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Economics of production of selected flowers in Nagpur district

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Abstract

The present study entitled "Economics of production of selected flowers in Nagpur district", was undertaken in Nagpur district. In overall 60 flower growers consisting 20 growers of each selected flower viz. Rose, Tuberose and Marigold were selected. The per hectare cost of cultivation of Rose was Rs. 1067736.04 for two years, in Tuberose it was Rs. 677916.10 for two years and in Marigold it was Rs. 177293.36. The major items of cost of cultivation were human labour, planting material, machinery charge, manures, fertilizers and imputed rental value of land. The total net returns received in Rose and Tuberose for two years was Rs. 1819959.62 and Rs. 579881.25 respectively and in Marigold it was observed Rs. 99785.02. The average input output ratio at cost C₃ was found 2.71, 1.86 and 1.56 for Rose, Tuberose and Marigold respectively. It is greater than 1, therefore cultivation of selected flowers in open field is profitable. Thus, the net profit increased with the increase in the size of holdings. The input output ratio at cost C₃ was highest in Rose followed by Tuberose and Marigold.

Keywords: Flowers, rose, tuberose, marigold, cost of cultivation, gross returns, net returns, input-output ratio

Introduction

Floriculture, commonly referred to as flower cultivation, is rapidly making its mark in the industry. Floriculture in India comprises flowers such as Rose, Tuberose, Anthurium, Carnation, Marigold, Chrysanthemum, Aster, Gaillardia etc. Flowers have always been an important component of Indian culture. Yet floriculture is not as advanced as it should have been in India. The industry is still in the early stages and has tremendous potential because soil, climates, labour, transport and the market are important factors that determine their scale of commercial floriculture. Consequently, the potential of growth is enormous. When floriculture is scientifically established on the pattern of industry, it will thrive and create enormous money and jobs. Commercial flower cultivation has been found to have greater capacity per unit area than other crops and is therefore a lucrative business. The Indian floriculture industry has moved from conventional to export flowers. The farming, cropping, and cultivation of flowers take place in farmlands (open field conditions) as well as protected conditions such as poly and greenhouses.

Floriculture in India alone is a significant part of the big cake (GDP) in India. It alone accounts for around INR 231.7 billion in 2022 as per statistics by Statista. The total area under cultivation of different flowers in India was estimated to be 322 thousand ha with the production of 828 thousand MT of cut flowers and 2152 thousand MT of loose flowers in 2020-21. The export of floricultural products has shown tremendous growth in last 10 years. The export of floriculture products from India in 2020-21 was 15695.32 MT fetched a foreign exchange of Rs. 57598.45 lacs.

Maharashtra is one of the leading producers of flowers in the country. Floriculture in Maharashtra is mainly concentrated in the districts like Pune, Nasik, Sangli, Kolhapur, Thane, Nagpur, Akola, Amravati and Satara having total area of about 11.41 thousand ha. with the production of 0.36 thousand MT of cut flowers and 61.69 thousand MT of loose flowers. The export of floriculture product from Maharashtra state in 2020-21 was 1350.55 MT fetched a foreign exchange of Rs.13302.46 lacs.

Materials and Methods

The multistage sampling technique was used for drawing a sample for the present study. At first stage of selection, 3 tahsils in Nagpur district viz. Nagpur, Hingana and Kalmeshwar were selected purposively.

At the second stage, 2 villages in each selected tahsils were selected. On the third stage of selection, 60 flower growers were selected as respondents of the study.

For the present study primary data was collected from selected flower growers by survey method using pretested questionnaires for the year 2021-22.

Cost structure

Rose and Tuberoses flowers are perennial with an economic life span of 4-5 and 2-3 years respectively. The cost incurred in cultivation of these flowers was classified into two groups *viz.*

1. Establishment cost (cost for year I)
2. Maintenance cost (cost for year II)

The establishment cost included all the expenses incurred during pre flowering period of flower cultivation *viz.* land preparation, soil sterilization, bed preparation, FYM application, planting of seedlings.

Expenses incurred on input services like human labour utilized for fertigation, irrigation, plant protection, weeding and services of machineries and charges on material inputs such as manures, fertilizers, plant protection chemicals, considered as maintenance costs during flowering period.

