CHAPTER – V

COST-BENEFIT ANALYSIS OF MAJOR CROPS

5.1 Introduction

This chapter deals with the cost and returns analysis of the major crops cultivated by the sample farmers in the Maldah district. It basically gives an idea about the economically viable crops in the study area among the major crops. Such a comparative economic study of different crops might help to judge the appropriate economic viable crop in the region. However, this is one of the primary objectives of this study. A well-structured schedule/questionnaire has been prepared to collect the data from the sample farmers, based on which the cost-benefit analysis (CBA) has been performed. According to Mishan and Quah (2013), cost-benefit analysis is a structured and logical method for assessing the advantages of a significant crop and evaluating the desirable costs of that crop in a project or program. It is a comprehensive method used for economic evaluation (Robinson, 1993). The CBA of the major crops has been performed by categorizing the sample farmers into three different size groups, i.e., marginal, small and large, instead of together. It is assumed that such an individual picture would be more beneficial than group-wise results. Moreover, it gives the marginal variation in different input and output levels across the different size groups. The level of various input use is much concerned across different size groups, especially for owned and purchased inputs, including human labour. Before evaluating the cost and return of the major crops, the socio-economic characteristics of the respondents have been discussed in this chapter.

5.2 Socio-economic characteristics of the respondents

Farmers are the respondents of the present study. The socio-economic status of the farmers was evaluated by categorizing them into three farmers groups, i.e., marginal (farm size <1 ha), small (farm size 1-2 ha) and large (farm size >2 ha). As per the West Bengal development report, planning commission, Government of India, the land size of 1ha. is equal to 7.50 bigha of land. In the present study, this value has been considered while calculating different aspects of cost and benefit. After evaluating the survey report, it is found that the average age of the respondents is more or less similar for all the categories. Table 5.1 shows that the average ages of the farmers are 52.65, 49.85, and 49.85 years for the marginal, small and large farmers, respectively. It is also observed from Table 5.1 that the large farmers have the highest average household income excluding the agricultural sector (₹83000/year), whereas, marginal and small farmers have equal average household income excluding the agricultural sector

(₹28000/year) throughout the year. However, the variation of household income is greater among large farmers, as the large farmers have the highest standard deviation value of ₹7755. A similar condition has been noticed in terms of the income from the agricultural sector. The large farmers have the highest average annual income from agriculture (₹211643/year), whereas, the small farmers have the lowest average annual income (₹58221/year). Whereas, it is ₹59186/year for marginal farmers, which is very similar to the small farmers average annual income (Table 5.1).

The family size of the marginal and small farmers varied from 3 to 10 persons, with a mean of 5.59 ±1.45. In contrast, the large farmer's family size varied from 4 to 14 persons, with a mean of 7.61± 2.62. The household survey also revealed that the farmers of the study area are engaged in agricultural activities for a long time. So, they have good experience in agriculture. The average farming experience of the marginal farmers is 27.2 years; for small and large farmers, it is 34.52 and 37.15 years, respectively. There is also a remarkable discrepancy in the expenditure on different purposes among marginal, small and large farmers. The large farmers spend more money on entertainment, food, education, clothing and health care than the small or marginal farmers (Table 5.1). However, the expenditure of the marginal and small farmers is more or less equal for all the cases except for entertainment in the study area. The average annual expenditure for education is ₹1830/year, ₹1882.14/year and ₹3132.86/year for marginal, small and large farmers. While for food, the marginal, small and large farmers spend ₹2798.45/year, ₹2781.43/year and ₹12037.07/year, respectively. The largest difference has been noticed in food expenditure between marginal/small farmers and large farmers (>₹9000 /year). In contrast, the difference in expenditure on entertainment between marginal/small and large farmers is minimal (₹405/year). Additionally, Table 5.1 depicts that the large farmers saved more money every year than the marginal and small farmers. The average annual savings of marginal and small farmers are ₹23833/year±11222 and ₹25833/year ±11522, respectively. In comparison, the large farmer's average annual savings is ₹43300/year±12431. One explanation that could be mentioned in this regard is that larger farmers have more household income and more family members.

Table 5.1 Socio-economic characteristics of the farmers of Maldah district

Social-economic assets	Farmers	Minimum	Maximum	Mean	Std. Deviation
Family size	Marginal	3	10	5.59	1.45
	Small	3	10	5.59	1.45
	Large	4	14	7.61	2.62
Age	Marginal	39	61	49.85	5.49
	Small	39	61	49.85	5.49
	Large	35	66	52.65	8.12
Farming experience	Marginal	13	35	27.2	5.98
	Small	12	50	34.52	6.96
	Large	16	50	37.15	6.05
Household income	Marginal	8000	27000	11350	3475
	Small	8000	28000	11450	3475
	Large	23000	83000	31550	7755
Income from agriculture	Marginal	30000	85000	59186	14219
	Small	30000	80000	58221	14180
	Large	160000	275000	211643	35092
Expenditure for entertainment	Marginal	200	1000	412.86	127.42
	Small	200	1000	412.86	125.72
	Large	300	2000	817.86	427.86
Expenditure for food	Marginal	2200	5000	2798.45	601.148
	Small	2000	5000	2781.43	600.07
	Large	8000	20000	12035.7	2892.34
Expenditure for education	Marginal	800	3000	1830	665.69
	Small	1000	3500	1882.14	665
	Large	500	6000	3132.86	1573.4
Expenditure for cloth	Marginal	300	1500	396	266
	Small	400	1500	666	267
	Large	1000	5000	1614	934
Expenditure for health	Marginal	400	2000	867.14	288.74
	Small	400	2000	867.86	289.7
	Large	500	4000	1975.71	709.13
Annual savings	Marginal	6000	60000	23833	11222
	Small	12000	60000	25833	11522
	Large	20000	60000	43300	12431

Source: Household Survey, 2020-21

5.3 Methodology for cost-benefit analysis

For analyzing the cost and return of the major crops the method of Hadi et al. (2008) has been used. The method comprises various aspects which have been discussed below:

5.3.1 Concept of cost

The idea of cost is essential and to be settled first to calculate the production cost of the different significant crops. In the present study, the entire cost of production is divided into three categories, i.e., i) Operating or variable cost (Cost A), ii) Opportunity cost of operating capital (Cost B) and iii) Opportunity cost of family labour (Cost C).

5.3.1.1 Operating cost (Cost A)

Operating cost consists of all input costs (cost of seeds, cost of irrigation, cost of manures, fertilizers and pesticides, cost of plant protection, cost of watch and ward) and hired human labour cost. All the input costs experienced in cultivating different crops under the yielding period are called establishment costs.

5.3.1.2 Opportunity cost of operating capital (Cost B)

Opportunity costs of operating capital are estimated at 12% of operating cost/cash (Dreze & Stern, 1987).

5.3.1.3 Opportunity cost of family labour (Cost C)

This is the price of family labour calculated using the local wage rate. The average price of hired labour has been considered in this investigation.

5.3.1.4 Total enterprise cost (Cost D)

This indicates the total value of all inputs used in the production process. It is the total operational, family labour opportunity and operating capital opportunity costs. Total costs are usually divided into two main categories: total fixed costs and total variable costs.

5.3.2 Farmers profit

Farmers profit has been estimated in the following ways:

5.3.2.1 Total revenue

Total revenue (TR) measures revenue of the total quantity produced from products. TR has been calculated by multiplying average yield with average price. TR incorporates the products produced during the year that was sold, used for household consumption,

used on the farm for seed, utilized for payment in any kind or stored for future sale. Non-market transactions have been evaluated at their opportunity cost as a proportion of the total market price.

5.3.2.2 Gross profit

A simple formula has been used for calculating the gross profit, which is:

$$\pi_{gp} = TR - TOC$$

Where, π_{gp} denotes gross profit, *TR* indicates total revenue, and *TOC* is the total operating cost.

