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Comparative economics of soybean cultivation among FPO member and non-member farmers in Latur district of Maharashtra

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ABSTRACT

The present study was undertaken to examine the cost and returns of soybean cultivation among Farmer Producer Organization (FPO) member and non-member farmers in Latur district of Maharashtra. A multi-stage sampling procedure was followed, and a total of 120 farmers comprising 60 FPO member and 60 non-member farmers were selected for the study. Primary data were collected during 2024-25 through personal interviews using a pre-tested structured interview schedule. The results revealed that FPO member farmers obtained a higher average soybean yield of 24.36 quintals per hectare, compared with 22.56 quintals per hectare among non-member farmers. The gross returns from soybean cultivation were ₹1,30,998.61 per hectare for member farmers, whereas non-member farmers obtained ₹1,07,954.88 per hectare. Member farmers incurred comparatively lower costs, with $Cost\ C_2$ of ₹84,707.79 per hectare, compared with ₹88,993.35 per hectare among non-members. The net income was substantially higher among member farmers (₹46,290.82/ha) than non-member farmers (₹18,961.53/ha). Similarly, farm business income and family labour income were ₹76,146.10 and ₹52,512.61 per hectare, respectively, among members, compared with ₹44,218.47 and ₹26,225.99 per hectare among non-members. The output-input ratio was 1.55 for member farmers compared with 1.21 for non-member farmers, while the per quintal cost of production was lower among members (₹3,427.90) than non-members (₹3,892.84). Overall, FPO member farmers demonstrated comparatively higher productivity, lower cost of production and better profitability than non-member farmers. The findings indicate that collective participation through FPOs may contribute to improved resource-use efficiency, cost management and economic performance in soybean cultivation.

Keywords: Soybean, Farmer Producer Organization, FPO members, Non-member farmers, Cost of cultivation, Net returns, Profitability, Output-input ratio

Introduction

Agriculture plays an important role in the Indian economy by providing employment, income and livelihood to a large section of the rural population. A large proportion of Indian farmers are small and marginal farmers who face difficulties in purchasing inputs, adopting improved technologies, accessing markets and obtaining remunerative prices. Limited production and marketable surplus often reduce their bargaining power and increase their dependence on intermediaries. Collective action through Farmer Producer Organisations (FPOs) can help farmers overcome some of these constraints by facilitating collective input purchase, aggregation, marketing, processing, value addition and better market linkages.

Among the important oilseed crops, soybean (*Glycine max* L.) occupies a significant place in Indian agriculture. It is an important source of edible oil and protein and is widely cultivated as a commercial crop. Soybean cultivation requires the use of various resources such as human labour, machinery, seed, fertilizers, manure and plant protection inputs. The profitability of soybean cultivation therefore depends on efficient resource utilization, proper management of cultivation costs, productivity and the price received by farmers. Maharashtra is one of the important soybean-growing states of India, and soybean has become a major crop in the Marathwada region. Latur district is an important agricultural district of Marathwada where soybean forms an important part of the cropping pattern. The economic performance of soybean farmers depends on production conditions, input use, cost of cultivation, productivity and market price. Therefore, estimation of the cost of cultivation and returns is important for assessing the profitability and economic viability of soybean production in the district.

The cost of soybean cultivation includes expenditure on hired and family labour, bullock and machine labour, seed, manure, fertilizers, herbicides, plant protection chemicals and other farm expenses. Efficient utilization of these resources is essential for reducing the cost of production and improving farm income. Similarly, gross returns, farm business income, family labour income, net returns and output-input ratio are important indicators for evaluating the economic performance of soybean cultivation. The comparison of

costs and returns helps in understanding the profitability of the crop and identifying opportunities for improving farm efficiency.

In recent years, Farmer Producer Organisations have emerged as an important institutional mechanism for strengthening farmers' economic position. FPOs enable farmers to collectively purchase inputs, obtain technical guidance, aggregate produce and undertake marketing and value addition. Collective marketing can improve bargaining power, reduce dependence on intermediaries and provide better market opportunities. The Government of India has also promoted FPOs through various programmes, particularly the Central Sector Scheme for Formation and Promotion of 10,000 FPOs.

