



IMPACT OF MECHANISATION OF COST AND RETURN STRUCTURE OF PADDY CULTIVATION IN KRISHNAGIRI DISTRICT

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Introduction

Agriculture is the corner stone of development in developing countries. It is a dominant sector in Indian economy both in terms of its contribution to the total value added as well as support base for labour. It is observed that the farmers of mechanised farm execute the agricultural operations more capably than the farmers of non-mechanised farm. This paper analyses and compares the input-output structure of both the farmers of mechanised and non-mechanised farm so as to enable to find the impact of mechanisation on farm operations.

Review

In agricultural operations, the farm cost of production refers to the expenses incurred on the various inputs (both operational and fixed) to obtain the final produce. The cost of production consists of two parts, namely fixed cost and variable or operational cost. In farm management studies, Shukla has categorised cost into Cost A1, Cost A2, Cost B and Cost C. Cost A1 includes the cost of seeds, manures and fertilizers, plant protection, livestock expenses, hired human labour, irrigation charges, land revenue, interest on working capital , depreciation of fixed assets and miscellaneous expenses. Cost A2 covers Cost A1 plus rent paid for leased in land. Cost B includes Cost A2 plus rental value of owned land plus interest on fixed capital minus land revenue owned land. Cost C includes Cost B plus imputes value of family labour.

Objectives of the study

To find out the impact of mechanisation of cost and returns structure of paddy cultivation in the study area.

Methodology

In order to analyse and compare the cost and returns structure of mechanised and non-mechanised, cost A and cost C concepts used by farm management studies have been adopted for the present study.

Analysis and Interpretation



The input-output structure of paddy cultivation for farmers of mechanised and non-mechanised farm is unfurnished in Table1.

Table 1

INPUT-OUTPUT STRUCTURE ACRE FOR THE FARMERS OF MECHANISED AND NON-MECHANISED FARM CULTIVATION OF PADDY

SL. NO	Particles	Mechanised Farm	Non-Mechanised Farm	t-value
1.	Human Labour (in man days)	32.19	33.19	3.3362*
2.	Bullock Labour (in pairs)	5.41	3.41	1.2618*
3.	Fertilizers (in kg)	221.61	239.16	3.7917*
4.	Pesticides (in kg)	141.16	139.16	4.2217*
5.	Mechanical power (in hours)	5.92	3.62	2.9863*
6.	Irrigation (in hours)	181.16	198.65	2.7516*
7.	Seeds (in Rs)	9.15	8.62	1.0462
8.	Yield (in kg)	3496.65	3211.25	3.6917
9.	Sample size	150	150	-

Source: Survey data.

*Indicates significance at 5 per cent level.

It is observed from Table 1 that yield per acre was 3496.65kgs for mechanised farm and 3211.25kgs for the farmers of non-mechanised farm. This shows that there is a significant difference in the yield between the farmers of mechanised and non-mechanised farm. The difference in yield works out to 285.40 kgs. Apart from yield, the difference in the utilization of other input variables like human labour, fertilizers, pesticides, mechanical power and irrigation is also found to be significant between the mechanised and non-mechanised farm in the study area. In the case of human labour, the amount of labour required is 32.19 man days for farmers of mechanised and 33.19 man days for farmers of non-mechanised farms. The farmers mechanised farm applied 221.61 kgs of fertilizers, whereas the non-mechanised farms used 239.16kgs of fertilizers. It is observed that there is a significant difference in hours used for irrigation purpose between the farmers of mechanised and non mechanised farms. In the case of pesticides, the farmers of mechanised farms used the 141.16 kgs while the farmers of non-mechanised farms used 139.16kgs.

In the case of mechanical power, the farmers of mechanised farms used 5.92 hours while the farmers of non-mechanised farms used 3.62 hours. With regard to the use of other variables



like bullock labour and seeds, the differences between the farmers of mechanised and non mechanised farm was not found to be significant

Input-Output Structure for Small and Large Farmers of Mechanised and Non-mechanised

Table 2 gives a clear picture about the input-output structure of small and large farmers of mechanised and non-mechanised farm.

Table 2

INPUT-OUTPUT STRUCTURE FOR SMALL AND LARGE FARMERS OF MECHANISED AND NON-MECHANISED FARM CULTIVATION OF PADDY

Sl No	Particulars	Mechanised			Non-Mechanised		
		Small Farmers	Large Farmers	t-value	Small Farmers	Large Farmers	t-value
1.	Human Labour (in man days)	32.19	35.16	4.9624*	33.19	36.21	4.983*
2.	Bullock Labour (in pairs)	5.41	5.32	1.5162*	3.41	3.69	1.6615*
3.	Fertilizers (in kg)	221.61	252.15	3.8518*	239.16	269.15	3.9919*
4.	Pesticides (in kg)	141.16	142.63	4.9163*	139.16	142.14	4.6516*
5.	Mechanical power (in hours)	5.92	5.31	2.9624*	3.62	4.39	3.7217*
6.	Irrigation (in hours)	181.16	162.16	3.7518*	198.65	185.16	4.1262*
7.	Seeds (in Rs)	9.15	9.66	1.4618	8.62	8.13	1.5162
8.	Yield (in kg)	3496.65	3211.25	5.6113*	3211.25	3191.25	6.0921*
9.	Sample size	92	58		150	44	

Source: Survey data.