5.3.2.3 Net profit

After the calculation of gross profit, the net profitability of farmer has been estimated using the following simple algebraic equation:

$$\pi_{np} = \mathcal{Q}_Y \mathcal{P}_Y - \sum_{i=1}^{n} (\mathcal{Q}_i \mathcal{P}_i) - \sum_{j=1}^{k} (c_j)$$

Where, π_{np} is the net profit (₹ /ha), $\mathcal{Q}_Y$ denotes Yield (kg/ ha), $\mathcal{P}_Y$ is the output price, $\mathcal{P}_i$ presents variable input price (unit/ha) and $\mathcal{Q}_i$ is the variable input quantity (unit/ha), c_j denotes fixed cost (₹ /ha), i denotes variable input (ploughing and planting, seed, fertilizer, pesticides, labour, other materials) and j represents fixed input (family labour, depreciation, interest etc.).

5.3.3 Rates of returns

The rate of returns has been calculated in the following ways:

5.3.3.1 Return to operating cost

For calculating return to operating cost, the total operating cost i.e., cost A is subtracted from TR and then dividing by Cost A**.**

5.3.3.2 Return to total cost

This is the difference between TR and Cost D (TEC), which incorporates the opportunity cost of family labour as part of cost and then dividing by Cost D.

5.3.3.3 Return to family labour, land, management per day

It has been calculated by dividing the gross profit by the number of days spent by family labour. It assesses the family's reward for land and agricultural management.

5.3.4 Procedure for imputation of values of farm inventory and inputs

5.3.4.1 Seeds

Farm-produced seeds were priced at current market rates at the time of sowing, while purchase seeds were estimated as the total value of actual price spent and transportation charges.

5.3.4.2 Farmyard manure

It denotes the sum of the market price of farmyard manure (FYM) and the price of self-made FYM.

5.3.4.3 Fertilizers

It includes the aggregated value of fertilizers price, transport charge and other incidental costs.

5.3.4.4 Plant protection chemical

It denotes the cost of crop protection chemicals purchased by farmers. Chemicals are routinely applied in agriculture to prevent diseases, insects and weeds. Here the author measured the actual cost of the plant protection chemicals used by respondents.

5.3.4.6 Irrigation charges

The amounts of water prices are determined by the commercial worth of the crop, the crop's water needs, and the period of water requirement in relation to the source's available supplies. The irrigation charges include repair costs, operating costs including oil and lubricants, as well as hire fees for utilizing water through various sources. Irrigation costs submitted to the appropriate governmental authority for every crop are included as well.

5.3.4.7 Human labour

The study area’s current wage rates were used to compute household human labour price. The wages of the female labour are equated to 0.75 of male labour. One adult man's day entails eight hours of work. One hour of child labour is equal to half an hour of adult men labourer.

5.3.4.8 Bullock labour

The expenditure of hired bullock labour was computed using the current market price for a couple of bullocks in the study region. Bullock labour that was owned was rated at the equivalent category as bullock labour that was hired. A bullock labour day is

defined as an 8-hour shift performed by a pair of bullocks. Tractor power has also been turned into the bullock pair day based on account of the average time needed by tractor power in executing a given work performed by a couple of bullocks.

5.3.4.9 Marketing costs

Marketing denotes a set of practices that are engaged in getting things from the manufacturer point to the consumption point. Agricultural marketing includes all the activities, organizations and regulations associated with farmers buying of farm inputs and moving agricultural products from farms to the customers.

5.3.4.10 Miscellaneous costs

Other incidental charges involved in the management of businesses were covered in this category. These comprised the price of perishable equipment such as ropes and baskets, as well as the price of repairs and servicing of the implements utilized.

5.3.4.11 Interest in working capital

For each crop, interest in working capital is altered at a time rate of 12% each year for a three months duration. The following were the item including under working capital such as (i) hired human labour, (ii) hired bullock labour, (iii) machine labour (both owned and hired), (iv) seeds (owned and purchased), (v) manures, fertilizer and plant protection chemicals, (vi) insecticides, pesticides and (viii) irrigation charges.

5.3.4.12 Fixed cost

Fixed cost has been estimated by considering the following three costs:

5.3.4.12.1 Depreciation cost

In discussions with the respondents about the depreciation cost, the purchase value, life spans and residual value for different agricultural equipment and machinery were determined. The straight-line technique was implemented to compute the depreciation. The equation of the depreciation is given below:

$$\text{Depreciation} = \frac{\text{Purchase value} - \text{Residual value}}{\text{Life Span}} \qquad (1)$$

5.3.4.12.2 Electricity costs

Agricultural productivity is affected by fluctuations in energy prices, either directly or indirectly, through energy-related inputs like fertilizer (Sands et al., 2011). These have been assessed based on horsepower and were accounted for as fixed charges.

5.3.4.12.3 Other fixed costs

This analysis did not include other fixed costs such as land revenue, land rent and interest on fixed capital. Because a firm's output level is defined in the short run by changeable factor inputs, the study has focused on estimating the farmer's profit on a temporary basis. As fixed prices are not taken into account, net returns are calculated as gross income per unit of activity.

5.4 Cost-benefit analysis of major crops of the study area

5.4.1 Winter rice (aman)

Rice is the significant major field crop of Maldah district. The calculation of cost and return of winter rice (aman) have been shown in Table 5.2. The marginal, small and large farmers are taken into consideration to analyse the cost and return of the major crops. Total operating cost is defined as total input and hired labour costs. The average total operating cost (cost A) of the winter rice (aman) for the sample farmers is ₹38142/ha. which is maximum (₹39646/ha.) for the large farmers and minimum (₹36630/ ha.) for the marginal farmers. The average opportunity cost of operating capital (cost B) is ₹1144/ha., which is 2.59% of the total enterprise cost. On the other hand, family labour's total operating cost and opportunity costs are 86.30% and 10.37% of the total enterprise cost. The total family labour cost expenditure is high for the large farmers (₹5750/ha.) and low for the marginal farmers (₹3750/ ha.), which is 12.28% and 8.95% of the total enterprise cost, respectively. The sample farmers' average gross and net profit of winter rice (aman) are ₹56076/ ha. and ₹50021/ ha., respectively. It can be seen from the Table 5.2 that there is not much difference among large, small, and marginal farmers in cost analysis, but a significant difference has been noticed in profit analysis. The total average revenue for the sample farmers is ₹94218/ ha., where the difference in total revenue between large and small farmers is ₹5482/ha. and large and marginal farmers are ₹8744/ ha. For the small and marginal farmers, the gross profit is ₹55328/ ha. and ₹53586/ ha., respectively, and the net profit is ₹49606/ha. and ₹48324/ha., respectively. Whereas, in the case of large farmers, the gross profit is ₹59314/ ha., and the net profit is ₹52135/ ha. It can also be seen from the Table 5.2 that the average rates of return to the operating cost and the total cost are ₹1.47/ ha. and ₹1.13/ ha., respectively. The average gross profit per day for family labour, land and

management is ₹623/ ha., whereas for the large, small and marginal farmers, it is ₹659/ ha, ₹615/ ha. and ₹595/ ha. respectively.

Table 5.2 Cost-benefit analysis of winter rice (aman) for marginal, small and large farmers

Item	Marginal farmers (₹/ha.)	Small farmers (₹/ha.)	Large farmers (₹/ha.)	Average (₹/ha.)
a. Operating cost (Cost A)				
Input Cost	6630 (15.83 %)	6900 (15.73 %)	7146 (15.26 %)	6892 (15.59 %)
Cost of hired labour	30000 (71.61 %)	31250 (71.23 %)	32500 (69.41 %)	31250 (70.71 %)
Total operating cost	36630 (87.44 %)	38150 (86.96 %)	39646 (84.67 %)	38142 (86.30 %)
b. Opportunity cost of operating capital (Cost B)	1099 (2.62 %)	1145 (2.61 %)	1189 (2.54 %)	1144 (2.59 %)
c. Opportunity cost of family labour (Cost C)				
Number of family labour day	15 (0.04 %)	17 (0.04 %)	23 (0.05 %)	18 (0.04 %)
Total family labour cost	3750 (8.95 %)	4250 (9.69 %)	5750 (12.28 %)	4583 (10.37 %)
d. Total enterprise cost (Cost D)				
Depreciation cost	413 (0.99 %)	328 (0.75 %)	240 (0.51 %)	327 (0.74 %)
Total enterprise cost	41892 (100.00 %)	43873 (100.00 %)	46825 (100.00 %)	44197 (100.00 %)
e. Farmer Profit				
Total Revenue	90216	93478	98960	94218
Gross profit	53586	55328	59314	56076
Net Profit	48324	49606	52135	50021
f. Rates of return				
Return to operating cost	1.46	1.45	1.50	1.47
Return to total cost	1.15	1.13	1.11	1.13
Gross profit per day family labour, land, management	595	615	659	623

