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Impact of credit on productivity of soybean in Akola district of Maharashtra

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Abstract

The present study has attempted to assess the impact of the agricultural credit on productivity of soybean crop Akola district of Maharashtra. Primary data was collected with the help of pre-structured interview schedules. The study found that the socio-economic characteristics of the farmers contribute majorly for the decision to borrow credit from different lending agencies available. The findings also revealed that most of the farmers borrowed the credit from the formal institutions. The results of the study showed that the productivity as well as cost of cultivation of non-beneficiaries were less compared to the beneficiaries. Hence it was confirmed from the study, that there was positive impact of the agricultural credit on the soybean production.

Keywords: Agricultural credit, socio-economic characteristics, sources of credit, productivity

Introduction

Agriculture in India, since independence, is considered as the backbone of Indian economy and farming community is its spinal cord. The agriculture sector has experienced buoyant growth in the past two years despite of the Coronavirus (COVID-19) pandemic. Agricultural development requires timely and adequate supplies of essential farm inputs. But investment capacity of majority of Indian farmers is quite low as they are poor and they cannot afford to meet increasing demand for the purchase of improved seeds, recommended dose of fertilizer, hiring costly farm machinery etc. So, lack of finance and its accessibility are one of the main reasons for low productivity of Indian agriculture. The existence of imperfection in the capital market in rural areas of developing countries has been a major feature which has engaged the attention of a number of scholars.

Maharashtra ranks second in India in terms of organic farm production (22% share) after Madhya Pradesh. During 2020-21, the export of organic farm production from the State was 1.26 lakh MT (Economic Survey of Maharashtra 2022-23). Financial assistance is provided to farmers by way of short-term loans, credit, etc. by the Maharashtra government through various banks and co-operative agencies. The National Bank for Agriculture and Rural Development (NABARD), the apex bank for agricultural

and rural development in India, provides agricultural short term & medium-term loans through Maharashtra State Co-operative Bank (MSCB) & District Central Co-operative Banks (DCCB), Regional Rural Banks (RRB) and Commercial Banks (CB). Several measures like establishment of Lead Bank Scheme, direct lending for the priority sectors, banking sector's linkage with the government-sponsored programmes targeted at the poor. Differential Rate of Interest Scheme, the Service Area Approach, the SHG-Bank linkage programme, Special Agricultural Credit Plans, and Rural Infrastructure Development Fund (RIDF), financial inclusion schemes were introduced to enhance the flow of credit to the rural sector. These initiatives have had a positive impact on the flow of rural credit. However, the inadequacy of rural credit especially to agriculture continues to remain a big challenge. The persistence of money lenders in the rural credit market is also often fiercely debated in the policy discourses in India. Still the Indian farmers are facing the financial issues and even sometimes committing suicides at a younger age. So, there is a major concern to study the individual borrower farmers about the reasons for borrowing, various sources of credit available to the farmers and impact of the credit on productivity. Akola district is situated in the middle east of Maharashtra state.

Akola district is situated between North 20.17 to 21.16 latitude and East 76.7 to 77.4 longitude. The economy of the district is mainly based on agriculture. Cotton, Soybean and Sorghum are the predominant crops grown in the district. Hence, the present study was conducted in Akola district to fulfil the objectives mentioned below.

Objectives of the study

1. To study the socio-economic characteristics of beneficiaries and non-beneficiaries of Akola district.
2. To study the sources of credit available to the farmers of Akola district.
3. To assess the impact of credit on productivity of Soybean crop.

Materials and Methods

Akola district was purposively selected for the present study based on the number of banks availability and total agricultural loan flows and the tehsils, villages and farmers were selected randomly. Two tehsils were selected from each district and from each of the selected tehsil two villages were randomly selected on the basis of population having minimum 100 farmers. The farmers from the village were categorized into beneficiaries and non-beneficiaries. From each of the selected villages ten farmers were selected randomly from each category according to access to credit, such as beneficiaries and non-beneficiaries of credit. Hence, twenty beneficiaries and twenty non-beneficiaries of credit. Thus, in all forty beneficiaries and forty non-beneficiaries were selected from two tehsils. Totally 80 sample units were selected from two tehsils and primary data were collected through personal interview method with the help of the pre-structured interview schedule.

Descriptive statistics, cost concepts and farm budgeting were the analytical techniques used in achieving the objectives of the present study.

Descriptive statistics

Tabular analysis with the frequency distribution and percentages were used to achieve the objectives.

Cost concepts

The impact of credit on productivity was assessed with the comparative analysis of cost and returns based on cost concepts of soybean crop in the study area. Cost and returns were calculated to compare the net returns between the beneficiaries and non-beneficiaries. The cost concepts and the items included under each concept were mentioned below.

Cost A₁:- Hired human labour, hired bullock labour, owned bullock labour, owned machinery labour, hired machinery charges, seed, insecticides and pesticides, manure, fertilizer, depreciation, irrigation charges, land revenue, cesses and other taxes, interest on working capital, miscellaneous expenses.

Cost A₁: Cost A₁ + rent paid for leased in land.

Cost B₁: Cost A₁ + interest on value of owned fixed capital assets (excluding land).

Cost B₂: Cost B₁ + rental value of owned land (net of land revenue) and rent paid for leased-in land.

Cost C₁: Cost B₁ + imputed value of family labour.

Cost C₂: Cost B₂ + imputed value of family labour.

Cost C₃: Cost C₂ + value of management input at 10 percent of total cost of C₂.

Output- Input ratio: Gross income ÷ Respective cost.