Marigold is a seasonal flower crop. Thus cost incurred in cultivation of marigold is calculated by using standard cost concept for a season.

Cost of Cultivation

The evaluation of the cost of cultivation of selected flowers has been worked out by following consideration. The standard cost concepts *viz.* Cost A₁, Cost A₂, Cost B₁, Cost B₂, Cost C₁, Cost C₂ and Cost C₃ will be computed in study.

Cost A₁: It is actual cost paid out by cultivator in the form of cash and kind. It approximates the actual expenditure incurred by the farmers. This cost includes expenditure on following items.

1. Wages of hired human labour
2. Wages of permanent labour
3. Wages of contract labour
4. Wages of hired bullock labour
5. Imputed value of owned bullock labour
6. Charges of hired machinery
7. Imputed value of owned machinery
8. Market rate of manures and fertilizers
9. Market rate of seeds / planting material
10. Imputed value of owned seed
11. Imputed Value of manure
12. Market value of pesticides, herbicides, hormones etc.
13. Irrigation charges
14. Land revenue, cesses and other taxes
15. Depreciation on farm machinery, implements, equipment, farm buildings and Irrigation structure etc.
16. Interest on working capital.
17. Miscellaneous expenses.

Cost A₂ = Cost A₁ + rent paid for leased-in land.

Cost B₁ = Cost A₁ + interest on fixed capital assets

(excluding land)

Cost B₂ = Cost A₁ + rental value of owned land + 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 + 10% of Cost C₂ on account of managerial functions performed by farmers.

Gross returns

Gross returns from flowers enterprises was calculated by multiplying total production of the main product and by product of each of the flowers grown.

Net profit

Net profit is calculated by subtracting annual total cost of flower production from annual total returns derived from the respective flower enterprise.

Input output ratio

Input output ratio was worked out by dividing annual total returns received from the flowers by its annual total cost of production.

Results and Discussion

Cost and Returns of the selected flower growers

The profitability of any enterprise depends upon income generating capacity and cost structure. The cost has determined on the basis of standard cost concepts i.e. cost A₁, A₂, B₁, B₂, C₁, C₂ and C₃. Here an attempt has been made to estimate the figures of cost of cultivation of selected flower crop in the study area and presented in succeeding tables.

Per hectare cost of cultivation of Rose

The Rose is economically beneficial crop for 4-5 years hence establishment cost (cost for I year) and maintenance cost (cost for II year) was calculated.

Establishment Cost of Rose (I year)

This includes all the expenses incurred during year I of Rose cultivation *viz.* land preparation, soil sterilization, bed preparation, FYM and fertilizer application, planting of seedlings etc.

The per hectare cost of cultivation of Rose grown in open field condition for year I is presented in Table 1.

It is revealed from the Table 1 that, the per hectare cost of cultivation of Rose at cost A₁, cost A₂, cost B₁, cost B₂, cost C₁, cost C₂ and cost C₃ were Rs. 224273.87, Rs. 224273.87, Rs. 230255.09, Rs. 426757.65, Rs. 255977.31, Rs. 452479.87 and Rs. 497727.85 respectively. The major share of cost of cultivation goes towards cost A₁ and A₂ (45.06 percent). In cost A₁ share of hired human labour was 15.07 percent, planting material 13.05 percent, machine charges 1.91 percent, fertilizers 3.75 percent, plant protection 3.98 percent. The cost B₁ contributes to 46.26 percent, cost B₂ contributes to 85.74 percent. The share of family labour was 5.17 percent. The per hectare yield obtained during I year was 269.62 quintals with gross returns of Rs. 1215918.80. The per quintal cost of production for Rose was Rs. 1846.03.