Source: Household survey, 2020-21

5.4.2 Summer rice (boro)

The cost-benefit analysis for the summer rice (boro) is shown in Table 5.3. The average total operating cost (Cost A) of summer rice (boro) for the sample farmers is ₹39645/ha, which was a maximum (₹41846/ha) for the large farmers and minimum (₹37940/ha) for the marginal farmers. The average opportunity cost of operating capital (Cost B) is ₹1189/ha which is 2.64% of the total enterprise cost. On the other hand, family labour's total operating cost and opportunity cost were 88.11% and 8.52% of the total enterprise cost, respectively. The total family labour cost expenditure is highest for the small farmers (₹4250/ha) and lowest for the large farmers (₹3500/ha), which is 9.47% and 7.47% of the total enterprise cost, respectively. The sample farmers' average gross and net profit of summer rice (boro) are ₹61573/ha and ₹56223/ha, respectively. It can be seen from the Table 5.3 that there is not much difference among large, small and marginal farmers in cost analysis, but a remarkable difference has been seen in profit analysis. The average revenue for the sample farmers is ₹101218/ ha, where the difference between large and small farmers' revenue is ₹8482/ha and large and marginal farmers is ₹11744/ha. For the small and marginal farmers, the gross profit is ₹60328/ha and ₹58276/ ha, respectively, and the net profit is ₹54576/ha and ₹52975/ha, respectively, whereas, for large farmers, the gross profit is ₹66114/ha and net profit is ₹61119/ ha. It can also be seen from Table 5.3 that the average rates of return to the operating cost and the total cost are ₹1.55/ ha and ₹1.25/ ha, respectively. The average gross profit per day for family labour, land and management is ₹684/ha. Individually, it is ₹735/ ha, ₹670/ ha and ₹648/ ha for the large, small and marginal farmers.

5.4.3 Wheat

The cost-benefit analysis of wheat is presented in Table 5.4. The average total operating cost (cost A) of wheat for the sample farmers was ₹11212/ha, which was maximum for large farmers (₹12146/ha) and minimum for marginal farmers (₹10550/ ha). The average opportunity cost of operating capital (cost B) was ₹336/ha which is 1.92% of the total enterprise cost. On the other hand, family labour's total operating cost and opportunity costs were 63.92% and 32.31% of the total enterprise cost. The expense for total family labour cost was highest for the marginal farmers (₹6250/ha) and lowest for the large farmers (₹5000/ ha), which is 34.86% and 28.17% of the total enterprise cost, respectively. The average gross and net profit of wheat for the sample farmers was ₹11467/ ha and ₹5137/ ha, respectively. It can also be said from the Table 5.4 that there

Table 5.3 Cost-benefit analysis of summer rice (boro) for marginal, small and large farmers

Item	Marginal farmers (₹/ha)	Small farmers (₹/ha)	Large farmers (₹/ha)	Average (₹/ha)
a. Operating cost (Cost A)				
Input Cost	7940 (18.36 %)	7900 (17.59 %)	8096 (17.28 %)	7979 (17.73 %)
Cost of hired labour	30000 (69.38 %)	31250 (69.59 %)	33750 (72.05 %)	31667 (70.38 %)
Total operating cost	37940 (87.74 %)	39150 (47.19 %)	41846 (89.34 %)	39645 (88.11 %)
b. Opportunity cost of operating capital (Cost B)	1138 (2.63 %)	1175 (2.62 %)	1255 (2.68 %)	1189 (2.64 %)
c. Opportunity cost of family labour (Cost C)				
Number of family labour day	15 (0.04 %)	17 (0.04 %)	14 (0.03 %)	15 (0.03 %)
Total family labour cost	3750 (8.67 %)	4250 (9.47 %)	3500 (7.47 %)	3833 (8.52 %)
d. Total enterprise cost (Cost D)				
Depreciation cost	413 (0.96 %)	328 (0.73 %)	240 (0.51 %)	327 (0.73 %)
Total enterprise cost	43241 (100.00 %)	44903 (100.00 %)	46841 (100.00 %)	44995 (100.00 %)
e. Farmer Profit				
Total Revenue	96216	99478	107960	101218
Gross profit	58276	60328	66114	61573
Net Profit	52975	54576	61119	56223
f. Rates of return				
Return to operating cost	1.54	1.54	1.58	1.55
Return to total cost	1.23	1.22	1.30	1.25
Gross profit per day family labour, land, management	648	670	735	684

Source: Household survey, 2020-21

is not much difference among small and marginal farmers in cost analysis, but a significant difference can be seen in profit analysis. The total average revenue for the sample farmers was ₹22679/ ha, where the difference in total revenue between large and small farmers was ₹5482/ha, and large and marginal farmers were ₹4360/ ha. For the small and marginal farmers, the gross profit was ₹9928/ ha and ₹10660/ ha, respectively, and the net profit was ₹3534/ ha and ₹3669/ ha, respectively, whereas, in the case of large farmers the gross profit was ₹13814/ ha and net profit was ₹8210/ ha. It can also be seen from Table 5.4 that the average rates of return to the operating cost and to the total cost are ₹1.02/ ha and ₹0.29/ ha, respectively. The average gross profit per day for family labour, land and management was ₹127/ ha; while it was ₹153/ ha, ₹110/ ha, and ₹118/ ha for the large, small and marginal farmers, respectively.

5.4.4 Maize

Table 5.5 explains the cost-benefit analysis of maize in Maldah district. The average total operating cost (cost A) of maize for the sample farmers is ₹18812/ha which is maximum (₹20146/ha) for large farmers and minimum (₹17940/ ha) for marginal farmers. The average opportunity cost of operating capital (cost B) is ₹564/ha which is 2.28% of the total enterprise cost. On the other hand, the total operating cost and opportunity cost of family labour is 75.89% and 20.51% of the total enterprise cost, respectively. The total family labour cost expenditure is highest for the small farmers (₹5500/ha) and lowest for the large farmers (₹4500/ ha), which is 22.24% and 17.65% of the total enterprise cost, respectively. The average gross and net profit of maize for the sample farmers are ₹79021/ ha and ₹73047/ ha, respectively. It can be said from Table 5.5 that there is not much difference between small and marginal farmers in cost analysis as well as in profit analysis, but a significant difference has been seen for large farmers in both the cost and profit analysis. The total average revenue for the sample farmers is ₹97833/ ha, where, the difference in total revenue between large and small farmers is ₹10000/ha, and large and marginal farmers is ₹11500/ ha. For the small and marginal farmers, the gross profit is ₹76650/ ha and ₹75560/ ha. On the other hand, the net profit is ₹70272/ ha and ₹69359/ ha for small and large farmers. The gross and net profit for large farmers is ₹84854/ ha and ₹79510/ ha. It can also be seen from the analysis that the average rates of return to the operating cost and to the total cost are ₹4.20/ha and ₹2.95/ha, respectively. The average gross profit per day for family labour,

land and management are ₹564/ ha, which is ₹606/ ha, ₹548/ ha, and ₹540/ ha for the large, small and marginal farmers, respectively.

