



E-ISSN: 2278-4136

P-ISSN: 2349-8234

[www.phytojournal.com](http://www.phytojournal.com)

JPP 2020; Sp 9(6): 530-534

Received: 25-09-2020

Accepted: 28-10-2020

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## Economics of production of Brinjal in Akola district

**Mayuri Raut, Vanita Khobarakar, Aishwarya Patil, Priyanka Govekar and Ashwini Dangore**

**Abstract**

The present study was carried out to study cost structure, returns and resource use efficiency during the year 2018-2019 based on primary data. The study was conducted in Akola, Patur and Akot tahsils based on purposive sampling. A sample of 90 Brinjal growers was selected based on random sampling. It was observed that, It is observed that, per hectare cost of cultivation of Brinjal at cost C<sub>3</sub> was highest in the large group i.e. Rs. 158038.79 followed by medium group (Rs. 153629.41) and small group (Rs.143751.95). Per hectare total cost of cultivation of Brinjal for overall farmers was Rs.151778.83. The average yield and gross returns per hectare increased with the increase in size of farms. The benefit cost ratio of Brinjal at cost 'C<sub>3</sub>' was 1.54 in small group, 1.59 in medium group, 1.61 in large group and The overall input-output ratio was found to be 1.58, This indicates that, Cultivation of brinjal crop was economically profitable. The average main production was 157.95 q/ha.

**Keywords:** Brinjal, cost, returns, profit, benefit cost ratio

**Introduction**

Vegetables play an important role in both the regional and national economy of the agriculture sector. India continues to be the second largest producer of vegetables in the world next to China. However, the horticulture sector has witnessed tremendous growth as a result of investment through National Horticulture Mission (NHM) and a number of other programmes. It has really brought the 'Golden Revolution' by rising the vegetable production. It is necessary to increase the production of vegetable crops at a much faster rate mainly by increasing the productivity. Brinjal or eggplant (*Solanum melongena* L.) is an important solanaceous crop of sub-tropics and tropics which is low in calories and fats, contains mostly water, some proteins, fiber and carbohydrates. It is a good source of minerals and vitamins. Brinjal is known to have ayurvedic medicinal properties and is good for diabetic patients. The area under brinjal in Akola district is 697 ha in 2016 while the production of it is 13940 tonnes in 2016-17 with 20 t/ha productivity. Brinjal in India cultivation during 2016-17 was 733 thousand ha and production was 12510 metric tonnes.

**Materials and Methods**

The standard cost concept i.e. Cost A<sub>1</sub>, Cost A<sub>2</sub>, Cost B<sub>1</sub>, Cost B<sub>2</sub>, Cost C<sub>1</sub>, Cost C<sub>2</sub> and Cost C<sub>3</sub> was used in present analysis.

**Cost A<sub>1</sub>:** All variable cost excluding family labour cost and including depreciation

**Cost A<sub>2</sub>:** Cost A<sub>1</sub>+ Rent paid for leased-in land.

**Cost B<sub>1</sub>:** Cost A<sub>1</sub> + interest value of owned fixed capital assets (excluding land).

**Cost B<sub>2</sub>:** Cost B<sub>1</sub> + Rental value of owned land (net of land revenue) and rent paid for leased-in land.

**Cost C<sub>1</sub>:** Cost B<sub>1</sub> + imputed value of family labour.

**Cost C<sub>2</sub>:** Cost B<sub>2</sub> + Imputed value of family labour.

**Cost C<sub>3</sub>:** Cost C<sub>2</sub> + marketing costs and transportation report.

**Gross and net returns****Gross returns**

Gross return of the farmers under the present study was estimated from returns obtained from sale of main produce.

**Net returns**

Net returns was computed at different costs i.e. Cost A<sub>1</sub>, Cost A<sub>2</sub>, Cost B<sub>1</sub>, Cost B<sub>2</sub>, Cost C<sub>1</sub>, Cost C<sub>2</sub> and Cost C<sub>3</sub> by deducting respective costs from the gross returns.

**Benefit-cost ratio**

It was calculated at cost A<sub>1</sub>, cost A<sub>2</sub>, cost B<sub>1</sub>, cost B<sub>2</sub>, cost C<sub>1</sub>, cost C<sub>2</sub> and cost C<sub>3</sub> by dividing gross income by respective cost.

