cost of cultivation and returns were collected from the selected beneficiary and non-beneficiary farmers and other relevant information was collected through the survey method with the help of pretested schedules. The village wise data so collected for cost of cultivation and returns were compiled for the whole district. For studying the impact of farm ponds on farmers economy on production of soybean the standard cost concept i.e. Cost 'A', Cost 'B' and Cost 'C' were used. The analytical part of the research was mainly confined to:

- Estimation of per hectare Cost 'A', Cost 'B', and Cost 'C'.
- Per hectare net returns at Cost 'A', Cost 'B', and Cost 'C'.

$$\text{Output-input ratio} = \frac{\text{Gross income}}{\text{Respective cost}}$$

This study was undertaken with main object of determining input used, costs, returns, and profitability from Soybean production.

Results and Discussion

The findings of the present study as well as relevant discussion have been presented under following heads.

Per hectare input utilization of Soybean

The degree of management of the resources can be judged for the utilization of resources, the choice and the decision making. Beside this, it is also indicates the level of technology adopted by the farmers. The farmers requires to spend on various inputs like seed, manure, fertilizers, human labour and bullock labour, machinery labour etc. therefore, it is necessary to know the pattern of expenditure on various inputs on per hectare basis. It is observed from table 1 reveals that at overall level hired human labour, machinery and fertilizers was used more in Non-beneficiary farmers as compared to the beneficiary farmers. It showed that more used of input used in Non-beneficiary farmers for the production of Soybean crop. Singh and Thapaliya (1991) [8] in their study reported that the cropping intensity increased significantly due to implementation of watershed project. The use of inputs was more in watershed area than non-watershed area.

Table 1: Per hectare input utilization pattern of selected farmers of Soybean

Sr. No.	Particulars	Unit	Physical quantity						Overall	
			Small	Medium	Large	B	NB	B	NB	
			B	NB	B	NB	B	NB	B	NB
1	Hired human labour	Days								
	Male		22.30	22.80	13	16.46	16	22.08	51.3	61.34
	Female		32.7	30.7	22.26	23.4	35.8	36.04	90.76	90.14
	Total		55.00	53.5	35.16	39.86	51.80	58.12	142.06	151.48
2	Bullock labour	Days	6.6	8.7	8.6	6.86	7.08	8.04	22.28	23.60
3	Machinery	Hrs.	4.7	5.6	5.26	5	3.52	5.88	13.48	16.48
4	Seed	Kg.	64.2	74	72.2	74.26	73.4	72.68	75.04	73.17
5	Manures	Qtl.	3.2	3.3	2.13	3.73	2.28	3.64	7.61	10.67
6	Fertilizers	Kg.								
	N		56.3	54.9	58.26	61.8	59.96	57.84	174.52	176.54
	P		119.9	122.1	123.53	121.93	106.6	105.48	350.03	350.51
	Total		176.2	177	181.79	183.73	166.56	163.32	524.55	527.05
7	Family labour	Days								
	Male		12.2	11.52	11.51	31.48	16.84	31.36	40.55	74.37
	Female		10.65	10.52	11.66	34.04	18.00	18.09	40.32	62.66
	Total		22.85	22.04	23.17	65.52	34.85	49.45	80.87	137.07

Per hectare cost of cultivation of Soybean for beneficiary farmers

The share of each items to the total cost i.e. cost 'C' for Soybean cultivation. The cost has determined on the basis of standard cost concept i.e. cost 'A', cost 'B', cost 'C', the

different cost concept have different utilities in research. Thus attempt has been made to estimate the cultivation costs of Soybean crop of beneficiary and non-beneficiary farmers in the study area and presented in succeeding table.