The economic performance of soybean cultivation may differ between FPO member and non-member farmers because of differences in access to inputs, technical information, collective services and markets. FPO member farmers may benefit from collective procurement, extension support, aggregation and improved marketing linkages, whereas non-member farmers generally undertake these activities individually. Hence, comparison between FPO member and non-member farmers is useful for examining differences in resource use, cultivation costs, returns and profitability.

Marketing is another important component of soybean economics. Farmers incur expenses on transportation, loading, unloading and other marketing activities, while the marketing channel determines the share received by producers and the costs and margins involved in the movement of produce. Collective marketing through FPOs may provide better opportunities for aggregation and direct market linkages. Therefore, analysis of marketing along with production costs and returns provides a broader understanding of the economic performance of soybean farmers.

In view of the importance of soybean in the agricultural economy of Latur district and the growing role of FPOs in improving farmers' access to inputs and markets, the present study was undertaken to examine the cost and returns of soybean cultivation among FPO member and non-member farmers in Latur district of Maharashtra. The study focuses on the socio-economic characteristics, resource use, cost of cultivation, returns, profitability and marketing performance of selected farmers. The findings are expected to be useful to farmers, FPOs, agricultural agencies, researchers and policymakers for improving resource-use efficiency, reducing cultivation costs, strengthening collective marketing and enhancing farm profitability.

Objectives

- To estimate the cost of cultivation and returns of soybean among FPO Member and Non-Member Farmers.

Cost B₂: Cost B₂ includes Cost B₁ together with the rental value of owned land and rent paid for leased-in land.

$$\text{Cost B}_2 = \text{Cost B}_1 + \text{Rental Value of Owned Land} + \text{Rent Paid for Leased-in Land}$$

Cost C₁: Cost C₁ is obtained by adding the imputed value of family labour to Cost B₁.

$$\text{Cost C}_1 = \text{Cost B}_1 + \text{Imputed Value of Family Labour}$$

Cost C₂: Cost C₂ is obtained by adding the imputed value of family labour to Cost B₂.

$$\text{Cost C}_2 = \text{Cost B}_2 + \text{Imputed Value of Family Labour}$$

Cost C₃: Cost C₃ accounts for the managerial function performed by the farmer and is calculated by adding 10 per cent of Cost C₂.

Materials and Methods

The study was conducted in Latur district of the Marathwada region of Maharashtra, which is predominantly an agricultural district with favourable conditions for diversified crop production, including soybean. The district is characterized mainly by black soils and soybean is an important Kharif crop cultivated by farmers in the region. Soybean provides an important source of farm income and employment to farming households. The availability of suitable soil conditions, agricultural resources and established marketing facilities makes Latur an appropriate location for analysing the cost and returns of soybean cultivation among FPO member and non-member farmers. A multistage sampling procedure was followed for the selection of soybean growers for the present study in Latur district of Maharashtra. Latur district was purposively selected considering the importance of soybean cultivation and the presence of Farmer Producer Organisations (FPOs) undertaking soybean-related activities. FPOs which had completed five years were considered eligible for selection. From the eligible FPOs, the required FPOs were selected randomly. Since soybean was an important crop undertaken by the selected FPOs, soybean cultivation was selected for the present study. Subsequently, 60 FPO member farmers and 60 non-member farmers were selected randomly from the same study area to maintain comparable production and climatic conditions. Thus, a total sample of 120 soybean farmers, comprising 60 FPO members and 60 non-members, was selected for the study.

Estimation of cost and returns

The cost and return structure of Soybean cultivation was analysed using the cost concepts recommended by the **Commission for Agricultural Costs and Prices (CACP)**. Both actual and imputed costs were considered to obtain a comprehensive assessment of the economics and profitability of Soybean cultivation. The analysis was carried out on a per-hectare basis.

Cost concepts

The following cost concepts were used for estimating the cost of Soybean cultivation:

Cost A₁:

Cost A₁ comprises the actual paid-out expenses incurred by the farmer in cash and kind for Soybean cultivation. It includes expenditure on hired human labour, bullock and machine labour, seed, farmyard manure, fertilizers, plant protection chemicals, land revenue, depreciation on farm assets and interest on working capital.