Table 5.4 Cost-benefit analysis of wheat for marginal, small and large farmers

Item	Marginal farmers (₹/ha)	Small farmers (₹/ha)	Large farmers (₹/ha)	Average (₹/ha)
a. Operating cost (Cost A)				
Input Cost	4690 (26.16 %)	4800 (28.33 %)	5146 (28.99 %)	4879 (27.81 %)
Cost of hired labour	6250 (34.86 %)	5750 (33.93 %)	7000 (39.44 %)	6333 (36.10 %)
Total operating cost	10940 (61.01 %)	10550 (62.26 %)	12146 (68.43 %)	11212 (63.92 %)
b. Opportunity cost of operating capital (Cost B)	328 (1.83 %)	317 (1.87 %)	364 (2.05 %)	336 (1.92 %)
c. Opportunity cost of family labour (Cost C)				
Number of family labour day	25 (0.14 %)	23 (0.14 %)	20 (0.11 %)	23 (0.13 %)
Total family labour cost	6250 (34.86 %)	5750 (33.93 %)	5000 (28.17 %)	5667 (32.31 %)
d. Total enterprise cost (Cost D)				
Depreciation cost	413 (2.30 %)	328 (1.94 %)	240 (1.35 %)	327 (1.86 %)
Total enterprise cost	17931 (100.00 %)	16945 (100.00 %)	17750 (100.00 %)	17542 (100.00 %)
e. Farmer Profit				
Total Revenue	21600	20478	25960	22679
Gross profit	10660	9928	13814	11467
Net Profit	3669	3534	8210	5137
f. Rates of return				
Return to operating cost	0.97	0.94	1.14	1.02
Return to total cost	0.20	0.21	0.46	0.29
Gross profit per day family labour, land, management	118	110	153	127

Source: Household survey, 2020-21

Table 5.5 Cost-benefit analysis of maize for marginal, small and large farmers

Item	Marginal (₹/ha)	Small (₹/ha)	Large (₹/ha)	Average (₹/ha)
a. Operating cost (Cost A)				
Input Cost	8440 (34.96 %)	8600 (34.78 %)	9646 (37.84 %)	8895 (35.89 %)
Cost of hired labour	9500 (39.35 %)	9750 (39.43 %)	10500 (41.19 %)	9917 (40.01 %)
Total operating cost	17940 (74.31 %)	18350 (74.20 %)	20146 (79.03%)	18812 (75.89 %)
b. Opportunity cost of operating capital (Cost B)	538 (2.23 %)	551 (2.23 %)	604 (2.37 %)	564 (2.28 %)
c. Opportunity cost of family labour (Cost C)				
Number of family labour day	21 (0.09 %)	22 (0.09 %)	18 (0.07 %)	20 (0.08 %)
Total family labour cost	5250 (21.75 %)	5500 (22.24 %)	4500 (17.65 %)	5083 (20.51 %)
d. Total enterprise cost (Cost D)				
Depreciation cost	413 (1.71 %)	328 (1.33 %)	240 (0.94 %)	327 (1.32 %)
Total enterprise cost	24141 (100.00 %)	24729 (100.00 %)	25490 (100.00 %)	24787 (100.00 %)
e. Farmer Profit				
Total Revenue	93500	95000	105000	97833
Gross profit	75560	76650	84854	79021
Net Profit	69359	70272	79510	73047
f. Rates of return				
Return to operating cost	4.21	4.18	4.21	4.20
Return to total cost	2.87	2.84	3.12	2.95
Gross profit per day family labour, land, management	540	548	606	564

Source: Household survey, 2020-21

5.4.5 Lentil (masoor)

Table 5.6 demonstrates the cost-benefit analysis of lentil (masoor) in Maldah district. The average total operating cost (cost A) of lentil (masoor) for the sample farmers is ₹7512/ha, which is maximum (₹9946/ha) for large farmers and minimum (₹6150/ ha)

for small farmers. The average opportunity cost of operating capital (cost B) is ₹225/ha which is 1.45% of the total enterprise cost. On the other hand, family labour's total operating cost and opportunity costs are 48.52% and 47.91% of the total enterprise cost. The total family labour cost expenditure is highest for the marginal farmers (₹9500/ha) and lowest for the large farmers (₹4250/ ha), which is 57.42% and 28.84% of the total enterprise cost, respectively. The average gross and net profit of maize for the sample farmers is ₹12478/ ha and ₹4509/ ha, respectively. It can be said from Table 5.6 that there is no immense difference between small and marginal farmers in cost analysis, but a significant difference has been observed among large, small and marginal farmers in profit analysis. The total average revenue for the sample farmers is ₹19990/ ha, where the difference in total revenue between large and small farmers is ₹300/ha, and large and marginal farmers are ₹330/ ha. For the small and marginal farmers, the gross profit is ₹13750/ ha, and ₹13430/ ha, respectively, and the net profit is ₹4738/ ha and ₹3324/ ha, respectively, whereas, in the case of large farmers the gross profit is ₹10254/ ha and net profit is ₹5466/ ha. It can also be seen from the Table 5.6 that the average rates of return to the operating cost and the total cost are ₹1.66/ ha and ₹0.29/ ha, respectively. The average number of days of the family members who work in their field is 30 days for growing lentils (masoor) which is maximum (38 days) for marginal farmers and a minimum (17 days) for the large farmers. The average gross profit per day for family labour, land and management is ₹139/ ha; it is ₹114/ ha, ₹153/ ha, and ₹149/ ha for the large, small and marginal farmers, respectively.

5.4.6 Urad (maskalai)

The average total operating cost (cost A) of Urad (maskalai) for the sample farmers is ₹7012/ha, which was a maximum (₹9346/ha) for large farmers and a minimum (₹5750/ ha) for small farmers (Table 5.7). The average opportunity cost of operating capital (cost B) was ₹210/ha, which is 1.37% of the total enterprise cost (Table 5.7). On the other hand, the total operating cost and opportunity cost of family labour is 45.58% and 50.92% of the total enterprise cost, respectively. The total family labour cost expenditure is highest for the marginal farmers (₹9500/ha) and lowest for the large farmers (₹5500/ ha), which is 59.26% and 35.79% of the total enterprise cost, respectively. The average gross and net profit of urad (maskalai) for the sample farmers

Table 5.6 Cost-benefit analysis of lentil (masoor) for marginal, small and large farmers

Item	Marginal farmers (₹/ha)	Small farmers (₹/ha)	Large farmers (₹/ha)	Average (₹/ha)
a. Operating cost (Cost A)				
Input Cost	2440 (14.75 %)	2650 (17.48 %)	2446 (16.60 %)	2512 (16.23 %)
Cost of hired labour	4000 (24.18 %)	3500 (23.08 %)	7500 (50.90 %)	5000 (32.30 %)
Total operating cost	6440 (38.92 %)	6150 (40.56 %)	9946 (67.50 %)	7512 (48.52 %)
b. Opportunity cost of operating capital (Cost B)	193 (1.17 %)	185 (1.22 %)	298 (2.02 %)	225 (1.45 %)
c. Opportunity cost of family labour (Cost C)				
Number of family labour day	38 (0.23 %)	34 (0.22 %)	17 (0.12 %)	30 (0.19 %)
Total family labour cost	9500 (57.42 %)	8500 (56.06 %)	4250 (28.84 %)	7417 (47.91 %)
d. Total enterprise cost (Cost D)				
Depreciation cost	413 (2.50 %)	328 (2.16 %)	240 (1.63 %)	327 (2.11 %)
Total enterprise cost	16546 (100.00 %)	15163 (100.00 %)	14734 (100.00 %)	15481 (100.00 %)
e. Farmer Profit				
Total Revenue	19870	19900	20200	19990
Gross profit	13430	13750	10254	12478
Net Profit	3324	4738	5466	4509
f. Rates of return				
Return to operating cost	2.09	2.24	1.03	1.66
Return to total cost	0.20	0.31	0.37	0.29
Gross profit per day family labour, land, management	149	153	114	139

Source: Household survey, 2020-21

is ₹11645/ ha and ₹3274/ ha, respectively. It can be said from Table 5.7 that there is not much difference between small and marginal farmers, but a significant difference has been seen with large farmers in cost and profit analysis. The total average revenue for

the sample farmers is ₹18657/ ha, where the difference in total revenue between large and small farmers is ₹1300/ha and large and marginal farmers were ₹330/ ha. For the small and marginal farmers, the gross profit is ₹12150/ ha, and ₹12930/ ha, respectively, and the net profit is ₹3150/ ha and ₹2839/ ha, respectively, whereas, in the case of large farmers the gross profit is ₹9854/ ha and net profit was ₹3834/ ha. It can also be seen from the Table 5.7 that the average rates of return to the operating cost and the total cost are ₹1.66/ ha and ₹0.21/ ha, respectively. The average number of days of the family members working in their field is 31 days for growing urad (maskalai) which is a maximum (38 days) for marginal farmers and minimum (22 days) for the large farmers. The average gross profit per day for family labour, land, and management are ₹129/ ha, while for the large, small and marginal farmers, it is ₹109/ ha, ₹135/ ha, and ₹144/ ha, respectively.