Results and Discussion

Socio-economic characteristics of beneficiary and non-beneficiary farmers

The socio-economic characteristics of the beneficiaries and non-beneficiaries considered in the present study area are age, educational status and average size of family.

Table 1: Distribution of selected beneficiary and non-beneficiary farmers according to age group (N=80)

Sr. No.	Particulars	Credit categories				Overall
		Beneficiaries		Non-Beneficiaries		
		Small	Medium	Small	Medium	
I		Age				
1	Younger age (20-35 yrs)	5 (25.00)	4 (20.00)	4 (20.00)	4 (20.00)	17 (21.25)
2	Middle age (36-50 yrs)	13 (65.00)	14 (70.00)	15 (75.00)	14 (70.00)	56 (70.00)
3	Old age (> 50 yrs)	2 (10.00)	2 (10.00)	1 (5.00)	2 (10.00)	7 (8.75)
4	Total	20 (100.00)	20 (100.00)	20 (100.00)	20 (100.00)	80 (100.00)
II		Educational status				
1	Illiterate	2 (10.00)	1 (5.00)	2 (10.00)	1 (5.00)	6 (7.50)
2	Primary school	4 (20.00)	2 (10.00)	5 (25.00)	4 (20.00)	15 (18.75)
3	Middle school	6 (30.00)	7 (35.00)	7 (35.00)	4 (20.00)	24 (30.00)
4	High school	5 (25.00)	3 (15.00)	3 (15.00)	4 (20.00)	14 (17.50)
5	Higher secondary school	2 (10.00)	3 (15.00)	3 (15.00)	4 (20.00)	12 (15.00)
6	College and above	1 (5.00)	4 (20.00)	1 (5.00)	3 (15.00)	9 (11.25)
	Total	20 (100.00)	20 (100.00)	20 (100.00)	20 (100.00)	80 (100.00)
III		Average size of family				
1	Small Family (Up to 4)	10 (50.00)	14 (70.00)	12 (60.00)	11 (55.00)	45 (56.25)
2	Medium Family (5-8)	9 (45.00)	6 (30.00)	8 (40.00)	8 (40.00)	33 (41.25)
3	Large Family (> 8)	1 (5.00)	0 (0.00)	0 (0.00)	1 (5.00)	2 (2.50)
	Total	20 (100.00)	20 (100.00)	20 (100.00)	20 (100.00)	80 (100.00)

(Figures in parentheses indicate percentage to the total)

The findings from this study revealed that the beneficiaries of small and medium size group had middle age category of 65.00 percent and 70.00 percent while 25.00 percent beneficiaries of small group and 20.00 percent beneficiaries of medium group had younger age and 10.00 percent beneficiaries of small group and 10.00 percent beneficiaries of medium size group had old age category. The non-beneficiaries of small and medium group had 75.00 percent and 70.00 percent of middle age category. The non-beneficiaries of small and medium group had 20.00 percent and 20.00 percent of younger age category while 5.00 percent and 10.00 percent of non-beneficiaries of small and medium group of old age category. At overall, it is revealed that 70.00 percent selected farmers from Akola district had middle age category while 21.25 percent belonged to younger age and only 8.75 percent to old age. Age plays a vital role in production and livelihood status of the farmers. This indicates that more than half of the beneficiaries and non-beneficiaries belonged to middle age category which make them to take flexible decision about obtaining the credit and the ability to work more to repay it.

The results of this study showed that the educational status of beneficiaries of small and medium size group in Akola district was found highest in middle school with 30.00 percent and 35.00 percent, followed by high school with 25.00 percent beneficiaries of small and 15.00 percent beneficiaries of medium size group. The educational status at higher secondary school level for beneficiaries of small group was 10.00 percent and 15.00 percent beneficiaries of medium group. It was observed that the educational status for college and above was found with 5.00 percent beneficiaries of small group and 20.00 percent beneficiaries of medium group while the least was found in illiterate level with 10.00 percent beneficiaries of small and 5.00 percent beneficiaries of medium group.

The educational status in Akola district for non-beneficiaries of small and medium size group was found highest in middle school level with 35.00 percent and 20.00 percent, followed by high school level with 15.00 percent non-beneficiaries of small group and 20.00 percent non-beneficiaries of medium group, higher secondary school level with 15.00 percent non-beneficiaries of small and 20.00 percent non-beneficiaries of medium group, while college and above level with 5.00 percent non-beneficiaries of small group and 15.00 percent non-beneficiaries of medium and the least in illiterate level with 10.00 percent non-beneficiaries of small and 5.00 percent non-beneficiaries of medium group.

At overall, the educational status for middle school level was found highest with 30.00 percent selected farmers followed by primary school level with 18.75 percent farmers, high school level with 17.50 percent farmers, higher secondary school level with 15.00 percent farmers, college and above level with 11.25 percent farmers and illiterate level with 7.50 percent farmers. This implies that the beneficiaries and non-beneficiaries in the study area had educated. This indicates that the educated heads of the families play an important role in borrowing of credit from the available sources. The level of understanding the loan procedure to access the institutional credit facilities was found as low since most of the farmers have completed their middle school and the high chances of cheating by taking

credit from the non-institutional sources.