Cost A₂: Cost A₂ is obtained by adding the rent paid for leased-in land to Cost A₁.

Cost A₂ = Cost A₁ + Rent Paid for Leased-in Land

Cost B₁: Cost B₁ includes Cost A₁ along with interest on owned fixed capital, excluding the value of owned land.

$$\text{Cost B}_1 = \text{Cost A}_1 + \text{Interest on Owned Fixed Capital}$$

$$\text{Cost C3} = \text{Cost C2} + 10\% \text{ of Cost C2}$$

The above cost concepts were used to determine the complete cost structure of Soybean cultivation, from paid-out expenses to the imputed value of family resources and managerial functions.

$$\text{Gross Returns (₹/ha)} = \text{Quantity of Output (q/ha)} \times \text{Price Received (₹/q)}$$

Gross returns indicate the total income generated from Soybean cultivation before deducting the cost of production.

$$\text{Net Returns (₹/ha)} = \text{Gross Returns} - \text{Total Cost of Cultivation}$$

Net returns were used as an important indicator of the profitability of Soybean cultivation.

$$\text{Farm Business Income (₹/ha)} = \text{Gross Returns} - \text{Cost A1 (or A2)}$$

It reflects the return to land, owned capital, family labour and management after meeting the paid-out expenses.

$$\text{Family Labour Income (₹/ha)} = \text{Gross Returns} - \text{Cost B2}$$

This measure indicates the return accruing to family labour and farm management.

$$\text{BC Ratio} = \text{Gross Returns} / \text{Total Cost of Cultivation}$$

A BC ratio greater than 1.00 indicates that the gross returns obtained from Soybean cultivation are higher than the total cost incurred, indicating economic profitability.

Assessment of economic viability

The different cost concepts, returns measures and profitability indicators were used collectively to assess the economic viability and profitability of Soybean cultivation among the selected Soybean growers in Latur district of Maharashtra.

Results and Discussion

Input use pattern of soybean cultivators for member and non-member farmers (/ha)

Soybean is a relatively short-duration Kharif crop, generally requiring around 3 to 4 months for completion of its production cycle. It requires the timely use of human labour, machinery, seed, fertilizers, herbicides and other production inputs. Consequently, the expenditure on these inputs constitutes an important component of the total cost of

Returns from soybean cultivation

The economic returns from Soybean cultivation were estimated using the following measures:

1) Gross Returns: Gross returns represent the total monetary value of Soybean production obtained per hectare.

2) Net Returns: Net returns represent the surplus obtained after deducting the total cost of cultivation from gross returns.

Income measures

1) Farm Business Income: Farm business income represents the return available to the farmer after meeting the paid-out costs of cultivation.

2) Family Labour Income: Family labour income represents the return remaining after accounting for Cost B₂.

Profitability measure

1) Benefit-Cost Ratio (BC Ratio): The benefit-cost ratio was used to assess the economic efficiency and profitability of Soybean cultivation. It was calculated as:

soybean cultivation. Throughout the production process, physical inputs are converted into the final soybean output. Since the level of output and profitability depends considerably on the quantity and efficiency of resources used, proper management of inputs is essential. Therefore, it is important that these inputs are utilized optimally, avoiding both excessive use that increases cultivation costs and inadequate use that may adversely affect productivity and returns.

Table 1 presents the per hectare physical quantity of various inputs utilized by soybean cultivators, along with the output obtained by FPO member and non-member farmers. Regarding labour and machinery, soybean cultivation required 10.70 male and 18.33 female man-days of hired labour per hectare among member farmers, compared with 11.09 male and 20.09 female man-days among non-member farmers. Family labour utilization was 7.14 male and 8.17 female man-days for members, whereas it was 8.18 and 9.04 man-days, respectively, among non-members. The average machine labour used was 12.18 hours per hectare for members and 13.21 hours for non-members, while seed requirement was 69.62 and 73.85 kg per hectare, respectively.