5.4.7 Rapeseed & mustard

The average total operating cost (cost A) of rapeseed & mustard for the sample farmers is ₹5345/ha, which is maximum (₹13346/ha) for large farmers and minimum (₹11340/ ha) for marginal farmers (Table 5.8). The average opportunity cost of operating capital (cost B) is ₹365/ha which is 1.97% of the total enterprise cost. On the other hand, the total operating cost and opportunity cost of family labour is 65.70% and 30.57% of the total enterprise cost, respectively. The expenditure for total family labour cost is highest for the marginal farmers (₹7000/ha) and lowest for the large farmers (₹4000/ ha), which is 36.66% and 22.24% of the total enterprise cost, respectively (Table 5.8). The average gross and net profit of rapeseed & mustard for the sample farmers are ₹26178/ ha and ₹19819/ ha, respectively. It is seen from the Table 5.8 that there is no significant difference between small and marginal farmers, but a significant difference has been observed with large farmers in both cost and profit analysis. The total average revenue for the sample farmers is ₹38357/ ha, where the difference in total revenue between large and small farmers is ₹3100/ha and large and marginal farmers is ₹2430/ ha. For the small and marginal farmers, the gross profit is ₹25250/ ha and ₹26430/ ha, respectively, and the net profit is ₹18567/ ha and ₹18677/ ha, respectively, whereas, in the case of large farmers the gross profit is₹26854/ ha and net profit was ₹22214/ ha. It can also be observed from the Table 5.8 that the average rates of return to the operating cost and the total cost are ₹2.15/ ha and ₹1.07/ ha, respectively. The average number of days when the family members work in their field is 23 days for growing rapeseed

Table 5.7 Cost-benefit analysis of urad (maskalai) for marginal, small and large farmers

Item	Marginal farmers (₹/ha)	Small farmers (₹/ha)	Large farmers (₹/ha)	Average (₹/ha)
a. Operating cost (Cost A)				
Input Cost	1440 (8.98 %)	1500 (10.17 %)	1596 (10.39 %)	1512 (9.83 %)
Cost of hired labour	4500 (28.07 %)	4250 (28.81 %)	7750 (50.44 %)	5500 (35.75 %)
Total operating cost	5940 (37.05 %)	5750 (38.98 %)	9346 (60.82 %)	7012 (45.58 %)
b. Opportunity cost of operating capital (Cost B)	178 (1.11 %)	173 (1.17 %)	280 (1.82 %)	210 (1.37 %)
c. Opportunity cost of family labour (Cost C)				
Number of family labour day	38 (0.24 %)	34 (0.23 %)	22 (0.14 %)	31 (0.20 %)
Total family labour cost	9500 (59.26 %)	8500 (57.62 %)	5500 (35.79 %)	7833 (50.92 %)
d. Total enterprise cost (Cost D)				
Depreciation cost	413 (2.58 %)	328 (2.22 %)	240 (1.56 %)	327 (2.13 %)
Total enterprise cost	16031 (100.00 %)	14751 (100.00 %)	15366 (100.00 %)	15383 (100.00 %)
e. Farmer Profit				
Total Revenue	18870	17900	19200	18657
Gross profit	12930	12150	9854	11645
Net Profit	2839	3150	3834	3274
f. Rates of return				
Return to operating cost	2.18	2.11	1.05	1.66
Return to total cost	0.18	0.21	0.25	0.21
Gross profit per day family labour, land, management	144	135	109	129

Source: Household survey, 2020-21

& mustard, which was maximum (28 days) for marginal farmers and minimum (16 days) for the large farmers. The average gross profit per day family labour, land and

management is ₹218/ ha; whereas for the large, small and marginal farmers, it was ₹224/ ha, ₹210/ ha, and ₹220/ ha, respectively (Table 5.8).

Table 5.8 Cost-benefit analysis of rapeseed & mustard for marginal, small and large farmers

Item	Marginal farmers (₹/ha)	Small farmers (₹/ha)	Large farmers (₹/ha)	Average (₹/ha)
a. Operating cost (Cost A)				
Input Cost	5090 (26.66 %)	5100 (27.52 %)	5096 (28.33 %)	5095 (27.48 %)
Cost of hired labour	6250 (32.73 %)	6750 (36.42 %)	8250 (45.87 %)	7083 (38.21 %)
Total operating cost	11340 (59.39 %)	11850 (63.94 %)	13346 (74.20 %)	12179 (65.70 %)
b. Opportunity cost of operating capital (Cost B)	340 (1.78 %)	356 (1.92 %)	400 (2.22 %)	365 (1.97 %)
c. Opportunity cost of family labour (Cost C)				
Number of family labour day	28 (0.15 %)	24 (0.13 %)	16 (0.09 %)	23 (0.12 %)
Total family labour cost	7000 (36.66 %)	6000 (32.37 %)	4000 (22.24 %)	5667 (30.57 %)
d. Total enterprise cost (Cost D)				
Depreciation cost	413 (2.16 %)	328 (1.77 %)	240 (1.33 %)	327 (1.76 %)
Total enterprise cost	19093 (100.00 %)	18534 (100.00 %)	17986 (100.00 %)	18538 (100.00 %)
e. Farmer Profit				
Total Revenue	37770	37100	40200	38357
Gross profit	26430	25250	26854	26178
Net Profit	18677	18567	22214	19819
f. Rates of return				
Return to operating cost	2.33	2.13	2.01	2.15
Return to total cost	0.98	1.00	1.24	1.07
Gross profit per day family labour, land, management	220	210	224	218

Source: Household survey, 2020-21

5.4.8 Jute

The average total operating cost (cost A) of jute for the sample farmers was ₹35982/ha which was maximum (₹41746/ha) for large farmers and minimum (₹32350/ ha) for marginal farmers (Table 5.9). The average opportunity cost of operating capital (cost B) was ₹1079/ha which is 2.45% of the total enterprise cost. On the other hand, family labour's total operating cost and opportunity costs were 81.68% and 15.13% of the total enterprise cost. The total family labour cost expenditure was highest for the small farmers (₹9000/ha) and lowest for the large farmers (₹2500/ ha), which was 20.74% and 5.47% of the total enterprise cost, respectively. The average gross and net profit of Jute for the sample farmers was ₹134518/ ha and ₹126545/ ha, respectively. It has been observed from the Table 5.9 that there is not much difference between small and marginal farmers, but a significant difference can be seen with large farmers in cost analysis. Whereas, in profit analysis, a significant difference exists among marginal, small, and large farmers. The total average revenue for the sample farmers was ₹170600/ ha, where the difference in total revenue between large and small farmers was ₹22100/ha, and large and marginal farmers were ₹15700/ ha. For the small and marginal farmers, the gross profit was ₹127250/ ha and ₹135150/ ha, respectively, and the net profit was ₹116907/ ha and ₹125267/ ha, respectively, whereas, in the case of large farmers the gross profit was ₹141454/ ha and net profit was ₹137462/ ha. It can also be seen from the Table 5.9 that the average rates of return to the operating cost and the total cost are ₹3.74/ ha and ₹2.87/ ha, respectively. The average number of days when the family members work in their field is 27 days for growing Jute, which was maximum (34 days) for marginal farmers and minimum (10 days) for the large farmers. The average gross profit per day for family labour, land and management was ₹1122/ ha; it was ₹1179/ ha, ₹1060/ ha, and ₹1126/ ha for the large, small and marginal farmers, respectively.