**Result and Discussion****Table 1:** Distribution of Brinjal growers according to size of land holding

Sr. No.	Land holding group	Area in hectare	No. of cultivators
1.	Small	Upto 2.00 ha	49
2.	Medium	2.01 to 4.00 ha	22
3.	Large	4.01 ha and above	19
	Total		90

**Average size of holding of Brinjal cultivator**

The information regarding distribution land holding in different size groups, is presented in Table 2.

**Table 2:** Selected Farmers and their distribution. (ha)

Sr. No.	Size of holding	No. of farmer selected	Average size of holdings
1	Small (Up to 2 Ha.)	49 (54.44)	1.1
2	Medium (2.01 to 4.00 Ha)	22 (24.44)	2.73
3	Large (4.01 & above)	19 (21.11)	6.33
	Total/ Overall	90	3.39

**Cost of cultivation of selected Brinjal growers**

The cost of cultivation is helpful for crop planning therefore in order to know the cost and profitability, the cost of cultivation of Brinjal for small, medium, large and overall farmer was workout.

**Per hectare cost of cultivation of Brinjal for Small farmer**

The per hectare cost of cultivation of Brinjal for small farmers was workout and presented in Table 3.

**Table 3:** Per hectare cost of cultivation of Brinjal for small farmer (Rs)

Sr. No.	Item	Unit	Input	Cost/ unit(Rs.)	Total Cost	Percent to total cost C <sub>3</sub>	
1	2	3	4	5	6		
1	Hired Human Labor	Male	Days	34.5	200.23	6907.94	4.81
		Female	Days	112.5	149.64	16834.5	11.71
	Subtotal				23742.44	16.52	
2	Bullock Labor	(Pair days)	12.96	499.91	6478.79	4.51	
3	Machine charges	Hours	6.59	299.92	1976.5	1.37	
4	Seed	Kg.	0.77	14193.71	10929.16	7.60	
5	Manures	QTLS.	25.33	520.32	13179.71	9.17	
6	Fertilizer	N	Kg.	110.33	24	2647.92	1.84
		P	Kg.	58.08	44	2555.52	1.78
		K	Kg.	51.41	22	1131.02	0.79
	Subtotal				6334.44	4.41	
7	Irrigation charges	(Rs.)			2100	1.46	
8	Plant Protection	(Rs.)			15354.65	10.68	
9	Incidental charges	(Rs.)			437.08	0.30	
10	Repairing Charges	(Rs.)			198.75	0.14	
11	Working Capital (1 to 10)	(Rs.)	4844.25		80737.52	56.16	
12	Int. on wor.Cap. @ 6percent /annum	(Rs.)	2422.13		2422.13	1.68	
13	Depreciation	(Rs.)			997.91	0.69	
14	Land Rev. cess& other taxes	(Rs.)			175.91	0.12	
15	COST "A1" (11 to 14)	(Rs.)			84333.47	58.67	
16	Rental Value Leased in land	(Rs.)			-	-	
17	COST "A2" (15 to 16)	(Rs.)			84333.47	58.67	
18	Int. on Fix.Cap. @ 10percent/annum	(Rs.)			1419.05	0.99	
19	COST "B1" (17+18)	(Rs.)			85752.52	59.65	
20	Rental Value of Land	(Rs.)			36811.91	25.61	
21	COST "B2" (19 to 20)	(Rs.)			122564.42	85.26	
22	Family Human Labor	Male	Days	19.25	200.23	3854.43	2.68
		Female	Days	28.5	149.64	4264.74	2.97
	Subtotal				8119.17	5.65	
23	Cost " C1 " (19+22)	(Rs.)			93871.68	65.30	
24	Cost " C2 " (21+22)	(Rs.)			130683.59	90.91	
25	Cost "C2*" (24)	(Rs.)			130683.59	90.91	
26	10 percent Cost C2*	(Rs.)			13068.359	9.09	
27	Cost "C3" (25+26)	(Rs.)			143751.949	100	
28	Main produce	(Rs.)	151.72	1462.74	221926.91		
29	Per qtl. cost of production	(Rs.)			861.35		

(Figures in parentheses indicates the percentage to cost C<sub>3</sub>)

Table 3 revealed that per hectare cost of cultivation of brinjal for small farmer was Rs.143751.949 /- The major item was rental value of land (25.61 per cent) followed by hired human labour 16.52 per cent, manures 9.17 per cent, Seed 7.60 per cent and Family labour 5.65 per cent share to cost C<sub>3</sub> respectively. The percent share of Cost A<sub>2</sub> and Cost B<sub>2</sub> were Rs 58.67 per cent and Rs. 85.26 per cent in total cost

respectively. The per hectare yield obtained by the farmer was 151.72 quintal.