Table 1. Per hectare physical inputs and output of Soybean for Member and Non-Member Farmers

Sr. No	Particulars	Physical input	Member	Non- Member
1	Hired Human Labour	man days	10.7	11.09
	Male			
	Female	man days	18.33	20.09
2	Bullock labour	Pair days	3.18	3.54
3	Machine labour	hours	12.18	13.21
4	Seed	kg	69.62	73.85
5	Manure	T	4.85	6.12
6	Fertilizers N	kg	25	28.78
	P	kg	59.14	66.04
	K	kg	30.04	32.7
7	Herbicides	Lit	2.2	2.4
8	Plant Protection	Lit	0.85	0.97
9	Family Human Labour	man days	7.14	8.18
	Male			
	Female	man days	8.17	9.04
	Output			
10	Main Produce	q.	24.36	22.56
11	By Produce	q.	3.45	3.32

Note: All cost calculations are presented as per hectare basis

In terms of other inputs, member farmers used 4.85 tonnes of manure, 25.00 kg nitrogen, 59.14 kg phosphorus and 30.04 kg potassium per hectare, compared with 6.12 tonnes, 28.78 kg, 66.04 kg and 32.70 kg, respectively, among non-members. Herbicide and plant protection chemical use was also comparatively lower among members. The main produce obtained was 24.36 q/ha for member farmers compared

with 22.56 q/ha for non-member farmers, while by-produce was 3.45 and 3.32 q/ha, respectively.

Per hector cost of cultivation of member farmers

The cost of cultivation encompasses all direct and indirect expenses such as labour, seed, fertilizers, and machinery required to grow a crop. It is essential for calculating profitability, optimizing resources, and guiding agricultural policies.

Table 2. Cost of Cultivation of Soybean among member farmers

Sr. No.	Item	Unit	Quantity	Rate	Total Cost
1	Hired Human Labour (Male)	Days	10.7	516.67	5,528.37
	Hired Human Labour (Female)	Days	18.33	310	5,682.30
2	Bullock Labour	Pair Days	3.18	708.33	2,252.49
3	Machinery Charges	Hrs	12.18	1191.67	14,514.54
4	Seed	Kg	69.62	110.85	7,717.38
5	Manure	T	4.85	500	2,425.00
6	Fertilizer(N)	kg	25	14.3	357.50
	(P)	Kg	59.14	61.88	3,659.58
	(K)	Kg	30.04	30.68	921.63
7	Herbicides	ml	2200	1.3	2,860.00
8	Miscellaneous Charges	Rs.			228.16
9	Plant protection	ml	850	2.75	2,337.50
10	Total Working Cost (Σ 1 to 9)	Rs.			48,484.45
11	Land Revenue	Rs.			121.5
12	Depreciation On Implements	Rs.			3337.5
13	Interest on Working Capital@ 6%	Rs.			2,909.07
14	Cost A₁ (Σ 11 to 13)	Rs.			54,852.51
15	Cost A₂	Rs.			54,852.51
16	Interest on fixed capital 10%	Rs.			1800.45
17	Cost B₁	Rs.			56,652.96
18	Rental value of land	Rs.			21,833.10
19	Cost B₂	Rs.			78,486.06
20	Family Labour (Male)	Days	7.14	516.67	3,689.02
	Family labour (Female)	Days	8.17	310	2,532.70
21	Cost C₁	Rs.			62,874.69

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Sr. No.	Item	Unit	Quantity	Rate	Total Cost
22	Cost C₂	Rs.			84,707.79
23	10% Management	Rs.			8,470.78
24	Cost C₃	Rs.			93,178.57
	Main Product	Qtl	24.36	5328	1,29,794.56
	By Product	Qtl	3.45	349	1,204.05
	Gross Income	Rs.			1,30,998.61
	B:C Ratio				1.55
	Net Income	Rs.			46,290.82

Note: All cost calculations are presented as per hectare basis

Table 2 reveals the per hectare cost of cultivation, yield, and income of soybean farmers. The total cost of cultivation (*Cost C₃*) was calculated at Rs 93,178.57 per hectare. The analysis shows that soybean cultivation involves considerable expenditure on operational inputs. Among the working expenses, machinery charges (Rs 14,514.54) and hired human labour (Rs 11,210.67) were the major cost contributors, followed by seed (Rs 7,717.38). The total working cost was estimated at Rs 48,484.45 per hectare. Additionally, the rental value of owned land accounted for a substantial fixed cost of Rs 21,833.10.

