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Economics of production of sweet orange in Amravati district of Vidarbha region

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Abstract
The present study entitled economics of production of sweet orange in Amravati district was carried out during 2020-21 with the objectives of to estimate costs, returns of sweet orange, and to analyze the constraints in production of sweet orange.
Amravati district was selected for the study as this district has maximum potential area. Tiwasa, Morshi, Warud, Dhamangoan (Railway) tehsils were selected on the basis of maximum potential area. The standard cost concepts were used along with the simple tabular analysis for working out costs and returns of sweet orange.

Keywords: Economics of production, sweet orange, farmers

Introduction
Per hectare cost of establishment for five year was Rs. 271004.05 and amortization Rs. 34553.02. Per hectare average yield for small, medium and large farmers was 159.30 quintals 160.58 quintals and 161.67 quintals respectively and the overall farmers was 161.67 quintals. The average per hectare net return received at cost C_3 by the small, medium and large sweet orange farmers was Rs. 216066.44, Rs. 229623.13 and Rs. 237913.60 respectively and at overall farmers the net returns was Rs. 228440.25. The output-input ratio at cost C_3 for small, medium and large farmers was 2.03, 2.15 and 2.17 respectively. At overall the output-input ratio was 2.11. The output-input ratio which is an indicator of economic efficiency in crop production for crop and it found that sweet orange registered a good output-input ratio of 2.11 in selected study area. Major constraints in production of sweet orange was non-availability of quality graft of recommended variety

Objectives
1. To estimate costs and returns of Sweet Orange.
2. To analyze the constraints in production of Sweet Orange

Methodology
The present study on Sweet Orange was undertaken in Amravati district of Vidharbha region. The district was selected purposively.

Selection of the tehsil
Out of fourteen tehsil, four tehsils namely Tiwasa, Morshi, Warud, Dhamangaon (Railway) were selected for the study based on maximum potential area under cultivation.

Selection of village
List of Sweet Orange producing villages was obtained from Taluka Agriculture Office of selected tehsil, three villages from each tehsil were selected randomly. Ten farmers from each village were selected for study. Total 120 farmers were selected.
The data were collected from Sweet Orange growers by personal interview method with help of pre-tested interview schedule and pertain to the year 2020-2021.
The sweet orange farmers were further classified in to three size groups on the basis of land holding as small (less than 2 ha), medium (2.01 to 4.00 ha) and large (greater than 4.01 ha). To accomplish the objectives of the study the simple tabular analysis was used. Cost of production of Sweet Orange was calculated as per the standardized cost concept.

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List of Sweet Orange producing villages was obtained from Taluka Agriculture Office of selected tehsil, three villages from each tehsil were selected randomly.

Sr. No.	Tehsil	Village	Farmers
1	Tiwasa	Shendurjana (Bazar)	10
		Shirajgaon (Mozari)	10
		Jenushta	10
2	Morshi	Yavati	10
		Pimpalkhuta (Motha)	10
		Talani	10
3	Warud	Chinchalgavhan	10
		Belora	10
		Loni	10
4	Dhamangaon (Railway)	Pimpaalkhuta	10
		Chinchapur	10
		Mangrul (Dastagir)	10
	Total		120

Result and Discussion

Table 1: Per hectare input utilization of sweet orange farmers (unit/ha)

Sr No	Particulars		Small	Medium	Large	Overall
1	**Hired Labour**					
	Male	Days	29.68	35.94	38.15	34.81
	Female	Days	21.22	27.04	28.10	25.62
	Sub total		50.89	62.98	66.25	60.43
2	**Family Labour**					
	Male	Days	34.15	22.95	15.68	23.78
	Female	Days	28.00	20.79	8.58	18.59
	Sub total		62.15	43.74	24.26	42.36
3	**Total labour**					
	Male	Days	63.82	58.89	53.84	58.58
	Female	Days	49.22	47.83	36.67	44.21
	Sub total		113.04	106.72	90.51	102.79
4	Bullock pair		5.44	5.08	6.93	5.86
5	**Machine Labour**					
	Owned		17.97	16.26	15.89	16.64
	Hired		7.37	6.73	8.49	7.56
	Sub total		25.34	22.99	24.38	24.20
6	Manure	qtl	102.90	101.94	77.43	85.00
7	**Fertilizer**					
	N	Kg	127.59	109.05	99.97	111.43
	P	Kg	44.16	40.14	41.10	41.71
	k	Kg	76.43	71.32	63.61	70.06