The findings from table 1 revealed that, in Akola district beneficiaries of small and medium group had 50.00 percent and 70.00 percent of small family size respectively, 45.00 percent beneficiaries of small and 30.00 percent of medium group had medium family size while 5.00 percent beneficiaries of small group had large family size. It also revealed that Akola district had 60.00 percent non-beneficiaries of small and 55.00 percent non-beneficiaries of medium group had small family size, 40.00 percent non-beneficiaries of small and 40.00 percent non-beneficiaries of medium group had medium family size while 0.00 percent non-beneficiaries of small and 5.00 percent non-beneficiaries of medium group had large family size. At overall Akola district had 56.25 percent selected farmers of small family, 41.25 percent farmers had medium family and 2.50 percent had large family size. This implies that the credit need for household expenditure will be less and it can be efficiently utilized for the farm production needs.

The results of the study showed that the source wise borrowing of credit by selected beneficiaries. The selected beneficiaries obtained the credit from different sources of formal and informal sources. It was observed from the table 2, that the share of cooperative credit society has the highest i.e., about 37.50 percent in Akola district followed by banks at 22.50 percent and kisan credit card at 7.50 percent. It was also observed from the table that borrowing from informal sources also contributed major position. The informal source of family/ friends/ relatives contributed to borrowing of 15.00 percent followed by money lender at 12.50 percent and from other sources at 5.00 percent. The findings of this study revealed that the pattern of credit taken by the beneficiaries from the formal and informal institutions.

Source wise borrowing of credit by selected beneficiaries

Table 2: Source wise borrowing of credit by selected beneficiaries

(N=40)

Sr. No	Sources	Beneficiaries	Percentage
Formal			
1	Cooperative society	15	37.50
2	Banks	9	22.50
3	Kisan Credit Card	3	7.50
Informal			
4	Family/ friends/ relatives	6	15.00
5	Money lender	5	12.50
6	Other	2	5.00
	Total	40	100.00

(Figures in parentheses indicate percentage to the total)

Pattern of credit obtained by the selected beneficiaries

Table 3: Pattern of credit obtained by the selected beneficiaries

(N=40)

Pattern Of Credit	Akola	Percentage
Short-Term	21	52.50
Medium-Term	13	32.50
Long-Term	6	15.00
Total	40	100.00

It is evident from the table 3, that 52.50 percent of the beneficiaries obtained short-term credit, 32.50 percent

beneficiaries obtained medium-term credit and 15.00 percent of beneficiaries obtained long-term credit.

Per hectare cost of cultivation of soybean for beneficiaries of small size group

It is revealed from the Table 4 that, the per hectare cost of

cultivation at cost 'A2' was Rs 81739.75, cost 'B1' was Rs. 84761.35 Whereas cost 'B2' was Rs. 114755.65 and cost 'C2' was Rs. 123333.19 whereas cost 'C3' was Rs 135666.50 which indicate the 10 percent as a managerial cost. The share of cost of cultivation of cost 'A2' is 60.25 percent.

Table 4: Cost of cultivation of soybean for beneficiaries of small group (Rs)

Sr. No.	Particulars		Unit/ha	Input	Cost per input (Rs)	Total cost	Percentage to Cost C3
1.	Hired Human Labour	Male	Days	68.11	251.63	17138.52	12.63
		Female	Days	101.73	159.98	16274.77	12.00
		Total	Days	169.84	411.61	33413.28	24.63
2.	Bullock Labour	Hired	Days	0.00	0.00	0.00	0.00
		Owned	Days	16.83	532.51	8962.14	6.61
		Total	Days	16.83	532.51	8962.14	6.61
3.	Machine Charges	Hired	Hours	7.53	615.00	4630.95	3.41
		Total	Hours	7.53	615.00	4630.95	3.41
4.	Manure		Tons.	5.86	649.23	3804.49	2.80
5.	Fertilizer	N	Kg.	16.93	24.00	406.32	0.30
		P	Kg.	21.74	44.00	956.56	0.71
		K	Kg.	7.86	22.00	172.92	0.13
		Total		46.53	90.00	1535.80	1.13
6.	Seed	Cost	Kgs/Rs.	77.12	40.32	3109.48	2.29
7.	Irrigation charges	Cost	Rs.			3880.20	2.86
8.	Insecticide (Plant Protection)	Cost	Rs.		1.22	15105.00	11.13
9.	Incidental charges	Cost	Rs.			424.87	0.31
10.	Repairing charges	Cost	Rs.			412.18	0.30
11.	Working capital	Cost	Rs.			75278.39	55.49
12.	Int. on working capital	Cost	Rs.			4516.70	3.33
	@ 6%						0.00
13.	Depreciation		Rs.			1756.00	1.29
14.	Land Rev. cess & other taxes		Rs.			188.65	0.14
	COST A1		Rs.			81739.75	60.25
15.	Rent paid for leased land		Rs.			0.00	0.00
	COST A2		Rs.			81739.75	60.25
16.	Int. on Fix. Cap. @ 10%/annum		Rs.			3021.60	2.23
	COST B1		Rs.			84761.35	62.48
17.	Rental value of land		Rs.			29994.30	22.11
	COST B2		Rs.			114755.65	84.59
18.	Family Human Labour	Male	Days	20.41	249.11	5084.34	3.75
		Female	Days	21.67	161.20	3493.20	2.57
		Total	Days	42.08	410.31	8577.54	6.32
	COST C1		Rs.			93338.89	68.80
	COST C2					123333.19	90.91
	10% of Cost C2					12333.32	9.09
	COST C3					135666.50	100.00
19.	Yield Per hectare	Main	Qtls.	26.89	6734.76	181097.70	
		By produce	Qtls.	3.96	799.48	3165.94	
20.	Value Of Total Produce		Rs.	30.85	7534.24	184263.64	
21.	Per qtl. Cost of main produce at Cost C2					4586.58	

(Figures in parentheses indicate percentage to the Cost C3)

The highest share among the operational cost was contributed by hired human labour 24.63 percent followed by plant protection chemicals 11.13 percent, bullock labour 6.61 percent, and machine labour 3.41 percent. The share of manure, seed and fertilizer was 2.80 percent, 2.29 percent and 1.13 percent. Cost 'B1' contributes to 62.48 percent, cost 'B2' contribute 84.59 percent to the total cost i.e., cost 'C3'.