5.4.9 Potato

The average total operating cost (cost A) of potatoes for the sample farmers was ₹136845/ha, and it was maximum (₹140346/ha) for large farmers and minimum (₹134850/ ha) for small farmers (Table 5.10). The average opportunity cost of operating capital (cost B) is ₹4105/ha which is 2.80% of the total enterprise cost. On the other hand, the total operating cost and opportunity cost of family labour was 93.45% and 3.53% of the total enterprise cost, respectively. The expenditure for total family labour

Table 5.9 Cost-benefit analysis of jute for marginal, small and large farmers

Item	Marginal farmers (₹/ha)	Small farmers (₹/ha)	Large farmers (₹/ha)	Average (₹/ha)
a. Operating cost (Cost A)				
Input Cost	6100 (14.44 %)	6350 (14.37 %)	6746 (14.75 %)	6399 (14.53 %)
Cost of hired labour	26250 (62.15 %)	27500 (62.23 %)	35000 (76.52 %)	29583 (67.15 %)
Total operating cost	32350 (76.60 %)	33850 (76.59 %)	41746 (91.27 %)	35982 (81.68 %)
b. Opportunity cost of operating capital (Cost B)	971 (2.30 %)	1016 (2.30 %)	1252 (2.74 %)	1079 (2.45 %)
c. Opportunity cost of family labour (Cost C)				
Number of family labour day	34 (0.08 %)	36 (0.08 %)	10 (0.02 %)	27 (0.06 %)
Total family labour cost	8500 (20.13 %)	9000 (20.74 %)	2500 (5.47 %)	6667 (15.13 %)
d. Total enterprise cost (Cost D)				
Depreciation cost	413 (0.98 %)	328 (0.74 %)	240 (0.52 %)	327 (0.74 %)
Total enterprise cost	42234 (100.00 %)	44194 (100.00 %)	45738 (100.00 %)	44055 (100.00 %)
e. Farmer Profit				
Total Revenue	167500	161100	183200	170600
Gross profit	135150	127250	141454	134618
Net Profit	125267	116907	137462	126545
f. Rates of return				
Return to operating cost	4.18	3.76	3.39	3.74
Return to total cost	2.97	2.65	3.01	2.87
Gross profit per day family labour, land, management	1126	1060	1179	1122

Source: Household survey, 2020-21

Table 5.10 Cost-benefit analysis of potato for marginal, small and large farmers

Item	Marginal farmers (₹/ha)	Small farmers (₹/ha)	Large farmers (₹/ha)	Average (₹/ha)
a. Operating cost (Cost A)				
Input Cost	117340 (80.47 %)	115100 (78.98 %)	119096 (80.58 %)	117179 (80.02 %)
Cost of hired labour	18000 (12.34 %)	19750 (13.55 %)	21250 (14.38 %)	19667 (13.43 %)
Total operating cost	135340 (92.82 %)	134850 (92.54 %)	140346 (94.96 %)	136845 (93.45 %)
b. Opportunity cost of operating capital (Cost B)	4060 (2.78 %)	4046 (2.78 %)	4210 (2.85 %)	4105 (2.80 %)
c. Opportunity cost of family labour (Cost C)				
Number of family labour day	24 (0.02 %)	26 (0.02 %)	12 (0.01 %)	21 (0.01 %)
Total family labour cost	6000 (4.11 %)	6500 (4.46 %)	3000 (2.03 %)	5167 (3.53 %)
d. Total enterprise cost (Cost D)				
Depreciation cost	413 (0.28 %)	328 (0.23 %)	240 (0.16 %)	327 (0.22 %)
Total enterprise cost	145813 (100.00 %)	145724 (100.00 %)	147796 (100.00 %)	146444 (100.00 %)
e. Farmer Profit				
Total Revenue	365000	361000	370000	365333
Gross profit	229660	226150	229654	228488
Net Profit	219187	215277	222204	218889
f. Rates of return				
Return to operating cost	1.70	1.68	1.64	1.67
Return to total cost	1.50	1.48	1.50	1.49
Gross profit per day family labour, land, management	1914	1885	1914	1904

Source: Household survey, 2020-21

Plate 5.1 *By product of some crops used for cost-benefit analysis (a) & (b) maize (c) jute and (d) paddy*

cost was highest for the small farmers (₹6500/ha) and lowest for the large farmers (₹3000/ ha), which was 4.46% and 2.03% of the total enterprise cost, respectively. The average gross and net profit of potatoes for the sample farmers was ₹228488/ ha and ₹218889/ ha, respectively. It is observed from Table 5.10 that there was no immense difference between small and marginal farmers, but a significant difference can be seen with large farmers in cost analysis. Whereas, in profit analysis, a significant difference exists among marginal, small, and large farmers. The total average revenue for the sample farmers was ₹365333/ ha, where the difference in total revenue between large

and small farmers was ₹9000/ha and large and marginal farmers was ₹5000/ ha. For the small and marginal farmers, the gross profit was ₹226150/ ha and ₹229660/ ha, respectively, and the net profit was ₹215277/ ha and ₹219187/ ha, respectively. Whereas, in the case of large farmers, the gross profit was ₹229654/ ha and the net profit was ₹222204/ ha. It can also be seen from Table 5.10 that the average rates of return to the operating cost and the total cost are ₹1.67/ ha and ₹1.49/ ha, respectively. The average number of days when the family members worked in their field was 21 days for growing potatoes, which was maximum (26 days) for small farmers and minimum (12 days) for the large farmers. The average gross profit per day for family labour, land and management was ₹1904/ ha; it was ₹1914/ ha, ₹1885/ ha, and ₹1914/ ha for the large, small and marginal farmers, respectively.

Hypothesis II: *The cost-benefit ratio of the major crops is significantly different with respect to farm size.*

In the context of hypothesis II, Chi square test has been performed. First of all, the degree of freedom and expected frequency have been calculated and then the Chi square test has been done; the likelihood ratio, Phi and Cramer's V have also been calculated. The p value is also calculated to identify the level of significance. From the Chi square test, it is found that the Pearson's chi square statistic is 51.00 and the value of p is 0.283. On the other hand, the chi square likelihood ratio is 56.55 and p value is 0.137(Table 5.11). So, the value of p is greater than the significance level (0.05). Therefore, the association is not significant at 0.05 significance level. So, the hypothesis is rejected or the hypothesis is not accepted. Therefore, it is estimated that the cost benefit ratio of the major crops is not significantly different with respect to farm size.

Table 5.11 Results of the Chi Square test

Variable	Value	Sig.
Pearson Chi square	51.00	0.283
Likelihood ratio	56.55	0.137
Phi	1.37	0.283
Cramer's V	0.97	0.283

Sig.=Significant

5.5 Comparison of different aspects of cost-benefit analysis among marginal, small and large farmers

5.5.1 Total operating costs

The comparison analysis of the total operating cost of the major crops in Maldah district has been shown in Fig 5.1. Based on the average total operating cost, potato cultivation is the most expensive in this study area. The result shows the total operating cost of potato for marginal farmers was ₹135340/ha, for small farmers, it was ₹134850/ha, and for large farmers, it was ₹140346/ha. However, the average cost for potato is ₹136845/ha. On the other hand, the lowest average total operating cost is found for urad (maskalai), which is ₹7012/ha. For marginal, small and large farmers, the operating cost for urad (maskalai) was ₹5940/ha, ₹5750/ha, and ₹9346/ha, respectively.

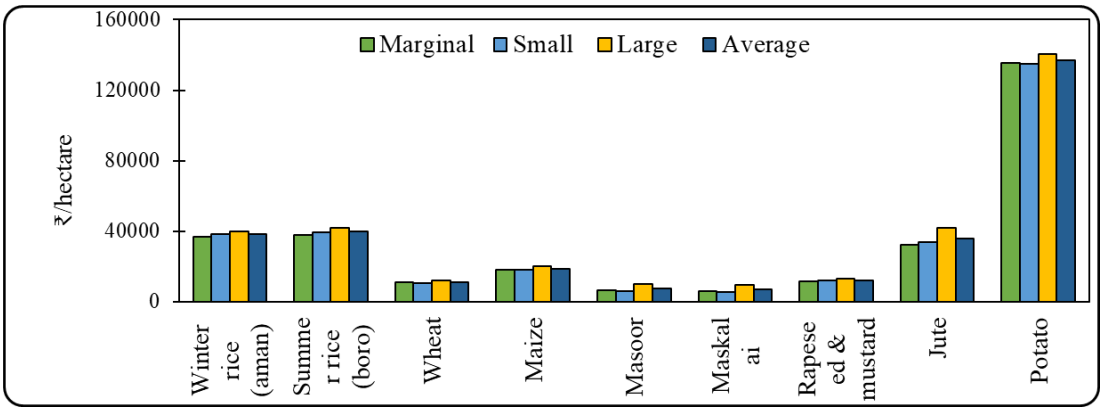

Fig. 5.1 Comparison of the total operating cost of the major crops among marginal, small and large farmers in the study area

5.5.2 Total labour requirements

Figure 5.2 represents the comparison of the total labour required for different crops in the study area. From the study, it is observed that the average labour requirement is maximum for jute production (145/ha), while the lowest (50/ha) is observed for lentil (masoor) production. For marginal farmers, the maximum and minimum labours are required for jute (139/ha) and wheat (50/ha) production. For small farmers, the highest and lowest labours are required for jute (146/ha) and wheat (46/ha). On the other hand, for large farmers, the maximum labour is needed for jute (150/ha) and minimum for lentil (masoor) (47/ha).