**Per hectare cost of cultivation of brinjal for Medium farmers**

The per hectare cost of cultivation of brinjal for Medium farmers was workout and presented in Table 4.

**Table 4:** Per hectare cost of cultivation of Brinjal for medium farmers (Rs)

Sr. No.	Item	Unit		Input/ha	Cost/unit (Rs.)	Total Cost	Percent to total cost C <sub>3</sub>
1	2	3		4	5	6	
1	Hired Human Labor	Male	Days	37.52	200.04	7505.5	4.89
		Female	Days	127.39	150.15	19127.61	12.45
	Subtotal		Days			26633.11	17.34
2	Bullock Labor		(Pair days)	9.55	500.04	4775.4	3.11
3	Machine charges		Hours	9.12	299.85	2734.63	1.78
4	Seed		Kg.	0.72	14352.38	10333.71	6.73
5	Manures		QTLS.	30.82	495.38	15267.61	9.94
6	Fertilizer	N	Kg.	104.16	24	2499.84	1.63
		P	Kg.	55.33	44	2434.52	1.58
		K	Kg.	45.91	22	1010.02	0.66
	Subtotal					5944.38	3.87
7	Irrigation charges	(Rs.)				2375	1.55
8	Plant Protection	(Rs.)				16057.97	10.45
9	Incidental charges	(Rs.)				599.41	0.39
10	Repairing Charges	(Rs.)				348.99	0.23
11	Working Capital (1 to 10)	(Rs.)		5104.57		85076.22	55.38
12	Int. on wor. Cap. @ 6 percent /annum	(Rs.)		2552.29		2552.29	1.66
13	Depreciation	(Rs.)				3488.04	2.27
14	Land Rev. cess& other taxes	(Rs.)				179.28	0.12
15	COST "A1" (11 to 14)	(Rs.)				91295.82	59.43
16	Rental Value Leased in land	(Rs.)				-	-
17	COST "A2" (15 to 16)	(Rs.)				91295.82	59.43
18	Int. on Fix. Cap. @ 10percent/annum	(Rs.)				1621.01	1.06
19	COST "B1" (17 + 18)	(Rs.)				92916.83	60.48
20	Rental Value of Land	(Rs.)				40953.09	26.66
21	COST "B2" (19 to 20)	(Rs.)				133869.92	87.14
22	Family Human Labour	Male	Days	13.19	200.04	2638.53	1.72
		Female	Days	21.01	150.15	3154.65	2.05
	Subtotal					5793.18	3.77
23	Cost " C1 " (19+22)	(Rs.)				98710.01	64.25
24	Cost " C2 " (21+22)	(Rs.)				139663.1	90.91
25	Cost "C2*" (24)	(Rs.)				139663.1	90.91
26	10 percent "Cost C2*"	(Rs.)				13966.31	9.09
27	Cost "C3" (25+26)	(Rs.)				153629.41	100
28	Main produce	(Rs.)		157.33	1548.95	243696.30	
29	Per qtl. cost of production	(Rs.)				876.56	

(Figures in parentheses indicates the percentage to cost C<sub>3</sub>)

It is observed from the table 4 that the per hectare cost of cultivation i.e. Cost C<sub>3</sub> was Rs.153629.41 /-. Among the different items of expenditure rental value of land accounted highest (26.66%) share in total cost C<sub>3</sub> followed by hired human labour (17.34%), Manure (9.94%), Seed (6.73%), Fertilizer (3.87%) and family labour (3.77%) of the total cost.

The per hectare yield obtained by the farmer was 157.33 quintal.

**Per hectare cost of cultivation of Brinjal for Large farmers:** The per hectare cost of cultivation of Brinjal for Large farmers was workout and presented in Table 5.