Looking at the standard cost concepts, the direct paid-out costs (*Cost A₁/A₂*) stood at Rs 54,852.51 per hectare. The cost increased to *Cost B₂* (Rs 78,486.06) after incorporating the rental value of owned land. Further, after including the imputed value of family labour, comprising Rs 3,689.02 for male labour and Rs 2,532.70 for female labour, the cost reached *Cost C₂* of Rs 84,707.79 per hectare. After adding 10 per cent management charges, the final *Cost C₃* was estimated at Rs 93,178.57 per hectare.

In terms of returns, soybean cultivation generated an average main produce yield of 24.36 quintals per hectare, resulting in a gross income of Rs 1,30,998.61 per hectare, including Rs 1,29,794.56 from the main product and Rs 1,204.05 from the by-product. After deduct-

ing the total cost of cultivation (*Cost C₃*), farmers obtained a net income of Rs 46,290.82 per hectare. Consequently, the Benefit-Cost (B:C) ratio was 1.55, indicating that for every rupee invested in soybean cultivation, farmers received Rs 1.55, demonstrating the economic viability and profitability of soybean cultivation in the study area.

Per hectare cost of cultivation of non-member farmers

The cost of cultivation encompasses all direct and indirect expenses such as labour, seed, fertilizers, and machinery required to grow a crop. It is essential for calculating profitability, optimizing resources, and guiding agricultural policies.

Table 3 reveals the per hectare cost of cultivation, yield, and income of soybean non-member farmers. The total cost of cultivation (*Cost C₃*) was calculated at Rs 97,892.69 per hectare. The analysis shows that soybean cultivation involves considerable expenditure on operational inputs. Among the working expenses, machinery charges (Rs 16,303.39) and hired human labour (Rs 12,375.25) were the major cost contributors, followed by seed (Rs 9,157.40) and fertilizer. The total working cost was estimated at Rs 55,327.56 per hectare. Additionally, the rental value of owned land accounted for a fixed cost of Rs 17,992.48.

Table 3. Cost of Cultivation of Soybean among Non-member farmers

Sr. No.	Item	Unit	Quantity	Rate	Total Cost
1	Hired Human Labour (Male)	Days	11.09	531.67	5,896.22
	Hired Human Labour (Female)	Days	20.09	322.5	6,479.03
2	Bullock Labour	Pair Days	3.54	727.5	2,575.35
3	Machinery Charges	Hrs	13.21	1234.17	16,303.39
4	Seed	Kg	73.85	124	9,157.40
5	Manure	T	6.12	500	3,060.00
6	Fertilizer(N)	kg	28.75	14.3	411.13
	(P)	Kg	66.04	62.73	4,142.69
	(K)	Kg	32.7	30	981.00
7	Herbicides	ml	2400	1.3	3,120.00
8	Miscellaneous Charges	Rs.			242.86
9	Plant protection	ml	970	3.05	2,958.50
10	Total Working Cost (Σ 1 to 9)	Rs.			55,327.56
11	Land Revenue	Rs.			135.24
12	Depreciation On Implements	Rs.			3053.7
13	Interest on Working Capital@ 6%	Rs.			3,319.65
14	Cost A₁ (Σ 11 to 13)	Rs.			61,836.15
15	Cost A₂	Rs.			61,836.15
16	Interest on fixed capital 10%	Rs.			1900.26
17	Cost B₁	Rs.			63,736.41
18	Rental value of land	Rs.			17,992.48
19	Cost B₂	Rs.			81,728.89
20	Family Labour (Male)	Days	8.18	531.67	4,349.06
	Family labour (Female)	Days	9.04	322.5	2,915.40