*Indicates significance at 5 per cent level.

It is revealed from Table 2 that the yield per acre was 3496.65 kgs for small farmers and 3211.25 kgs for large farmers under the mechanised farm. This shows that there is a significant difference in the yield between small and large farmers. The difference in yield works out to 285.40 kgs. In the case of human labour, the amount of labour required was 32.19 man days for the small farmers and 35.16 man days for large farmers. The small farmers applied 221.61 kgs of fertilizers whereas the large farmers used 252.15 kgs of fertilizers. In the case of pesticides, small farmers used 141.16 kgs and large farmers used 142.63 kgs respectively.



It is observed that the differences in the utilization of other inputs variables like fertilizers and pesticides were also found to be significant between the small and large farmers study area. With regard to the use of other variables like bullock labour and seeds the differences between small and large farmers were not found to be significant. Thus, it may be inferred from the above analysis that the small farmers were better off in the use of inputs like human labour, fertilizers, pesticides, and they produced higher yield than the large farmers.

Whereas, in the case of farmers of non-mechanised farm, the yield per acre was 3211.25 kgs for small farmers, and 3191.25 kgs for large farmers. It is observed that the difference in the yield is significant between small and large farmers under non-mechanised farm. The difference in yield works out to 20.00kgs. The human labour required was 33.19 man days and 36.21 man days for small and large farmers respectively. The small farmers used 239.16 kgs of fertilizers whereas the large farmers applied 269.15 kgs of fertilizers. Pesticides amounting to 139.16 kgs and 142.14 kgs were used by small and large farmers respectively. It is observed that, in the case of bullock labour and seeds, the difference between small and large farmers was not found to be significant.

COST AND RETURN STRUCTURE

In this section, the cost and return structure of small and large farmers producing paddy under mechanised and non-mechanised farm are studied in order to understand the differences in farm management. For this purpose, the collected data have been analysed with the reference to cost and return structure including various cost components used in the Krishnagiri district.

Cost Components

In agricultural operations, the cost of cultivation refers to the expenses incurred on the various inputs to obtain the final produce. In the present study, cost has been categorised into Cost A (operational cost) and Cost C (Cost A plus fixed cost and rent of land). Cost of production of paddy is calculated on the following assumption.

The cost of human labour was calculated at the price of Rs.150 per man day which was the prevailing wage rate during the period under study. In the case of woman labour, 2 woman days of eight hours each were considered as one man day unit on the basis of the prevailing wage rate. The existing wage rate was considered alike and valued by hired labour and family labour. Similarly, The actual expenses incurred by the farmers were considered for both hired and owned bullock pairs. The cost of bullock labour per pair per dar was Rs. 220 which included the cost of human labour engaged along with the bullock pairs.

The actual amount paid by the farmers towards the cost of fertilizers, pesticides and farm manures were considered. In the case of owned manure, market value at the rate of Rs.250 per cart load was uniformly taken. The actual expenses incurred on seeds per acre during the study period were considered and these included both transportation and seed treatment



charges. Regarding the land rent, the existing rental value of the owned land in the study area was taken into account. Annual interest on farm assets was estimated at 11 per cent on the basis of the interest rate charged by the Land Development Bank for a long-term loan. The farm assets were evaluated on the basis of values given by the farmers during the interview. The Co-operative Banks charged the annual interest on loan, which was calculated at 12 per cent based on the rate of interest for short-term loans. The cost items also included the actual payment made for land revenue and the expenses incurred on irrigation.

Cost and Return Structure of Mechanised Farm

Per acre average cost and return structure of small and large farmers of the mechanised farm cultivating paddy are furnished in Table 3.