The share of family labour was 6.32 percent. Per hectare yield obtained by beneficiaries of small size group was 26.89 quintal with gross returns of Rs. 181097.70. The by produce yield obtained was 3.96 quintals and the returns from it was Rs. 3168.00. The value of total produce was 184265.70. In case of small size group, per quintal cost of production was Rs. 4586.58.

Table 5: Cost of cultivation of soybean crop for beneficiaries of medium group (Rs)

Sr. No.	Particulars		Unit/ha	Input	Cost per input (Rs)	Total cost	Percentage to Cost C3
1.	Hired Human Labour	Male	Days	71.42	250.68	17903.57	12.70
		Female	Days	104.67	159.67	16712.66	11.86
		Total	Days	176.09	410.35	34616.22	24.56
2.	Bullock Labour	Hired	Days	0.00	0.00	0.00	0.00
		Owned	Days	17.43	532.21	9276.42	6.58
		Total	Days	17.43	532.21	9276.42	6.58
3.	Machine Charges	Hired	Hours	8.26	614.76	5077.92	3.60
		Total	Hours	8.26	614.76	5077.92	3.60
4.	Manure		Tons.	5.89	649.25	3824.08	2.71
5.	Fertilizer	N	Kg.	16.72	24.00	401.28	0.28
		P	Kg.	22.46	44.00	988.24	0.70
		K	Kg.	7.76	22.00	170.72	0.12
		Total		46.94	90.00	1560.24	1.11
6.	Seed	Cost	Kgs/Rs.	77.12	40.36	3112.56	2.21
Sr. No.	Particulars		Unit/ha	Input	Cost per input (Rs)	Total cost	Percentage to Cost C3
7.	Irrigation charges	Cost	Rs.			3879.20	2.75
8.	Insecticide (Plant Protection)	Cost	Rs.		1.36	15103.00	10.71
9.	Incidental charges	Cost	Rs.			424.41	0.30
10.	Repairing charges	Cost	Rs.			408.85	0.29
11.	Working capital	Cost	Rs.			77282.91	54.83
12.	Int. on working capital @ 6%	Cost	Rs.			4636.97	3.29
	Depreciation		Rs.			1742.00	1.24
14.	Land Rev. cess & other taxes		Rs.			187.74	0.13
	COST A1		Rs.			83849.62	59.49
15.	Rent paid for leased land		Rs.			0.00	0.00
	COST A2		Rs.			83849.62	59.49
16.	Int. on Fix. Cap. @ 10%/annum		Rs.			2841.23	2.02
	COST B1		Rs.			86690.85	61.50
17.	Rental value of land		Rs.			31701.63	22.49
	COST B2		Rs.			118392.49	83.99
18.	Family Human Labour	Male	Days	23.28	248.34	5781.36	4.10
		Female	Days	24.64	160.96	3966.05	2.81
		Total	Days	47.92	409.30	9747.41	6.92
	COST C1		Rs.			96438.26	68.42
	COST C2					128139.89	90.91
	10% of Cost C2					12813.99	9.09
	COST C3					140953.88	100.00
19.	Yield Per hectare	Main	Qtls.	28.41	6734.82	191336.24	
		By produce	Qtls.	4.67	800.16	3736.75	
20.	Value Of Total Produce		Rs.	33.08	7534.98	195072.98	
21.	Per qtl. Cost of main produce at Cost C2					4510.38	

(Figures in parentheses indicate percentage to the Cost C3)

Per hectare cost of cultivation of soybean for beneficiaries of medium size group

It is revealed from the Table 5 that, the per hectare cost of cultivation at cost 'A2' was Rs 74553.51, cost 'B1' was Rs. 77394.74 Whereas cost 'B2' was Rs. 109096.4 and cost 'C2' was Rs. 118843.8 whereas cost 'C3' was Rs 130728.2 which indicate the 10 percent as a managerial cost. The share of cost of cultivation of cost 'A2' is 57.03 percent. The highest share among the operational cost was contributed by hired human labour 24.56 percent followed by plant protection chemicals 10.71 percent, bullock labour 6.58

percent, and machine labour 3.60 percent. The share of manure, seed and fertilizer was 2.71 percent, 2.21 percent and 1.11 percent. Cost 'B1' contributes to 59.20 percent, cost 'B2' contribute 83.45 percent to the total cost i.e. cost 'C3'. The share of family labour was 7.46 percent. Per hectare yield obtained by beneficiaries of medium size group was 28.41 quintal with gross returns of Rs. 191336.24. The by produce yield obtained was 4.67 quintals and the returns from it was Rs. 3736.75. The value of total produce was 195072.98. In case of medium size group, per quintal cost of production was Rs. 4510.38.