The manure use was highest in the small farmers i.e. 102.90 qtl/ha followed by a medium and large farmers i.e. 101.94 qtl/ha and 77.43 qtl/ha and at the overall level it was 85 qtl/ha. The per hectare highest use of nitrogen, phosphorus, and potassium was seen in a small farmers i.e. 127.59 kg, 44.16 kg, and 76.43 kg respectively followed by a medium farmers i.e. 109.05 kg, 40.14 kg, and 71.32 kg respectively. In the large farmers per hectare utilization of nitrogen, phosphorus and potassium were observed at 99.97 kg, 41.10 kg, and 63.61 kg respectively. At overall level utilization pattern of nitrogen, phosphorus and potassium were 111.43 kg, 41.71 kg, and 70.06 kg respectively.

Per hectare establishment cost of Sweet orange farmers
Every long duration horticultural crop has two phases in establishment phase or development phase and production phase. The sweet orange orchard starts bearing after five years from the year of plantation The farmers has to invest considerable amount for establishing orchard starts bearings. This period is called as gestation period and the sweet orange farmers do not get any returns from the sole orchards. Therefore, the cost of establishment of sweet orange orchards can be regarded as an investment capital in order to study capital investment made by the farmers in the study area, a separate sample of twenty-five sweet orange farmers was selected who were having the orchards of one year to five years of age i.e. first five years During which they have to invest in preparation of land, digging pits, purchase and planting material, irrigation, application of manures, fertilizer. Table 2 revealed that among the different ages of sweet orange orchard per hectare establishment cost was Rs. 63889.94, Rs. 47093.61, Rs. 50380.19, Rs. 53380.19, Rs. 56273.09 and Rs. 56273.09 in the first year, second year, third year, fourth year and fifth year orchard respectively indicating increase in the cost of establishment for a sweet orange orchard with an increase in age of orchard except a first year.

Table 2 revealed that the in first year of sweet orange orchard expenditure on graft was Rs. 17418.00. Per hectare cost of hired labour was highest in fifth year orchard of sweet oranges followed by the first year, the third year, fourth year, and second year age of sweet orange orchard i.e. Rs. 12207.00, Rs. 11132.00, Rs. 10143.00, Rs. 9470.00 and Rs. 8459.00 respectively. Per hectare expenditure on manures worked out to be Rs. 4164.60, Rs. 5833.60, Rs. 5362.80, Rs. 5680.00 and Rs. 5765.60 in first year, second year, third year, fourth year, fifth year age of sweet orange orchard respectively. Per hectare expenditure on the fertilizer highest in the fifth year followed by fourth year, third year, second year and first year i.e. Rs. 5315.00, Rs. 5132.80, Rs. 4519.00, Rs. 3913.20 and Rs. 3071.40 respectively it was indicating that manure and fertilizer increase in share with the increase in age of sweet orange orchard.

Per hectare cost of irrigation in first year, second year, third year, fourth year and fifth year was Rs. 3294.00, Rs. 3548.00, Rs. 3860.00, Rs. 4560.00, and 4480.00 respectively. Per hectare expenditure on plant protection was Rs. 410.00, Rs. 616.00, Rs. 842.00, Rs. 904.00, and Rs. 1040.00 in first year, second year, third year, fourth year and fifth year respectively it shows that as year increased expenditure on plant protection also increased. Per hectare interest on working capital was highest in first year was Rs. 4854.36 followed by fifth year, fourth year, third year and second year i.e. Rs. 3597.55, Rs. 3269.86, Rs. 3108.58 and Rs. 2793.58 respectively. Per hectare interest on fixed capital was highest in fifth year of orchard it was Rs. 10590.00, followed by second year, fourth year, first year and third year i.e. Rs. 9007.00, Rs. 7933.00, Rs. 7414.00 and Rs. 7262.40 respectively. Per hectare family laboured required highest in first year it was Rs. 2160.00 followed by second year, fourth year, third year and fifth year i.e. Rs. 1640.00, Rs. 1660.00, Rs. 1362.00 and Rs. 1140.00 respectively.