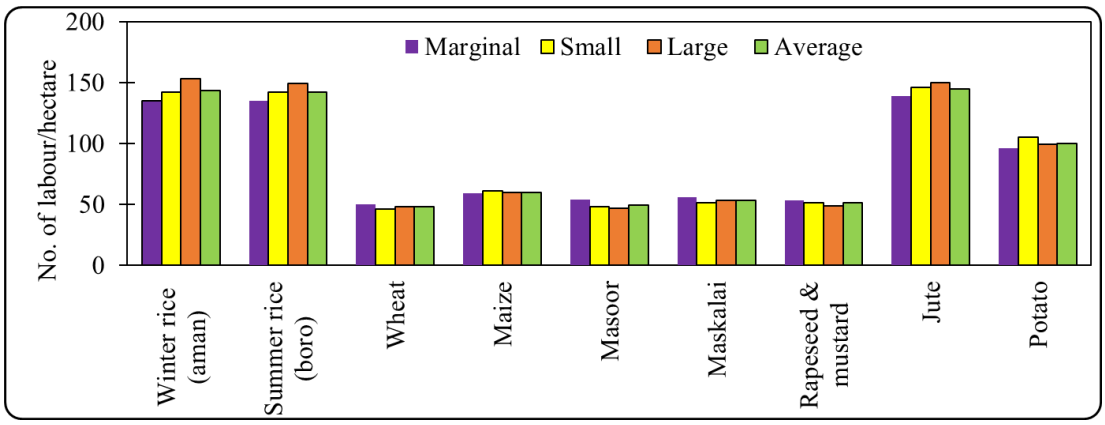

Fig. 5.2 Comparison of the total labour required for the major crops among marginal, small and large farmers in the study area

5.5.3 Gross profit

Figure 5.3 compares farmers' gross profit of the major crops in Maldah district. The study reveals that the farmers average gross profit is maximum for potatoes (₹228488/ha) and minimum for urad (maskalai) (₹11645/ha) in the study area. For marginal, small and large farmers, the gross profit of potato production are ₹229660/ha, ₹226150/ha, and ₹229654/ ha, respectively. On the other hand, the lowest gross profit is found for urad (maskalai) production for all the farmers types; for marginal, it is ₹12930/ ha; for small, it is ₹12150/ha; and for large farmers, it is ₹9854/ha.

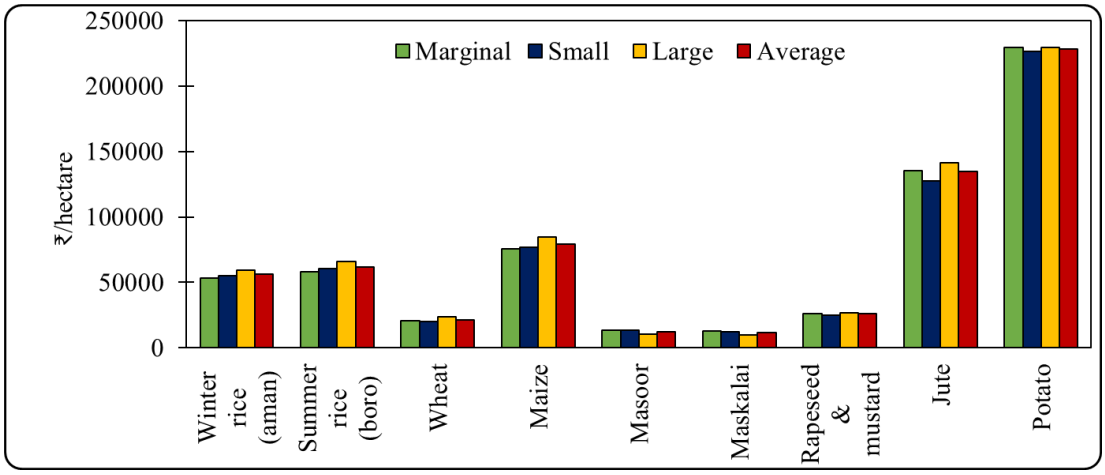

Fig. 5.3 Comparison of the gross profit of the major crops among marginal, small and large farmer in the study area

5.5.4 Net profit

The comparison analysis of farmer's net profit of the major crops in Maldah district is presented in Fig 5.4. Based on farmer net profit, the highest average net profit is observed in potato (₹218889/ha) production, while the lowest average net profit is observed in urad (maskalai) production (₹4374/ha). The net profit of potato among

marginal, small and large farmers are ₹219187/ha, ₹215277/ha and₹222204/ha respectively. Whereas, the net profit of urad (maskalai) for marginal farmers is ₹2839/ha, for small farmers ₹3150/ha and for large farmers, it is ₹3834/ha.

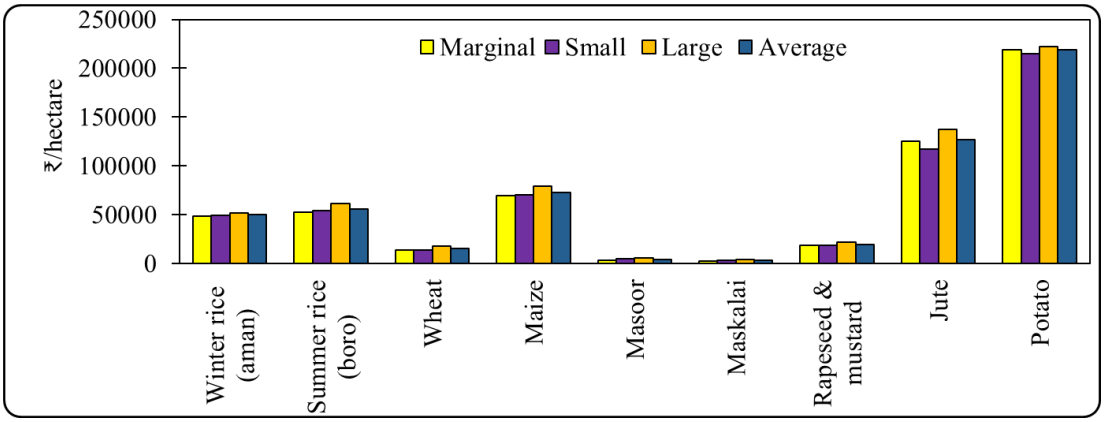

Fig. 5.4 Comparison of the net profit of the major crops among marginal, small and large farmers in the study area

5.5.5 Return to operating cost

The comparison analysis of the return to operating cost of the major crops have been shown in Fig 5.5. The figure shows that the return to operating cost is maximum for maize for all the farmers group, i.e., marginal (₹4.21/ha), small (₹4.18/ha) and large (₹4.21/ha). On the other hand, the lowest return to operating cost is found for winter rice (aman) for all farmers, i.e., marginal (₹1.46/ha), small (₹1.45/ha) and large (₹1.50/ha). However, the average return to total operating cost of maize and winter rice (aman) are ₹4.20/ha and ₹0.50/ha respectively.