Table 2: Per hectare cost of cultivation of Soybean for beneficiary farmers

Sr. No.	Particular	Unit	Small	Medium	Large	Overall
1	Hired human labour	(Days)				
	Male		4460.00 (8.85)	2600.00 (4.83)	3200.00 (5.20)	3272.00 (5.41)
	Female		5886.00 (11.67)	4008.00 (7.45)	6444.00 (10.47)	5601.60 (9.26)
	Total		10346.00 (20.52)	6608.00 (12.28)	9644.00 (15.67)	8873.60 (14.67)
2	Bullock labour	(Days)	4140.00 (8.21)	5160.00 (9.59)	4248.00 (6.90)	4500.00 (7.44)
3	Machinery	(Hrs.)	2350.00 (4.66)	2633.33 (4.89)	1760.00 (2.86)	2140.00 (3.54)
4	Seed	(Kg.)	6420.00 (12.73)	7220.00 (13.42)	7340.00 (11.93)	7120.00 (11.77)
5	Manure	(Qtl.)	4800.00 (9.52)	3200.00 (5.95)	3420.00 (5.56)	3630.00 (6.00)
6	Fertilizer	(Kg)				
	N		350.00 (0.69)	350.00 (0.65)	350.00 (0.57)	350.00 (0.58)
	P		2877.60 (5.71)	3286.67 (6.11)	2660.00 (4.32)	2891.52 (4.78)
	Total		3227.60 (6.40)	3636.67 (6.76)	3010.00 (4.89)	3241.52 (5.36)
7	Plant Protection	(₹)	3280.00 (6.51)	2293.33 (4.26)	2404.00 (3.91)	2546.00 (4.21)
8	Depreciation	(₹)	2170.00 (4.30)	1640.00 (3.05)	1837.60 (2.99)	1844.80 (3.05)
9	Land revenue	(₹)	175.00 (0.35)	180.33 (0.34)	186.40 (0.30)	182.30 (0.30)

10	Interest on working capital (@6% annum)	(₹)	1710.00 (3.39)	1455.33 (2.70)	1432.40 (2.33)	1494.80 (2.47)
11	Cost 'A'	(₹)	31390.06 (62.26)	34432.69 (63.98)	32439.31 (52.71)	34346.41 (56.78)
12	Int. on fixed capital (@10% annum)	(₹)	2165.00 (4.29)	2176.67 (4.04)	2143.20 (3.48)	2157.60 (3.57)
13	Rental value of land (1/6th of Gross) produce	(₹)	13298.33 (26.38)	13119.72 (24.38)	15643.58 (25.42)	16381.45 (27.08)
14	Cost 'B'	(₹)	46853.39 (92.93)	49729.08 (92.40)	50226.09 (81.61)	52885.46 (87.43)
15	Family labour	(Days)				
	Male		2000.00 (3.97)	2133.33 (3.96)	6568.00 (10.67)	4324.00 (7.15)
	Female		1566.00 (3.11)	1956.00 (3.63)	4752.00 (7.72)	3276.00 (5.42)
	Total		3566.00 (7.07)	4089.33 (7.60)	11320.00 (18.39)	7600.00 (12.57)
16	Cost 'C'	(₹)	50419.39 (100.00)	53818.41 (100.00)	61546.09 (100.00)	60485.46 (100.00)

Figures in parentheses indicate the per cent to total cost 'C'

The per hectare cost of cultivation of soybean grown by the selected farmers is presented in Table 2. It is revealed that the per hectare cost of cultivation of soybean for beneficiary farmers at overall level as a whole was ₹60485.46. Amongst the different items of expenditure; human labour accounted 14.67 per cent share to the total cost while the share of rental value land is 27.08 per cent to the total cost. The proportion of the other items of expenditure were bullock labour 7.44 per cent, machinery charges 3.54 per cent, seed 11.77 per cent and fertilizers charges 5.36 per cent. The share of interest on working capital and fixed capital was 2.47 per cent and 3.57 per cent, respectively.

Per hectare total cost of cultivation i.e. at cost 'C' was ₹61546.09 in large size group, ₹53818.41 in medium size group and ₹50419.39 for small size group of beneficiary

farmers, respectively. Higher total cost on large size farm was obviously due to large farm area and higher use of input.

Per hectare cost of cultivation of Soybean for Non-beneficiary farmers

It is revealed from the table 3 that the per hectare cost of cultivation of Soybean for non-beneficiary farmers at overall level as a whole was ₹.61016.30. Amongst the different items of expenditure; human labour accounted 14.70 per cent share to the total cost while the share of rental value land is 24.94 per cent to the total cost. The proportion of the other items of expenditure were bullock labour 7.69 per cent, machinery charges 2.28 per cent, seed 12.03 per cent and fertilizers charges 5.08 per cent. The share of interest on working capital and fixed capital was 2.20 per cent and 3.28 per cent, respectively.