At overall level per hectare cost of hired labour stood first in order to work out to be Rs. 51411.00. Interest on fixed capital stood second i.e. Rs. 42206.00. Expenditure on manure stood third i.e. Rs. 26806.60. Fertilizer is another important component which accounted Rs. 21951.40. expenditure on irrigation, plant protection, and family labour was Rs. 19742.00, Rs. 3812.00, and Rs. 7962.00. At overall level cost A_1, cost A_2, Cost B_1, cost B_2, cost C_1, Cost C_2 and C_3 (total establishment cost) was Rs. 196198.92, Rs. 196198.92, Rs. 238405.32, Rs. 238405.32, Rs. 246367.32, Rs. 246367.32 and Rs. 271004.05 respectively. The Amortization cost was found to be Rs. 34553.

Table 5: Per hectare establishment cost of sweet orange farmers (Rs/ha)

Sr. No	Particulars	1st year	2nd year	3rd year	4th year	5th year	Overall
1	Cost of Graft	17418.00	-	-	-	-	17418.00
2	Hired Labour						
	Male	7380.00	6006.00	6918.00	6245.00	8816.00	35365.00
	Female	3752.00	2453.00	3225.00	3225.00	3391.00	16046.00
	Sub total	11132.00	8459.00	10143.00	9470.00	12207.00	51411.00
3	Manure	4164.60	5833.60	5362.80	5680.00	5765.60	26806.60
4	Fertilizer						
	N	671.20	988.80	1299.00	1500.40	1507.00	5966.40
	P	1169.20	1392.85	1541.40	1638.80	1793.60	7535.85
	K	1231.00	1531.55	1678.60	1993.60	2014.40	8449.15
	Sub total	3071.40	3913.20	4519.00	5132.80	5315.00	21951.40
5	Irrigation	3294.00	3548.00	3860.00	4560.00	4480.00	19742.00
6	Plant protection	410.00	616.00	842.00	904.00	1040.00	3812.00
7	Incidental charges	384.00	430.00	566.00	754.00	580.00	2714.00
8	Repairing charges	579.00	480.00	612.00	748.00	592.00	3011.00
9	Working capital	40453.00	23279.80	25904.80	27248.80	29979.60	146866.00
10	Interest on working capital @12%	4854.36	2793.58	3108.58	3269.86	3597.55	17623.92
11	Depreciation	3100.00	6000.00	8084.00	8312.00	5760.20	31256.20
12	Land revenue	100.40	92.00	78.40	92.00	90.00	452.80
13	Cost A_1	48507.76	32165.38	37175.78	38922.66	39427.35	196198.92
14	Cost A_2	48507.76	32165.38	37175.78	38922.66	39427.35	196198.92
15	Interest on fixed capital @10%	7414.00	9007.00	7262.40	7933.00	10590.00	42206.40
16	Cost B_1	55921.76	41172.38	44438.18	46855.66	50017.35	238405.32
17	Cost B_2	55921.76	41172.38	44438.18	46855.66	50017.35	238405.32
18	Family labour	2160.00	1640.00	1362.00	1660.00	1140.00	7962.00
19	Cost C_1	58081.76	42812.38	45800.18	48515.66	51157.35	246367.32
20	Cost C_2	58081.76	42812.38	45800.18	48515.66	51157.35	246367.32
21	10% of Cost C_2 (managerial cost)	5808.18	4281.24	4580.02	4851.57	5115.74	24636.73
22	Cost C_3	63889.94	47093.61	50380.19	53367.22	56273.09	271004.05