**Table 5:** Per hectare cost of cultivation of Brinjal for Large farmers (Rs)

Sr. No.	Item	Unit		Input/ha	Cost/ unit (Rs.)	Total Cost	Per cent to total cost
1	2	3		4	5	6	
1	Hired Human Labor	Male	Days	40.17	200.01	8034.4	5.08
		Female	Days	154.12	150.01	23119.54	14.63
	Subtotal		Days			31153.94	19.71
2	Bullock Labor		(Pair days)	6.73	457.19	3076.92	1.95
3	Machine charges		Hours	11.19	285.91	3199.37	1.28
4	Seed		Kg.	0.71	14578.2	10350.52	6.55
5	Manures		QTLS	35.25	502.42	17710.31	11.21
6	Fertilizer	N	Kg.	97.31	24	2335.44	1.48
		P	Kg.	50.67	44	2229.48	1.41
		K	Kg.	43.85	22	964.7	0.61
	Subtotal					5529.62	3.50
7	Irrigation charges	(Rs.)				2384.62	1.51
8	Plant Protection	(Rs.)				15321.15	9.69
9	Incidental charges	(Rs.)				800.4	0.51
10	Repairing Charges	(Rs.)				451.44	0.29
11	Working Capital (1 to 14)	(Rs.)		5399.06		89984.29	56.94
12	Interest on working Capital	(Rs.)		2699.53		2699.53	1.71

13	Depreciation	(Rs.)				4062.5	2.57
14	Land Revenue	(Rs.)				177.79	0.11
15	COST "A1" (15 to 18)	(Rs.)				96924.11	61.33
16	Rental Value Leased in land	(Rs.)				-	-
17	COST "A2" (19 to 20)	(Rs.)				96924.11	61.33
18	Int. on Fix.Cap. @ 10percent	(Rs.)				1871.15	1.18
19	COST "B1" (19 + 22)	(Rs.)				98795.26	62.51
20	Rental Value of Land	(Rs.)				41531.18	26.28
21	COST "B2" (23 to 24)	(Rs.)				140326.44	88.79
22	Family Human Labor	Male	Days	9.15	200.01	1830.09	1.16
		Female	Days	10.1	150.01	1515.1	0.96
	Subtotal					3345.19	2.12
23	Cost " C1 " (23+26)	(Rs.)				102140.45	64.63
24	Cost " C2 " (25+26)	(Rs.)				143671.63	90.91
25	Cost "C2*" (24)	(Rs.)				143671.63	90.91
26	10 percent "Cost C2*" (24)	(Rs.)				14367.16	9.09
27	Cost" C3" (25+26)	(Rs.)				158038.79	100
28	Main produce	(Rs.)		165.70	1537.28	254727.30	
29	Per quintal cost of Production	(Rs.)				882.56	

(Figures in parentheses indicates the percentage to cost C3)

It is seen from the Table 5 that per hectare expenditure of Rs.158038.79 /- was incurred in the cultivation of brinjal as Cost C<sub>3</sub> by the cultivators. The major item of cost were rental value of land, hired human labour, manure, plant protection, seed and family labour which accounted 26.28, 19.71, 11.21, 9.69, 10.66, and 2.12 per cent respectively. The per hectare

yield was 165.70 quintal.

#### Per hectare cost of cultivation of Brinjal for Large farmers

The per hectare cost of cultivation of brinjal for overall farmers was worked out and presented in Table 6.

**Table 6:** Per hectare cost of cultivation of Brinjal for Overall farmers

S. No.	Item	Unit		Input/ha	Cost/ unit (Rs.)	Total Cost	Per cent to Total Cost C3
1	2	3		4	5	6	
1	Hired Human Labour	Male	Days	37.4	200.09	7482.82	3.12
		Female	Days	131.34	149.93	19691.74	12.97
	Subtotal					27174.56	17.90
2	Bullock Labor		(Pair days)	9.75	485.71	4734.1	3.12
3	Machine charges		Hours	8.97	295.23	2647.22	1.74
4	Seed		Kg.	0.73	14374.76	10541.49	6.95
5	Manures		QTLS.	30.47	506.04	15417.35	10.16
6	Fertilizer	N	Kg.	103.93	24	2494.4	1.64
		P	Kg.	54.69	44	2406.51	1.59
		K	Kg.	47.06	22	1035.25	0.68
	Subtotal					5936.16	3.91
7	Irrigation charges	(Rs.)				2286.54	1.51
8	Plant Protection	(Rs.)				15577.92	10.26
9	Incidental charges	(Rs.)				612.3	0.40
10	Repairing Charges	(Rs.)				333.06	0.22
11	Working Capital (1 to 14)	(Rs.)		5116		85266.7	56.18
12	Interest on working Capital			2558		2558	1.69
13	Depreciation	(Rs.)				2849.48	1.88
14	Land Revenue	(Rs.)				177.66	0.12
15	COST "A1" (15 to 18)	(Rs.)				90851.85	59.86
16	Rental Value Leased in land					-	-
17	COST "A2" (19 to 20)					90851.85	59.86
18	Int. on Fix. Cap. @ 10percent					1637.07	1.08
19	COST "B1" (19 + 22)					92488.92	60.94
20	Rental Value of Land	(Rs.)				39738.71	26.18
21	COST "B2" (23 to 24)					132227.63	87.12
22	Family Human Labour	Male	Days	13.86	200.09	2773.96	1.83
		Female	Days	19.87	149.93	2979.18	1.96
	Subtotal					5753.14	3.79
23	Cost " C1 " (23+26)	(Rs.)				98242.05	64.73
24	Cost " C2 " (25+26)	(Rs.)				137980.76	90.91
25	Cost "C2*" (24)	(Rs.)				137980.76	90.91
26	10 percent cost C2*	(Rs.)				13798.07	9.09
27	Cost "C3" (25+26)	(Rs.)				151778.83	100
28	Main produce	(Rs.)		157.95	1516.32	239498.22	
29	Per quintal cost of Production	(Rs.)				873.59	