Table 3: Per hectare cost of cultivation of Soybean for Non-beneficiary farmers

Sr. No.	Particular	Unit	Small	Medium	Large	Overall
1	Hired human labour	(Days)				
	Male		4560.00 (8.45)	3293.33 (5.52)	4416.00 (7.27)	4108.00 (6.73)
	Female		5526.00 (10.23)	3510.00 (5.89)	5406.00 (8.91)	4861.20 (7.97)
	Total		10086.00 (18.68)	6803.33 (11.41)	9822.00 (16.18)	8969.20 (14.70)
2	Bullock labour	(Days)	5220.00 (9.67)	4120.00 (6.91)	4824.00 (7.95)	4692.00 (7.69)
3	Machinery	(Hrs.)	1400.00 (2.59)	1250.00 (2.10)	1470.00 (2.42)	1390.00 (2.28)
4	Seed	(Kg.)	7400.00 (13.71)	7426.67 (12.46)	7268.00 (11.97)	7342.00 (12.03)
5	Manure	(Qtl.)	4950.00 (9.17)	5600.00 (9.39)	5460.00 (8.99)	5400.00 (8.85)
6	Fertilizer	(Kg)				
	N		365.00 (0.68)	362.00 (0.61)	358.80 (0.59)	361.00 (0.59)
	P		2700.00 (5.00)	2613.33 (4.38)	2832.00 (4.67)	2740.00 (4.49)
	Total		3065.00 (5.68)	2975.33 (4.99)	3190.80 (5.26)	3101.00 (5.08)
7	Plant Protection	(₹)	2590.00 (4.80)	2333.33 (3.91)	3404.32 (5.61)	2104.20 (3.45)
8	Depreciation	(₹)	1466.00 (2.72)	1237.33 (2.08)	1450.40 (2.39)	1389.60 (2.28)
9	Land revenue	(₹)	134.00 (0.25)	145.33 (0.24)	143.72 (0.24)	142.26 (0.23)
10	Interest on working capital (@6% annum)	(₹)	1431.00 (2.65)	1422.67 (2.39)	1257.60 (2.07)	1341.80 (2.20)
11	Cost 'A'	(₹)	39237.80 (72.67)	33889.90 (56.85)	33023.66 (54.40)	34526.40 (56.59)
12	Int. on fixed capital (@10% annum)	(₹)	1433.50 (2.66)	2153.33 (3.61)	2141.60 (3.53)	2003.50 (3.28)
13	Rental value of land (1/6th of Gross) produce	(₹)	10080.00 (18.67)	12815.00 (21.50)	14748.90 (24.30)	15216.50 (24.94)
14	Cost 'B'	(₹)	50751.30 (94.00)	48858.20 (81.96)	49914.16 (82.23)	51746.30 (84.81)
15	Family labour	(Days)				
	Male		1920.00 (3.56)	5946.67 (9.98)	6272.00 (10.33)	5304.00 (8.69)
	Female		1320.00 (2.44)	4810.00 (8.07)	4518.00 (7.44)	3966.00 (6.50)
	Total		3240.00 (6.00)	10756.70 (18.04)	10790.00 (17.77)	9270.00 (15.19)
16	Cost 'C'	(₹)	53991.31(100.00)	59614.92(100.00)	60704.16(100.00)	61016.30(100.00)

Figures in parentheses indicate the per cent to total cost 'C'

Per hectare total cost of cultivation i.e. at cost 'C' was ₹60704.16 in large size group, ₹59614.92 in medium size group and ₹53991.31 for small size group of farmers,

respectively. Higher total cost on large size farm was due to higher use of input and intensified cropping pattern. Total cost of cultivation in Non-beneficiary farmers was more than the

beneficiary farmer. It means that Non-beneficiary farmers incurred more inputs cost in cultivation of Soybean crop.