Table 3: Per hectare cost of cultivation of overall farmer (Rs/ha)

Sr. No.	Particulars		Unit	Input	Cost/unit (Rs.)	Total Cost	Percent to total cost
1	Hired Labour	Male	Days	34.81	273.41	9516.44	4.63
		Female	Days	25.62	219.78	5631.26	2.74
	Sub total			60.43		15147.69	7.36
2	Bullock Labour		(Pair days)	8.98	338.94	3043.65	1.48
							0.00
3	Machine Labour		Hours	24.20	290.50	7030.02	3.42
4	Manure		Qtl	85.00	73.02	6206.57	3.02
5	Fertilizer	N	kg	111.43	15.75	1754.96	0.85
		P	kg	41.71	47.88	1997.16	0.97
		K	kg	70.06	21.54	1509.18	0.73
	Sub total					5261.30	2.56
6	Irrigation					3701.58	1.80
7	Micronutrient					1296.12	0.63
8	Plant protection					1709.41	0.83
9	Weedicide					465.15	0.23
10	Incidental charges					635.90	0.31
11	Repairing charges					1414.20	0.69
12	Insurance premium					2475.71	1.20
13	Working capital					48387.32	23.52
14	Interest on working capital					5806.48	2.82
15	Depreciation					5596.00	2.72
16	Land revenue					79.73	0.04
17	Cost A_1					59869.53	29.10
18	Rent paid for leased in land					0.00	0.00
19	Cost A_2					59869.53	29.10
20	Amortization cost					34553.02	16.79
21	Interest on fixed capital @ 10%					8995.37	4.37
22	Cost B_1					103417.92	50.27
23	Rental value of land					72284.05	35.13
24	Cost B_2					175701.97	85.40
25	Family labour		Days	41.68	271.97	11336.80	5.51
26	Cost C_1					114754.72	55.78
27	Cost C_2					187038.77	90.91

28	10% of Cost C_2					18703.88	9.09
29	Cost C_3					205742.65	100.00
30	Yield per hectare	qtl				161.67	
31	Per qtl.cost for main produce at cost C_3					1272.61	

Table 3 observed that the per hectare cost of cultivation of overall farmers at cost C_3 was Rs. 205742.65. Among the different items of expenditure hired labour was highest share in cost A_1 with Rs. 15147.69 i.e. 7.36 percent. Expenditure on working capital was accounted Rs. 48387.32 (23.52 %). The cost of A_1 and A_2 was Rs. 59869.53 (29.10 %). Per hectare requirement of family labour was Rs. 11336.80 (5.51 %). The cost B_1 and cost B_2 was Rs.103417.92 (50.27 %) and Rs.175701.57 (85.40%) respectively.

Economics of Sweet orange Cultivation
It is revealed from table 4 that, the per hectare average yield for small, medium and large farmers was 159.30 quintals 160.58 quintals and 164.68 quintals respectively and the overall farmers was 161.67 quintals indicating that the increasing in yield with the increase in size of land holdings of farmers. The per quintal average rate were obtained was Rs 2668.92, Rs. 2703.18 and Rs. 2683.77 for small, medium and large farmers respectively and overall, it was Rs 2685.61. The average gross returns were obtained was Rs. 425158.70, Rs. 439174.19 and Rs. 441963.66 for small, medium and large farmers respectively and overall, it was Rs. 434182.95. Whereas the cost of production at cost C_3 was of small, medium and large farmers was Rs. 209092.26, Rs. 204455.09 and Rs.204050.06 respectively and at overall farmers the net returns was Rs. 205742.70.

The average per hectare net return received at cost C_3 by the small medium and large sweet orange farmers was Rs. 216066.44, Rs. 29623.13 and Rs. 237913.60 respectively and at overall farmers the net returns was Rs. 228440.25. The output-input ratio at cost C_3 for small, medium and large farmers was 2.03, 2.15 and 2.17 respectively. At overall the output-input ratio was 2.11.