Table 1: Per hectare cost of cultivation of Rose (I year)

Sr. No	Particulars	Units		Input /ha.	Cost /unit (Rs.)	Total cost (Rs.)	% to cost C ₃
1	Hired Human Labour	Male	Days	78.08	237.17	18518.16	3.72
		Female	Days	376.67	150.00	56500.00	11.35
	Subtotal		Days	454.75	164.97	75018.16	15.07
2	Bullock labour		Pair Days	0.76	455.65	346.29	0.07
3	Machine charges		Hrs.	9.49	1000.60	9495.73	1.91
4	Planting material		No.	6900.94	9.41	64930.51	13.05
5	Manure		CL.	20.89	513.27	10722.22	2.15
6	Fertilizers	NPK	Kg.	582.01	23.85	13881.01	2.79
		Calcium nitrate	Kg.	9.87	240.04	2369.23	0.48
		Micro-Nutrients	Kg.	17.82	125.00	2408.65	0.49
	Subtotal		Kg.	612.11		18658.89	3.75
7	Irrigation Charges		Rs.			5430.26	1.09
8	Plant Protection		Ltrs.	21.87	906.26	19819.87	3.98
9	Incidental Charges		Rs.			1570.89	0.32
10	Repairing Charges		Rs.			676.87	0.14
11	Working Capital		Rs.			206669.69	41.52
12	Int. on Working Capital @ 6%/annum		Rs.			12400.18	2.49
13	Depreciation		Rs.			5034.64	1.01
14	Land Rev. Cess and Other taxes		Rs.			169.35	0.03
15	Cost A ₁					224273.87	45.06
16	Rent paid for leased in land		Rs.			-	-
17	Cost A ₂		Rs.			224273.87	45.06
18	Int. on Fixed Capital 10% / annum		Rs.			5981.22	1.20
19	Cost B ₁		Rs.			230255.09	46.26
20	Rental value of land		Rs			202483.78	40.68
21	Cost B ₂		Rs.			426757.65	85.74
22	Family Human Labour	Male	Days	76.71	250.00	19177.35	3.85
		Female	Days	43.63	150.01	6544.87	1.31
	Subtotal		Days	120.34	213.75	25722.22	5.17
23	Cost C ₁		Rs.			255977.31	51.43
24	Cost C ₂		Rs.			452479.87	90.91
25	10% of Cost C ₂		Rs.			45247.98	9.09
26	Cost C ₃		Rs.			497727.85	100.00
27	Yield per hectare	Main Produce	Qtls.	269.62	4509.75	1215918.80	
28	Per Quintal Cost of Production		Rs.			1846.03	

Maintenance Cost of Rose (II year)

This includes expenses incurred on input services like human labour utilized for fertigation, irrigation, plant protection, weeding and services of machineries and charges on material inputs such as manures, fertilizers, plant protection chemicals, considered as maintenance costs during flowering period.

The per hectare cost of cultivation of Rose grown in open field condition for year II is presented in Table 2.

It is revealed from the Table 2 that, the per hectare cost of cultivation of Rose at cost A₁, cost A₂, cost B₁, cost B₂, cost C₁, cost C₂ and cost C₃ were Rs. 206218.45, Rs. 206218.45,

Rs. 212199.67, Rs. 484678.58, Rs. 245710.35, Rs. 518189.26 and Rs. 570008.19 respectively. The major share of cost of cultivation goes towards cost A₁ and A₂ (50.03 percent). In cost A₁ share of hired human labour was 26.94 percent, fertilizers 5.00 percent, plant protection 10.51 percent. The cost B₁ contributes to 51.45 percent, cost B₂ contributes to 82.91percent. The share of family labour was 8.00 percent. The per hectare yield obtained was 320.86 quintals with gross returns of Rs. 1671776.86. The per quintal cost of production for Rose was Rs. 1776.50.

Table 2: Per hectare cost of cultivation of Rose (II year)