Table 6: Cost of cultivation of soybean for beneficiaries of overall group (Rs)

Sr. No.	Particulars		Unit/ha	Input	Cost per input (Rs)	Total cost	Percentage to Cost C3
1.	Hired Human Labour	Male	Days	69.77	251.16	17521.83	13.43
		Female	Days	103.20	159.83	16493.94	12.64
		Total	Days	172.97	410.98	34015.77	26.07
2.	Bullock Labour	Hired	Days	0.00	0.00	0.00	0.00
		Owned	Days	17.13	532.36	9119.33	6.99
		Total	Days	17.13	532.36	9119.33	6.99
3.	Machine Charges	Hired	Hours	7.90	680.73	5374.36	4.12
		Total	Hours	7.90	680.73	5374.36	4.12
4.	Manure		Tons.	5.88	649.24	3814.29	2.92
5.	Fertilizer	N	Kg.	16.83	24.00	403.80	0.31
		P	Kg.	22.10	44.00	972.40	0.75
		K	Kg.	7.81	22.00	171.82	0.13
		Total		46.74	90.00	1548.02	1.19
6.	Seed	Cost	Kgs/Rs.	77.12	40.34	3111.02	2.38
7.	Irrigation charges	Cost	Rs.			2586.47	1.98
8.	Insecticide (Plant Protection)	Cost	Rs.			10069.33	7.72
9.	Incidental charges	Cost	Rs.			283.09	0.22
10.	Repairing charges	Cost	Rs.			273.68	0.21
11.	Working capital	Cost	Rs.			70195.35	53.80
12.	Int. on working capital @ 6%	Cost	Rs.			4211.72	3.23
13.	Depreciation		Rs.			1166.00	0.89
14.	Land Rev. cess & other taxes		Rs.			125.46	0.10
	COST A1		Rs.			75698.54	58.02
Sr. No.	Particulars		Unit/ha	Input	Cost per input (Rs)	Total cost	Percentage to Cost C3
15.	Rent paid for leased land		Rs.			0.00	0.00
	COST A2		Rs.			75698.54	58.02
16.	Int. on Fix. Cap. @ 10%/annum		Rs.			2841.23	2.18
	COST B1		Rs.			78539.77	60.20
17.	Rental value of land		Rs.			30910.69	23.69
	COST B2		Rs.			109450.46	83.89
18.	Family Human Labour	Male	Days	21.85	248.73	5433.40	4.16
		Female	Days	23.16	161.08	3729.81	2.86
		Total	Days	45.00	409.81	9163.21	7.02
	COST C1		Rs.			87702.97	67.22
	COST C2					118613.67	90.91
	10% of Cost C2					11861.37	9.09
	COST C3					130475.03	100.00
19.	Yield Per hectare	Main	Qtls.	27.65	6734.79	186216.94	
		By produce	Qtls.	4.32	799.82	3451.34	
20.	Value Of Total Produce		Rs.	31.97	7534.61	189668.28	
21.	Per qtl. Cost of main produce at Cost C2					4289.83	

(Figures in parentheses indicate percentage to the Cost C3)

Per hectare cost of cultivation of soybean for beneficiaries of overall size group

It is revealed from the Table 6 that, the per hectare cost of cultivation at cost 'A1' and 'A2' was Rs 75698.54, cost 'B1' was Rs. 78539.77 Whereas cost 'B2' was Rs. 109450.46 and cost 'C2' was Rs. 118613.67 whereas cost 'C3' was Rs 130475.03 which indicate the 10 percent as a managerial cost. The share of cost of cultivation of cost 'A2' is 58.02 percent. The highest share among operational cost was contributed by hired human labour 26.70 percent followed by plant protection chemicals 7.72 percent, bullock labour

6.99 percent, and machine labour 4.12 percent. The share of manure, seed and fertilizer was 2.92 percent, 2.38 percent and 1.19 percent. Cost 'B1' contributes to 60.20 percent, cost 'B2' contribute 83.89 percent to the total cost i.e., cost 'C3'. The share of family labour was 7.02 percent. Per hectare yield obtained by beneficiaries of overall size group was 27.65 quintal with gross returns of Rs. 186216.94. The by produce yield obtained was 4.32 quintals and the returns from it was Rs. 3451.34. The value of total produce was 189668.28. In case of overall size group, per quintal cost of production was Rs. 4289.83.

Table 7: Cost of cultivation of soybean for non-beneficiaries of small group (Rs)

Sr. No.	Particulars		Unit/ha	Input	Cost per input (Rs)	Total cost	Percentage to Cost C3
1.	Hired Human Labour	Male	Days	65.76	251.63	16547.19	13.37
		Female	Days	98.22	159.98	15713.24	12.70
		Total	Days	163.98	411.61	32260.42	26.07
2.	Bullock Labour	Hired	Days	0.00	0.00	0.00	0.00
		Owned	Days	13.54	532.51	7210.19	5.83
		Total	Days	13.54	532.51	7210.19	5.83
3.	Machine Charges	Hired	Hours	6.54	615.00	4022.10	3.25
		Total	Hours	6.54	615.00	4022.10	3.25
4.	Manure		Tons.	4.87	649.23	3161.75	2.55
5.	Fertilizer	N	Kg.	15.87	24.00	380.88	0.31
		P	Kg.	20.11	44.00	884.84	0.72
		K	Kg.	6.56	22.00	144.32	0.12
		Total		42.54	90.00	1410.04	1.14
6.	Seed	Cost	Kgs/Rs.	76.85	40.32	3098.59	2.50
7.	Irrigation charges	Cost	Rs.			3880.20	3.14
8.	Insecticide (Plant Protection)	Cost	Rs.		1.22	15105.00	12.21
9.	Incidental charges	Cost	Rs.			424.87	0.34
10.	Repairing charges	Cost	Rs.			412.18	0.33
11.	Working capital	Cost	Rs.			70985.34	57.36
12.	Int. on working capital	Cost	Rs.			4259.12	3.44
	@ 6%						0.00
13.	Depreciation		Rs.			1756.00	1.42
14.	Land Rev. cess & other taxes		Rs.			188.65	0.15
	COST A1		Rs.			77189.11	62.37
15.	Rent paid for leased land		Rs.			0.00	0.00
	COST A2		Rs.			77189.11	62.37
16.	Int. on Fix. Cap. @ 10%/annum		Rs.			3021.60	2.44
	COST B1		Rs.			80210.71	64.82
17.	Rental value of land		Rs.			24988.13	20.19
	COST B2		Rs.			105198.84	85.01
18.	Family Human Labour	Male	Days	17.34	249.11	4319.57	3.49
		Female	Days	18.51	161.20	2983.81	2.41
		Total	Days	35.85	410.31	7303.38	5.90
	COST C1		Rs.			87514.09	70.72
	COST C2					112502.22	90.91
Sr. No.	Particulars		Unit/ha	Input	Cost per input (Rs)	Total cost	Percentage to Cost C3
	10% of Cost C2					11250.22	9.09
	COST C3					123752.44	100.00
19.	Yield Per hectare	Main	Qtls.	22.43	6734.76	151060.67	
		By produce	Qtls.	3.87	799.32	3093.37	
20.	Value Of Total Produce		Rs.	26.30	7534.08	154154.04	
21.	Per qtl. Cost of main produce at Cost C2					5015.70	