The input output ratio which is an indicator of economic efficiency in crop production for the crop and it indicated that the sweet orange registered a good input output ratio i.e. 2.11. As from the result it is cleared that sweet orange is profitable crop enterprise hence our hypothesis is accepted and proved.

Table 4: Economics of sweet orange Cultivation (Rs/ha)

Sr. No.	Particulars	Small	Medium	Large	Overall
1	Main Produce (q/ha)	159.30	160.58	164.68	161.67
2	Rate per quintal	2668.92	2734.92	2683.77	2685.61
3	Gross return	425158.70	439174.19	441963.66	434182.95
4	Cost of cultivation at				
	Cost A_1	61085.04	58307.06	60242.39	59869.57
	Cost A_2	61085.04	58307.06	60242.39	59869.57
	Cost B_1	102854.00	101801.27	105355.22	103417.96
	Cost B_2	173638.91	174088.83	178912.99	175702.01
	Cost C_1	119298.97	113580.70	111942.28	114754.76
	Cost C_2	190083.87	185868.27	185500.06	187038.81
	Cost C_3	209092.26	204455.09	204050.06	205742.70
5	Net return at				
	Cost A_1	364073.66	380867.14	381721.27	374313.37
	Cost A_2	364073.66	380867.14	381721.27	374313.37
	Cost B_1	251519.80	265085.36	263050.67	258480.93
	Cost B_2	251519.80	265085.36	263050.67	258480.93
	Cost C_1	305859.73	325593.49	330021.38	319428.18
	Cost C_2	235074.83	248209.96	256463.60	247144.13
	Cost C_3	216066.44	229623.13	237913.60	228440.25
6	Input Output Ratio at				
	Cost A_1	6.96	7.53	7.34	7.25
	Cost A_2	6.96	7.53	7.34	7.25
	Cost B_1	4.13	4.31	4.19	4.20
	Cost B_2	2.45	2.52	2.47	2.47
	Cost C_1	3.56	3.87	3.95	3.78
	Cost C_2	2.24	2.36	2.38	2.32
	Cost C_3	2.03	2.15	2.17	2.11

Constraints in production
All the selected sweet orange farmers were interviewed for the problems they are facing while producing of sweet orange.

The information regarding the important problems faced by the farmers is presented in table 5

Table 5: Constraints in production and marketing (Nos)

Sr. No.	Particulars	No. of farmers	Percentage to total
1	Non-availability of quality graft of recommended variety	93	77.50
2	High cost of graft	71	59.17
3	Labour not available at proper time	50	41.67
4	High Labour wages rate	84	70.00
5	Non-availability of fertilizer at required time	44	36.67
6	High cost of fertilizer	87	72.50
7	Uncertain of electric supply	38	31.67
8	Lack of plant protection knowledge	42	35.00
9	Difficulties in getting loan	68	56.67

It is observed from table 5, that the perceived constraint faced by farmer in production like Non-availability of quality rootstock of recommended variety, high cost of graft, labour not available at proper time of various practices, high labour wages rate, Non-availability of fertilizer at required time, high cost of fertilizer, Uncertain of electric supply during irrigation of sweet orange, lack of plant protection knowledge during spraying insecticides and pesticides, difficulties in getting loan for sweet orange orchard. Among these Non-availability of quality graft of recommended variety rank 1st with 77.50 percent followed by high cost of fertilizer, high labour wages rate, high cost of graft, difficulties in getting loan, labour not available at proper time, non-availability of fertilizer at required time, lack of plant protection knowledge, and uncertain electric supply with 72.50 percent, 70.00 percent, 59.17 percent, 56.67 percent, 41.67 percent, 36.67 percent, 35.00 percent, and 31.67 percent.

Conclusion
Per hectare cost of establishment for five year was Rs. 271004.05 and amortization Rs. 34553.02.The input output ratio which is an indicator of economic efficiency in crop production for crop and it indicated that the sweet orange registered a good input output ratio i.e. 2.11. Major constraint in production of sweet orange was non-availability of quality rootstock of recommended variety

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