Table 3: PER ACRE AVERAGE COST AND RETURN STRUCTURE OF SMALL AND LARGE FARMER MECHANISED FARM

Sl No.	Cost Component	Small Farmers	Large Farmers	Overall Farmers
1.	Human labour (including family labour)	2319.65	2561.24	2366.45
2.	Bullock labour	411.24	376.15	416.25
3.	Chemical fertilizers	982.66	1201.21	998.68
4.	Pesticide cost	432.65	571.21	566.25
5.	Seed cost	366.24	415.16	405.15
6.	Farm manure	546.21	631.15	396.24
7.	Cost of irrigation	616.24	718.24	766.25
8.	Interest on working capital	692.65	818.16	716.24
	Cost A	6367.54	7292.52	6631.51
9.	Rent	1333.61	1333.61	1361.25
10.	Interest on fixed capital(excluding land cost)land revenue, cess and taxes, depreciation of implements and machinery	581.21	769.66	718.15
	Cost C	8282.36	9395.79	8710.91
	Yield per acre in kg	3496.65	3211.25	3419.26
	Gross Returns(Rs)	16361.25	15892.66	15692.13
	Net Returns(Rs)	8078.89	6496.87	6981.22

Source: Survey data

It is observed from Table 3 that the small farmers produced 3496.65 kgs of paddy and earned Rs.16361.25 per acre while their net returns per acre were Rs.8078.89. In the case of large farmers , the yield per acre was 3211.25kgs and they realised Rs. 15892.66 per acre as gross returns while their net returns per acre was Rs. 6496.87. The overall yield per acre as gross returns and net returns earned were 3419.26 kgs, Rs. 15692.13 and RS. 6981.22 per acre respectively. It indicates that the small farmers were getting higher yield and thereby higher net income than large farmers in the case of mechanised farmers. The cost analysis reveals that the per acre total cost, that is operational cost of cultivation for small farmers worked out to



Rs. 6367.54, whereas it was Rs.7292.52 for large farmers. It is observed that the total cost incurred was found higher in the case of large farmers compared to small farmers.

The cost of human labour constitutes major component of the total cost of production for both small and large farmers. Next to human labour, the amount spent on the use of chemical fertilizers occupied the major portion of the total cost of production. Next importance is the cost of irrigation, farm manure, pesticides, seed cost and bullock labour. The costs of all the inputs were found to be higher for large farmers than the small farmers. Thus, it is inferred from the analysis that the small farmers were found better off than the large farmers, both cost-wise and return-wise.

The percentage of various cost components to total cost (Cost C) is furnished in Table 4.

Table 4

PER ACRE PERCENTAGE COST OF VARIOUS COST COMPONENTS TO TOTAL COST OF SMALL AND LARGE FARMERS OF THE MECHANISED FARM

Sl No.	Cost Component	Small Farmers	Large Farmers	Overall Farmers
1.	Human labour (including family labour)	28.01	27.25	27.16
2.	Bullock labour	4.17	4.00	4.77
3.	Chemical fertilizers	11.86	12.78	11.46
4.	Pesticide cost	5.22	6.07	6.50
5.	Seed cost	4.42	4.41	4.65
6.	Farm manure	6.00	6.71	4.55
7.	Cost of irrigation	7.45	7.64	8.79
8.	Interest on working capital	8.37	8.71	8.23
	Cost A	76.88	77.61	76.12
9.	Rent	16.10	14.19	15.62
10.	Interest on fixed capital(excluding land cost)land revenue, cess and taxes, depreciation of implements and machinery	7.00	8.19	8.24
	Cost C	100.00	100.00	100.00

Source: Survey data

Table 4 reveals that the percentage cost of variable inputs (Cost A) to total cost (Cost C) was 76.88 per cent for small farmers, 77.61 per cent for large farmers and 76.12 per cent overall. In Cost A, human labour cost was found to be high for small, large and overall at 28.10 percent,



27.25 per cent and 27.16 per cent respectively followed by cost of chemical fertilizers. The small farmers spent 11.86 per cent of their total cost on the utilization of chemical fertilizer while large farmers spent 12.78 per cent and overall 11.46 per cent. Next to this, the major cost component was cost of irrigation which constituted 7.45 per cent, 7.64 per cent and 8.78 per cent of the total cost of small, large farmers, while it was 6.07 per cent per cent and 6.50 per cent for large farmers and overall respectively. Cost of pesticides worked out to 5.22 per cent for the small farmers, while it was 6.17 per cent and 4.55 percent for small farmers respectively. Farm manure constituted 6.00 per cent, 6.71 per cent and 4.55 per cent for small, large and overall farmers respectively. The rent for land was higher for small farmers than for large farmers. It accounted for 16.10 per cent and 14.19 per cent for small farmers and large farmers respectively.

Interest on farm assets, depreciation of implements and machinery involved 8.37 per cent of the total cost for small farmers and 8.71 per cent of the total cost for large farmers. It was 8.23 per cent overall.

Conclusion

It may be concluded from the above analysis that the farmers of mechanised farm are found to be better off in the use of inputs like fertilizer and irrigation and they are producing an output more than the farmers of non-mechanised farm. The above analysis that the small farmers were more capable of the use of inputs like human labour, fertilizers, pesticides and mechanical power and had produced more yields per acre than the large farmers under non-mechanised farm.

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