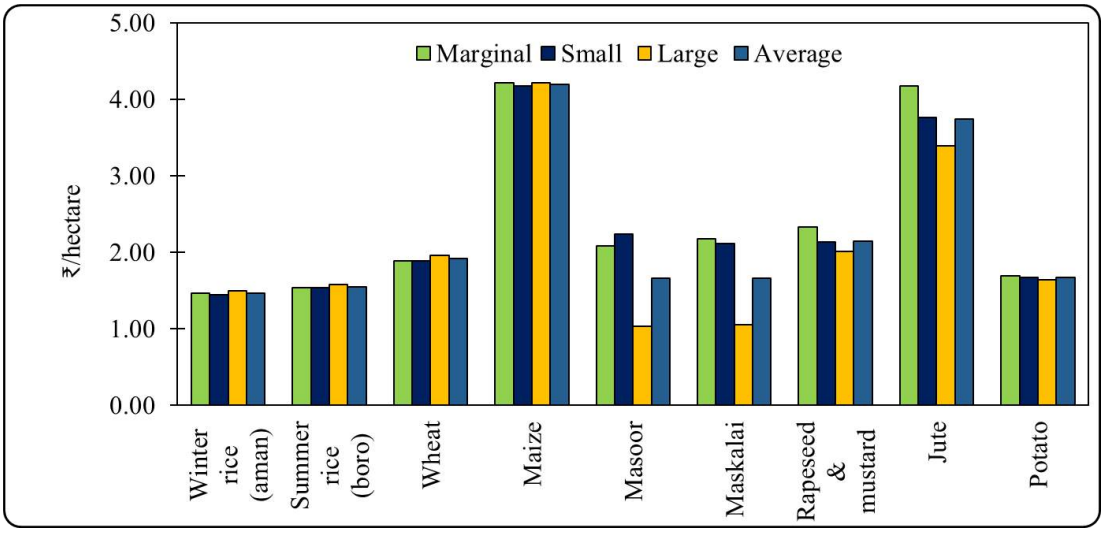

Fig. 5.5 Comparison of the return to operating cost of the major crops among marginal, small and large farmers in the study area

5.5.6 Return to the total cost

Figure 5.6 compares the return to the total cost of the major crops in the study area. The highest average return to total cost is observed in maize cultivation (₹2.98/ha), while the lowest average return is observed in urad (maskalai) cultivation (₹0.21/ha). Hence, in this agricultural environment, maize is very suitable for cultivation in terms of the return to the total cost. In every farmer group the return is highest for maize cultivation; for marginal farmers it is ₹2.97/ha, for small farmers it is ₹2.84/ha and for large farmers it is ₹3.12/ha. For urad (maskalai) the return to the total cost is 0.18/ha, 0.21/ha and 0.25/ha for marginal, small and large farmers respectively.

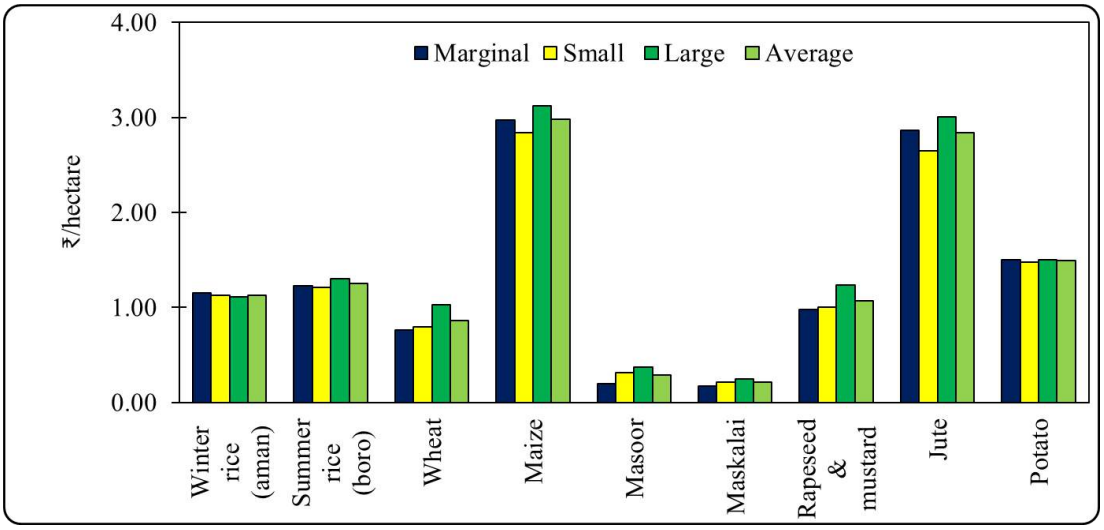

Fig. 5.6 Comparison of the return to the total cost of the major crops among marginal, small and large farmers in the study area

5.5.7 Return to family labour, land and management per day

The comparison analysis of return to family labour, land and management/day of the major crops in the study area has been displayed in Fig 5.7. The average return to family labour, land and management/day is highest for potato production (₹1904/ha) and lowest for urad (maskalai) production (₹129/ha). Individually, the return from potato for marginal farmers is ₹1914/ha; for small farmers is ₹1885/ha and for large farmers, it is ₹1914/ha. On the other hand, for urad (maskalai) the return to family labour, land and management/day is ₹144/ha, ₹135/ha and ₹109/ha for marginal, small and large farmers respectively.

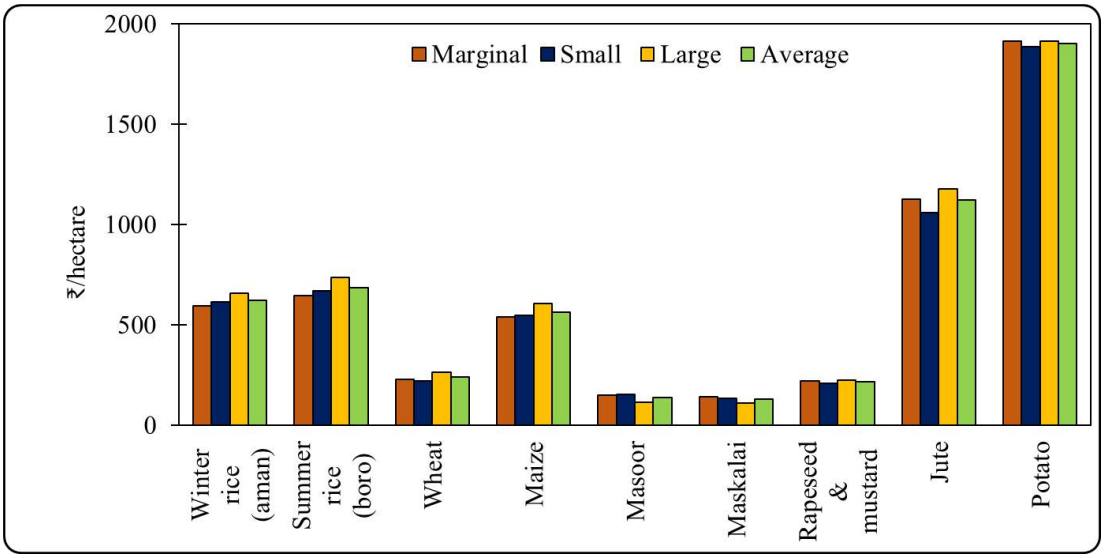

Fig. 5.7 Comparison of the return to the family labour, land and management per day of the major crops among marginal, small and large farmers in the study area

5.6 Conclusions

In this study, the cost-benefit analysis has been performed based on nine major crops in Maldah district of West Bengal. The three farmers group i.e., marginal, small and large farmers are also considered for this analysis. The outcomes revealed that among the nine major crops, potato is the most profitable crop due to achieving the highest gross and net profit in every farmer's group. On the other hand, lentil (masoor) and urad (maskalai) have the lowest gross and net profit among the marginal, small and large farmers. The average return to the total cost of different crops in the study area shows maize production has the highest return, while urad (maskalai) has the lowest. However, this study area needs significant assistance in terms of inputs, technical assistance, and commodity marketing. Parallelly, to preserve labour employment, effective precautions should be taken. For this reason, few agro-based industries like sugar mills, potato chips factory, baby food industries based on wheat and maize may be established.

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