(Figures in parentheses indicates the percentage to cost C3)

It is seen from the Table 6 that the overall level the cost of cultivation was Rs.151778.83/- The major item contributed to total cost C<sub>3</sub> were Rental value of land (26.18 per cent) followed by hired human labour (17.90 per cent), plant protection (10.26 per cent), Manure(10.16 per cent), seed(6.95 per cent) and family labour (3.79 per cent). The average main

production was 157.95 q/ha.

### Per hectare cost and returns from Brinjal

The per hectare cost and return of the brinjal was worked out for small, medium, large and overall farmers were presented in Table 7.

**Table 7:** Per hectare cost and returns from Brinjal (Rs)

Sr. No.	Particulars	Small	Medium	Large	Overall
1	Main Produce (q/ha)	151.72	159.33	162.79	157.95
2	Value of Main Produce	221926.91	243696.30	254727.30	239498.22
3	Gross Returns	221926.9	243696.30	254727.30	239498.2
4	Cost of Cultivation at				
	Cost "A1"	84333.47	91295.82	96924.11	90851.85
	Cost "A2"	84333.47	91295.82	96924.11	90851.85
	Cost "B1"	85752.52	92916.83	98795.26	92488.92
	Cost "B2"	122564.42	133869.92	140326.44	140326.44
	Cost "C1"	93871.68	98710.01	102140.45	98242.05
	Cost "C2"	130683.59	139663.1	143671.63	137980.76
	Cost "C3"	143751.95	153629.41	158038.79	151778.84
5	Return at				
	Cost "A1"	137593.45	152400.48	157803.19	148646.4
	Cost "A2"	137593.45	152400.48	157803.19	148646.4
	Cost "B1"	136174.4	150779.47	155932.04	147009.3
	Cost "B2"	99362.49	109826.38	114400.86	99171.78
	Cost "C1"	128055.2	144986.29	152586.85	141256.2
	Cost "C2"	91243.32	104033.20	111055.67	101517.5
	Cost "C3"	78174.95	90066.89	96688.50	87719.36
6	Output input ratio at				
	Cost "A1"	2.63	2.7	2.58	2.64
	Cost "A2"	2.63	2.7	2.58	2.64
	Cost "B1"	2.59	2.66	2.53	2.59
	Cost "B2"	1.81	1.84	1.78	1.71
	Cost "C1"	2.36	2.5	2.45	2.44
	Cost "C2"	1.7	1.77	1.74	1.74
	Cost "C3"	1.54	1.59	1.61	1.58

The Table 7 indicates that the per hectare production of Brinjal for small medium and large farmer was 151.72, 157.33 and 165.7 quintal respectively. At overall level it was 157.95 q/ha. The average per hectare net return received by the small, medium and large. The overall input-output ratio was 1.58. It indicates that the Brinjal cultivation was profitable.

### Conclusions

The average main production was 157.95 q/ha. It is observed that, per hectare cost of cultivation of Brinjal at cost C<sub>3</sub> was highest in the large group i.e. Rs. 158038.79 followed by medium group (Rs. 153629.41) and small group (Rs.143751.95). The average yield and gross returns per hectare increased with the increase in size of farms. The benefit cost ratio of Brinjal at cost 'C<sub>3</sub>' was 1.54 in small group, 1.59 in medium group and 1.61 in large group. This indicates that, Cultivation of Brinjal crop was economically profitable.

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