(Figures in parentheses indicate percentage to the Cost C3)

Per hectare cost of cultivation of soybean for non-beneficiaries of small size group

It is revealed from the Table 7 that, the per hectare cost of cultivation at cost 'A1' and 'A2' was Rs 77189.11, cost 'B1' was Rs. 80210.71 Whereas cost 'B2' was Rs. 105198.8 and cost 'C2' was Rs.112502.20 whereas cost 'C3' was Rs 123752.40 which indicate the 10 percent as a managerial cost. The major share of cost of cultivation of cost 'A2' is 62.37 percent. The highest share among operational cost was contributed by hired human labour 26.70 percent followed by plant protection chemicals 12.21 percent, bullock labour 5.83 percent, and machine labour 3.25

percent. The share of manure, seed and fertilizer was 2.55 percent, 2.50 percent and 1.14 percent. Cost 'B1' contributes to 64.82 percent, cost 'B2' contribute 85.01 percent to the total cost i.e. cost 'C3'. The share of family labour was 5.90 percent. Per hectare yield obtained by non-beneficiaries of small size group was 22.43 quintal with gross returns of Rs. 151060.67. The by produce yield obtained was 3.87 quintals and the returns from it was Rs. 3093.37. The value of total produce was 154154.04. In case of non-beneficiaries of small size group, per quintal cost of production was Rs. 5015.70.

Table 8: Cost of cultivation of soybean for non-beneficiaries of medium group (Rs)

Sr. No.	Particulars		Unit/ha	Input	Cost per input (Rs)	Total cost	Percentage to Cost C3
1.	Hired Human Labour	Male	Days	67.36	250.68	16885.80	13.23
		Female	Days	101.21	159.67	16160.20	12.66
		Total	Days	168.57	410.35	33046.01	25.89
2.	Bullock Labour	Hired	Days	0.00	0.00	0.00	0.00
		Owned	Days	13.87	532.21	7381.75	5.78
		Total	Days	13.87	532.21	7381.75	5.78
3.	Machine Charges	Hired	Hours	7.31	614.76	4493.90	3.52
Sr. No.	Particulars		Unit/ha	Input	Cost per input (Rs)	Total cost	Percentage to Cost C3
		Total	Hours	7.31	614.76	4493.90	3.52
4.	Manure		Tons.	3.96	649.25	2571.03	2.01
5.	Fertilizer	N	Kg.	14.64	24.00	351.36	0.28
		P	Kg.	20.86	44.00	917.84	0.72
		K	Kg.	6.73	22.00	148.06	0.12
		Total		42.23	90.00	1417.26	1.11
6.	Seed	Cost	Kgs/Rs.	76.23	40.36	3076.64	2.41
7.	Irrigation charges	Cost	Rs.			3879.20	3.04
8.	Insecticide (Plant Protection)	Cost	Rs.		1.36	15103.00	11.83
9.	Incidental charges	Cost	Rs.			424.41	0.33
10.	Repairing charges	Cost	Rs.			408.85	0.32
11.	Working capital	Cost	Rs.			71802.05	56.25
12.	Int. on working capital	Cost	Rs.			4308.12	3.38
	@ 6%						0.00
13.	Depreciation		Rs.			1742.00	1.36
14.	Land Rev. cess & other taxes		Rs.			187.74	0.15
	COST A1		Rs.			78039.91	61.14
15.	Rent paid for leased land		Rs.			0.00	0.00
	COST A2		Rs.			78039.91	61.14
16.	Int. on Fix. Cap. @ 10%/annum		Rs.			2841.23	2.23
	COST B1		Rs.			80881.14	63.37
17.	Rental value of land		Rs.			26482.15	20.75
	COST B2		Rs.			107363.29	84.12
18.	Family Human Labour	Male	Days	20.94	248.34	5200.24	4.07
		Female	Days	21.56	160.96	3470.30	2.72
		Total	Days	42.50	409.30	8670.54	6.79
	COST C1		Rs.			89551.68	70.16
	COST C2					116033.82	90.91
	10% of Cost C2					11603.38	9.09
	COST C3					127637.21	100.00
19.	Yield Per hectare	Main	Qtls.	23.76	6734.82	160019.32	
		By produce	Qtls.	4.09	801.76	3279.20	
20.	Value Of Total Produce		Rs.	27.85	7536.58	163322.52	
21.	Per qtl. Cost of main produce at Cost C2					4883.58	