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Sr. No.	Item	Unit	Quantity	Rate	Total Cost
21	Cost C₁	Rs.			71,000.87
22	Cost C₂	Rs.			88,993.35
23	10% Management	Rs.			8,899.34
24	Cost C₃	Rs.			97,892.69
	Main Product	Qtl	22.56	4733.33	1,06,783.92
	By Product	Qtl	3.32	352.7	1,170.96
	Gross Income	Rs.			1,07,954.89
	B:C Ratio				1.21
	Net Income	Rs.			18,961.54

Note: All cost calculations are presented as per hectare basis

Looking at the standard cost concepts, the direct paid-out costs (*Cost A₁/A₂*) stood at Rs 61,836.15 per hectare. The cost increased to *Cost B₂* (Rs 81,728.89) after incorporating the rental value of owned land. Further, after including the imputed value of family labour, comprising Rs 4,349.06 for male labour and Rs 2,915.40 for female labour, the cost reached *Cost C₂* of Rs 88,993.35 per hectare. After adding 10 per cent management charges, the final *Cost C₃* was estimated at Rs 97,892.69 per hectare.

In terms of returns, soybean cultivation by non-member farmers generated an average main produce yield of 22.56 quintals per hectare, resulting in a gross income of Rs 1,07,954.89 per hectare, including Rs 1,06,783.92 from the main product and Rs 1,170.96 from the by-product. After deducting the total cost of cultivation (*Cost C₃*), farmers obtained a net income of Rs 18,961.54 per hectare. Consequently, the Benefit-Cost (B:C) ratio was 1.21, indicating that for every rupee invested in soybean cultivation, non-member farmers received Rs 1.21, demonstrating the profitability of soybean cultivation among non-member farmers in the study area.

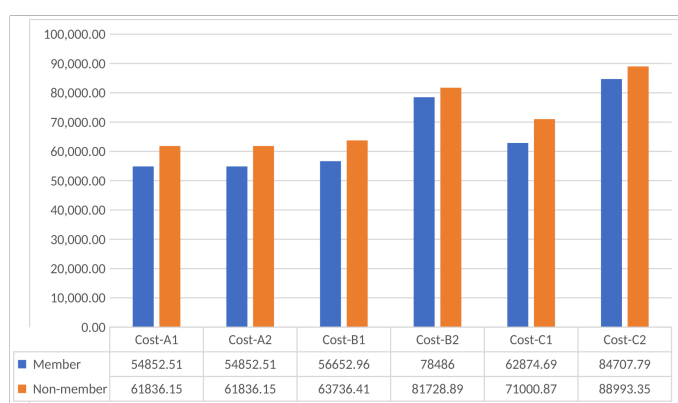


Figure. Fig. Per hectare Cost of Cultivation of Member and Non-Member farmers

Comparative analysis of cost and returns between member and non-member farmers

The cost of Soybean cultivation was estimated to assess the expenditure incurred by farmers in the production process. The total cost was classified into different cost concepts based on the nature and components of expenditure incurred per hectare. These cost concepts provide a systematic basis for analysing the cost structure and profitability of soybean cultivation. The major cost concepts considered were *Cost A₁*, *Cost A₂*, *Cost B* and *Cost C*, which include various paid-out expenses, rental value of owned land, interest on fixed capital and the imputed value of family labour.

Table 4 presents the per hectare cost concepts and profitability of Soybean cultivation among FPO member and non-member farmers. The gross returns obtained by FPO member farmers were Rs. 1,30,998.61 per hectare, compared with Rs. 1,07,954.88 for non-member farmers. The paid-out cost (*Cost-A₁*) was Rs. 54,852.51 for members and Rs. 61,836.15 for non-members, indicating lower expenditure among member farmers. *Cost-A₂*, including the applicable land-related component, was Rs. 54,852.51 for members and Rs. 61,836.15 for non-members. After incorporating interest on fixed capital, *Cost-B₁* amounted to Rs. 56,652.96 for members and Rs. 63,736.41 for non-members, while *Cost-B₂* was Rs. 78,486.00 and Rs. 81,728.89, respectively.