Per hectare cost and returns of Soybean

It is revealed from the table 4 that in case of beneficiary farmers at overall level average gross returns was ₹91898.00. The net returns obtain at various cost were ₹57551.59 at cost 'A', ₹ 39012.54 at cost 'B', and ₹ 31412.54 at cost 'C'. The highest Output-input ratio at cost 'C' was recorded in medium size group i.e. 1.53 and lowest Output-input ratio at cost 'C' was recorded in large size group i.e.1.40. At overall level the Output-input ratio at cost 'C' was 1.52 and small size group

was 1.46 In case of non-beneficiary farmers overall level average gross returns worked out to ₹75266.00. The net returns obtain at various costs were ₹40739.60 at cost 'A', ₹23519.70 at cost 'B', and ₹ 14249.70 at cost 'C'. Mondala *et al.* (2013) [7] reported that per hectare output in watershed village were 14 per cent, 44 per cent and 30 per cent higher in case wheat, gram and soybean, respectively. The highest output-input ratio at cost 'C' was recorded in small size group i.e. 1.32 and lowest output-input ratio at cost 'C' was recorded in large size group i.e.1.25. At overall level the output-input ratio at cost 'C' was 1.23 and medium size group 1.29, respectively.

Table 4: Per hectare cost and returns of Soybean

Sr. No.	Particulars	Size of group							
		Small		Medium		Large		Overall	
		B	NB	B	NB	B	NB	B	NB
1	Total Cost (₹)								
	Cost 'A'	31390.06	39237.80	34432.69	33889.90	32439.31	33023.66	34346.41	34526.40
	Cost 'B'	46853.39	50751.30	49729.08	48858.20	50226.09	49914.16	52885.46	51746.30
	Cost 'C'	50419.39	53991.30	53818.41	59614.90	61546.09	60704.16	60485.46	61016.30
2	Net Returns over (₹)								
	Cost 'A'	42309.94	31972.20	48079.31	43209.10	53656.69	42720.34	57551.59	40739.60
	Cost 'B'	26846.61	20458.70	32782.92	28240.80	35869.91	25829.84	39012.54	23519.70
	Cost 'C'	23280.61	17218.70	28693.59	17484.10	24549.91	15039.84	31412.54	14249.70
3	Yield of Soybean (Qtl)								
	Main produce	22.50	21.87	23.50	20.17	24.10	21.05	23.83	21.50
	By-produce	8.70	9.42	9.30	11.09	11.30	9.90	10.82	10.16
4	Value of Soybean (₹)								
	Main produce	69350.00	66500.00	77862.00	71554.00	80446.00	70794.00	86488.00	70186.00
	By-produce	4350.00	4710.00	4650.00	5545.00	5650.00	4950.00	5410.00	5080.00
5	Gross returns (₹)	73700.00	71210.00	82512.00	77099.00	86096.00	75744.00	91898.00	75266.00
6	Output-Input ratio at								
	Cost 'A'	2.35	1.81	2.40	2.27	2.65	2.29	2.68	2.18
	Cost 'B'	1.57	1.40	1.66	1.58	1.71	1.52	1.74	1.45
	Cost 'C'	1.46	1.32	1.53	1.29	1.40	1.25	1.52	1.23

It shown that the beneficiary farmers were more profitable than non-beneficiary farmers. The impact of gross return was observed in case of beneficiary farmers due to the construction of farm ponds in their field. Desai *et al.* (2007) [3] reported that the output- input ratio, which is an indicator of economic efficiency in crop production for soybean and other discussion indicated, that registered a good output-input ratio means this is profitable.

Conclusions

The per hectare cost of cultivation of soybean for beneficiary farmers at overall level was ₹60485.46 and in non-beneficiary farmers it was ₹61016.30. It means beneficiary farmers used more inputs in soybean production as compared to non-beneficiary farmers. The net returns was the highest in medium group of beneficiary farmers i.e. ₹ 28693.59 as compared to large ₹ 24549.91 and small ₹ 23280.61 group of beneficiary farmers at cost "c".

In case of beneficiary farmers at overall level average gross returns was ₹91898.00. While in case of non-beneficiary farmers it was ₹75266.00. It means production was more in case of beneficiary farmers as compared to non-beneficiary farmers.

At overall level the output-input ratio at cost 'C' was found highest (1.52) in beneficiary farmers, as compared to non-beneficiary farmers (1.23). It shows that the beneficiary farmers were more profitable than non-beneficiary farmers. The impact of farm ponds construction on their field increase water level of well and also for their field to provide water

during crop season whenever necessary to increase a crop production.

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