(Figures in parentheses indicate percentage to the Cost C3)

Per hectare cost of cultivation of soybean for non-beneficiaries of medium size group

It is revealed from the Table 8 that, the per hectare cost of cultivation at cost 'A2' was Rs 78039.91, cost 'B1' was Rs. 80881.14 whereas cost 'B2' was Rs. 107363.29 and cost 'C2' was Rs. 116033.82 whereas cost 'C3' was Rs 127637.21 which indicate the 10 percent as a managerial cost. The share of cost of cultivation of cost 'A2' is 61.14 percent. The highest share among operational cost was contributed by hired human labour 25.89 percent followed by plant protection chemicals 11.83 percent, bullock labour

5.78 percent, and machine labour 3.52 percent. The share of manure, seed and fertilizer was 2.01 percent, 2.41 percent and 1.11 percent. Cost 'B1' contributes to 63.37 percent, cost 'B2' contribute 84.12 percent to the total cost i.e. cost 'C3'. The share of family labour was 6.79 percent. Per hectare yield obtained by non-beneficiaries of medium size group was 23.76 quintal with gross returns of Rs. 160019.32. The by produce yield obtained was 4.09 quintals and the returns from it was Rs. 3279.20. The value of total produce was 163322.52. In case of medium size group, per quintal cost of production was Rs. 4883.58.

Table 9: Cost of cultivation of soybean for non-beneficiaries of overall group (Rs)

Sr. No.	Particulars		Unit/ha	Input	Cost per input (Rs)	Total cost	Percentage to Cost C3
1.	Hired Human Labour	Male	Days	66.56	251.16	16716.88	14.19
		Female	Days	99.72	159.83	15936.95	13.53
		Total	Days	166.28	410.98	32653.83	27.72
2.	Bullock Labour	Hired	Days	0.00	0.00	0.00	0.00
		Owned	Days	13.71	532.36	7295.99	6.19
		Total	Days	13.71	532.36	7295.99	6.19
3.	Machine Charges	Hired	Hours	6.93	680.73	4714.06	4.00
		Total	Hours	6.93	680.73	4714.06	4.00
4.	Manure		Tons.	4.42	649.24	2866.39	2.43
5.	Fertilizer	N	Kg.	15.26	24.00	366.12	0.31
		P	Kg.	20.49	44.00	901.34	0.77
		K	Kg.	6.65	22.00	146.19	0.12
		Total		42.40	90.00	1413.65	1.20
6.	Seed	Cost	Kgs/Rs.	76.54	40.34	3087.62	2.62
7.	Irrigation charges	Cost	Rs.			2586.47	2.20
8.	Insecticide (Plant Protection)	Cost	Rs.			10069.33	8.55
9.	Incidental charges	Cost	Rs.			283.09	0.24
10.	Repairing charges	Cost	Rs.			273.68	0.23
Sr. No.	Particulars		Unit/ha	Input	Cost per input (Rs)	Total cost	Percentage to Cost C3
11.	Working capital	Cost	Rs.			65244.11	55.39
12.	Int. on working capital @ 6%	Cost	Rs.			3914.65	3.32
							0.00
13.	Depreciation		Rs.			1166.00	0.99
14.	Land Rev. cess & other taxes		Rs.			125.46	0.11
15.	COST A1 Rent paid for leased land		Rs.			0.00	0.00
			Rs.			70450.22	59.81
16.	COST A2 Int. on Fix. Cap. @ 10%/annum		Rs.			70450.22	59.81
			Rs.			2841.23	2.41
17.	COST B1 Rental value of land		Rs.			73291.45	62.22
			Rs.			25797.87	21.90
18.	COST B2 Family Human Labour	Male	Days	19.14	248.73	4760.60	4.04
		Female	Days	20.04	161.08	3227.24	2.74
		Total	Days	39.18	409.81	7987.83	6.78
	COST C1		Rs.			81279.29	69.01
	COST C2					107077.15	90.91
	10% of Cost C2					10707.72	9.09
	COST C3					117784.87	100.00
19.	Yield Per hectare	Main	Qtls.	23.09	6734.79	155539.98	
		By produce	Qtls.	3.98	800.54	3186.28	
20.	Value Of Total Produce		Rs.	27.08	7535.33	158726.26	
21.	Per qtl. Cost of main produce at Cost C2					4636.38	

(Figures in parentheses indicate percentage to the Cost C3)

Per hectare cost of cultivation of soybean crop for non-beneficiaries of overall size group

It is revealed from the Table 9 that, the per hectare cost of cultivation at cost 'A2' was Rs 70450.22, cost 'B1' was Rs. 73291.45 whereas cost 'B2' was Rs. 99089.32 and cost 'C2' was Rs. 107077.15 whereas cost 'C3' was Rs 117784.87 which indicate the 10 percent as a managerial cost. The share of cost of cultivation of cost 'A2' is 59.81 percent. The highest share among operational cost was contributed by hired human labour 27.72 percent followed by plant protection chemicals 8.55 percent, bullock labour 6.19

percent, and machine labour 4.00 percent. The share of manure, seed and fertilizer was 2.43 percent, 2.62 percent and 1.20 percent. Cost 'B1' contributes to 62.22 percent, cost 'B2' contribute 84.13 percent to the total cost i.e. cost 'C3'. The share of family labour was 6.78 percent. Per hectare yield obtained by non-beneficiaries of overall size group was 23.09 quintal with gross returns of Rs. 155539.98. The by produce yield obtained was 3.98 quintals and the returns from it was Rs. 3186.28. The value of total produce was 158726.26. In case of overall size group, per quintal cost of production was Rs. 4636.38.