Table 4. Comparative cost and returns between Member and Non-member farmers

Sr. No	Particulars	Member	Non - member
1	Returns from main produce	1,29,794.56	1,06,783.92
2	Returns from by-produce	1,204.05	1,170.96
3	Gross returns	1,30,998.61	1,07,954.88
4	<i>Cost-A₁</i>	54,852.51	61,836.15
5	<i>Cost-A₂</i>	54,852.51	61,836.15
6	<i>Cost-B₁</i>	56,652.96	63,736.41
7	<i>Cost-B₂</i>	78,486.00	81,728.89
8	<i>Cost-C₁</i>	62,874.69	71,000.87
9	<i>Cost-C₂</i>	84,707.79	88,993.35
10	<i>Cost-C₃</i>	93,178.57	97,892.69
11	Farm Business Income (Gross returns minus <i>Cost-A₂</i>)	76,146.10	44,218.47

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Sr. No	Particulars	Member	Non - member
12	Family Labour Income (Gross returns minus $Cost-B_2$)	52,512.61	26,225.99
13	Net Income (Gross returns minus $Cost-C_2$)	46,290.82	18,961.53
14	Output-Input ratio (Gross returns divided by $Cost-C_2$)	1.55	1.21
15	Per quintal cost of production Cost C ($Cost-C_2$ minus value of by-produce & dividing by quantity of main produce)	3427.903941	3892.83644

Further, $Cost-C_1$ was estimated at Rs. 62,874.69 per hectare for member farmers and Rs. 71,000.87 for non-member farmers. $Cost-C_2$, which included the imputed value of family labour, stood at Rs. 84,707.79 for members compared with Rs. 88,993.35 for non-members. The total cost of cultivation ($Cost-C_3$), including management cost, was Rs. 93,178.57 per hectare for members and Rs. 97,892.69 for non-members. Thus, the overall cost of cultivation was lower for FPO member farmers than for non-member farmers.

In terms of profitability, FPO member farmers recorded a farm business income of Rs. 76,146.10 per hectare, compared with Rs. 44,218.47 for non-members. Family labour income was Rs. 52,512.61 for members and Rs. 26,225.99 for non-members, while net income was Rs. 46,290.82 and Rs. 18,961.53 per hectare, respectively. The output-input ratio was 1.55 for member farmers compared with 1.21 for non-member farmers, indicating comparatively higher returns relative to the cost incurred by member farmers. The per quintal cost of production was also lower among FPO members (Rs. 3,427.90) than among non-members (Rs. 3,892.84). Overall, the results indicate that FPO member farmers incurred lower cultivation costs and obtained higher gross and net returns than non-member farmers.

Conclusion

The analysis of input use, cost structure and profitability of soybean cultivation revealed that soybean is an important and economically viable crop in the study area. FPO member farmers used comparatively lower quantities of labour, machinery, seed, fertilizers and plant protection inputs than non-member farmers, while obtaining a higher main produce yield of 24.36 quintals per hectare compared with 22.56 quintals among non-members. This indicates comparatively efficient resource utilization among member farmers.

The profitability analysis showed that FPO member farmers incurred a lower total cost of cultivation ($Cost C_3$) of Rs. 93,178.57 per hectare compared with Rs. 97,892.69 for non-member farmers. Member farmers generated gross returns of Rs. 1,30,998.61 per hectare and net income of Rs. 46,290.82, whereas non-member farmers obtained gross returns of Rs. 1,07,954.88 and net income of Rs. 18,961.53. The farm business income and family labour income were also higher among members at Rs. 76,146.10 and Rs. 52,512.61 per hectare, re-

spectively, compared with Rs. 44,218.47 and Rs. 26,225.99 among non-members.

The returns analysis further showed that the output-input ratio was 1.55 for FPO members compared with 1.21 for non-members, while the per quintal cost of production was lower among members at Rs. 3,427.90 compared with Rs. 3,892.84 among non-members. Overall, FPO member farmers demonstrated higher productivity, lower cultivation costs and better profitability than non-member farmers. The findings suggest that collective participation through FPOs may contribute to improved resource-use efficiency, cost management and economic performance in soybean cultivation.

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