Table 10: Cost and returns of soybean for beneficiaries and non- beneficiaries

Sr. No.	Particulars		Beneficiaries			Non- beneficiaries		
			Small	Medium	Overall	Small	Medium	Overall
1	Cost of Cultivation at							
a)	Cost 'A ₂ '		81739.75	83849.62	75698.54	77189.11	78039.91	70450.22
b)	Cost 'B ₁ '		84761.35	86690.85	78539.77	80210.71	80881.14	73291.45
c)	Cost 'B ₂ '		114755.65	118392.49	109450.46	105198.84	107363.29	99089.32
d)	Cost 'C ₂ '		123333.19	128139.89	118613.67	112502.22	116033.82	107077.15
e)	Cost 'C ₃ '		135666.50	140953.88	130475.03	123752.44	127637.21	117784.87
2	Yield (Qtls)	Main Produce	26.89	28.41	27.65	22.43	23.76	23.09
		By Produce	3.96	4.67	4.32	3.87	4.12	3.98
3	Price/(Qtls)	Main Produce	6734.76	6734.82	6734.79	6734.76	6734.82	6734.79
		By Produce	799.48	800.16	799.82	799.32	801.76	800.54
4	Value of main produce		181097.70	191336.24	186216.94	151060.67	160019.32	155539.98
5	Value of by-produce		3165.94	3736.75	3451.34	3093.37	3279.20	3186.28
6	Total produce		184263.64	195072.98	189668.28	154154.04	163298.52	158726.26
7	Net return over							
a)	Cost 'A ₂ '		102523.89	111223.36	113969.74	76964.92	85258.61	88276.03
b)	Cost 'B ₁ '		99502.29	108382.13	111128.51	73943.32	82417.38	85434.80
c)	Cost 'B ₂ '		69507.99	76680.50	80217.82	48955.20	55935.24	59636.94
d)	Cost 'C ₂ '		60930.45	66933.09	71054.62	41651.82	47264.70	51649.10
e)	Cost 'C ₃ '		48597.13	54119.10	59193.25	30401.60	35661.32	40941.39
8	Benefit-cost ratio at							
a)	Cost 'A ₂ '		2.25	2.33	2.51	2.00	2.09	2.25
b)	Cost 'B ₁ '		2.17	2.25	2.41	1.92	2.02	2.17
c)	Cost 'B ₂ '		1.61	1.65	1.73	1.47	1.52	1.60
d)	Cost 'C ₂ '		1.49	1.52	1.60	1.37	1.41	1.48
e)	Cost 'C ₃ '		1.36	1.38	1.45	1.25	1.28	1.35

Cost and returns of soybean for beneficiaries and non-beneficiaries

Table 10 indicates that the per hectare cultivation of soybean crop for beneficiaries of small, medium and overall size group was 26.89, 28.41 and 27.65 quintals respectively. The average per hectare net return received by the beneficiaries of small, medium and overall size group was Rs. 48597.13, Rs. 54119.10 and Rs. 59193.25. The per hectare production of soybean crop for non-beneficiaries of small, medium and overall size group was 22.43, 23.76 and 23.09 quintals respectively. The average per hectare net return received by the non-beneficiaries of small, medium and overall size group was Rs. 30401.60, Rs. 35661.32 and Rs. 40941.39.

Efficiency of investment in the cultivation of soybean was judged by calculating input-output ratios. The input-output ratio at cost C₃ was 1.36, 1.38 and 1.45 for small, medium and overall size group respectively. The input-output ratio at cost C₂ was 1.25, 1.28 and 1.35 for small, medium and overall size group respectively. It was observed that by cultivation of soybean crop beneficiaries got the higher yields compared to the non-beneficiaries indicating the proper utilization of the credit for timely purchase and optimum use of the input by beneficiaries had impact on productivity of the crops.

Conclusion and policy recommendations

- About 68.44 percent of the farmers belongs to middle age group showed the working ability of the farmers. So the credit lending agencies may target these aged group farmers.
- Most of the farmers have completed their middle school level of education followed by high school level in both the beneficiary and non- beneficiary groups indicating

the low level of understanding of loan procedure to access the institutional credit facilities.

- About 56.25 percent of farmers consisted of small family size and 41.25 percent farmers had medium family and 2.50 percent had large family size. It was concluded that the credit need for household expenditure will be less. Hence the borrowed credit will be efficiently utilized for the crop production purpose.
- Regarding the source wise borrowing from different sources in the district, cooperative society contributed the highest share with 36.25 percent followed by banks with 22.50 percent. This indicates that the beneficiaries choose institutional sources majorly to access the credit. Therefore, the formal institutions should encourage the beneficiaries with attractive interest rates who deposit in their institution beyond regular saving.
- Majority of the beneficiaries obtained short term loans in the study area. Beneficiaries obtained short term loans to meet their short-term needs for purchasing seeds, fertilizers, paying wages to workers etc. for a period of less than 15 months.
- The per hectare cost of cultivation of soybean for the non-beneficiaries were less when compared to beneficiaries. The higher productivity levels and high cost of cultivation of beneficiaries were due to timely purchase as well as optimum levels of the inputs use and proper utilization of the credit for cultivation without diversion of the credit amount. The findings from the study confirmed that there is positive impact of the agricultural credit on the productivity of the beneficiaries in the study area.

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