Sr. No	Particulars		Units	Input /ha.	Cost /unit (Rs.)	Total cost (Rs.)	% to cost C ₃
1.	Hired Human Labour	Male	Days	83.08	233.04	19361.11	4.62
		Female	Days	622.86	150.00	93429.49	22.31
	Subtotal		Days	705.94	159.77	112790.60	26.94
2.	Bullock labour		Pair Days	-	-	-	-
3.	Machine charges		Hrs.	-	-	-	-
4.	Planting material		No.	-	-	-	-
5.	Manure		CL.	8.21	513.27	4213.95	1.70
6.	Fertilizers	NPK	Kg.	329.78	47.20	15565.48	3.72
		Calcium nitrate	Kg.	10.89	240.16	2615.38	0.62
		Micro-nutrients	Kg.	18.33	125.02	2773.29	0.67
	Subtotal		Kg.			20954.15	5.00
7.	Irrigation Charges		Rs.			5430.26	1.30
8.	Plant Protection		Ltrs.	39.53	1113.07	43999.57	10.51
9.	Incidental Charges		Rs.			1570.89	0.38
10.	Repairing Charges		Rs.			676.89	0.16
11.	Working Capital		Rs.			189636.29	46.02
12.	Int. on working Capital @ 6% / annum		Rs.			11378.18	2.76
13.	Depreciation		Rs.			5034.64	1.20
14.	Land Rev. Cess and Other taxes		Rs.			169.35	0.04
15.	Cost A ₁					206218.45	50.03
16.	Rent paid for leased in land		Rs.			0	0
17.	Cost A ₂		Rs.			206218.45	50.03
18.	Int. on Fixed Capital 10% / annum		Rs.			5981.22	1.43
19.	Cost B ₁		Rs.			212199.67	51.45
20.	Rental value of land		Rs			278460.13	32.88
21.	Cost B ₂		Rs.			484678.58	82.91
22.	Family Human Labour	Male	Days	103.11	233.86	24113.24	5.76
		Female	Days	62.65	149.99	9397.44	2.24
	Subtotal		Days	165.76	202.16	33510.68	8.00
23.	Cost C ₁		Rs.			245710.35	59.46
24.	Cost C ₂		Rs.			518189.26	90.91
25.	10% of Cost C ₂		Rs.			51818.93	9.09
26.	Cost C ₃		Rs.			570008.19	100.00
27.	Yield per hectare	Main Produce	Qtls.	320.86	5210.30	1671776.86	
28.	Per Quintal Cost of Production		Rs.			1776.50	

Per hectare cost of cultivation of Tuberose

The Tuberose is economically beneficial crop for 2-3 years hence establishment cost (cost for II year) and maintenance cost (cost for II year) was calculated.

Establishment Cost of Tuberose (I year)

This includes all the expenses incurred during year I for Tuberose cultivation viz. land preparation, soil sterilization, bed preparation, FYM and fertilizer application, planting of seedlings etc.

The per hectare cost of cultivation of Tuberose grown in open field condition for year I is presented in Table 3.

It is revealed from the Table 3 that, the per hectare cost of

cultivation of Tuberose at cost A₁, cost A₂, cost B₁, cost B₂, cost C₁, cost C₂ and cost C₃ were Rs. 205726.09, Rs. 205726.09, Rs. 210707.31, Rs. 301975.10, Rs. 236292.39, Rs. 327560.18 and Rs. 360316.20 respectively. The major share of cost of cultivation goes towards cost A₁ and A₂ (57.10 percent). In cost A₁ share of hired human labour was 17.09 percent, planting material 20.84 percent, machine charges 2.37 percent, fertilizers 4.33 percent, plant protection 2.92 percent. The cost B₁ contributes to 58.48 percent, cost B₂ contributes to 83.81 percent. The share of family labour was 7.10 percent. The per hectare yield obtained was 84.50 quintals with gross returns of Rs. 578432.08. The per quintal cost of production for Tuberose was Rs. 4264.10.

Table 3: Per hectare cost of cultivation of Tuberose (I year)

Sr. No	Particulars	Units		Input /ha.	Cost/unit (Rs.)	Total cost (Rs.)	% to cost C ₃
1.	Hired Human Labour	Male	Days	57.39	230.05	13202.66	3.66
		Female	Days	312.96	154.63	48392.08	13.43
	Subtotal		Days	370.35	166.52	61594.74	17.09
2.	Bullock labour		Pair Days	1.65	476.78	786.68	0.22
3.	Machine charges		Hrs.	8.52	1001.04	8528.86	2.37
4.	Planting material		Qtl.	27.75	2705.43	75075.74	20.84
5.	Manure		CL	20.95	481.15	10080.09	2.80
6.	Fertilizers	NPK	Kg.	361.12	32.06	11578.26	3.21
		Calcium nitrate	Kg.	8.81	240.18	2115.97	0.59
		Micro-nutrients	Kg.	15.32	125.04	1915.68	0.53
	Subtotal		Kg.	385.25		15609.91	4.33
7.	Irrigation Charges		Rs.			4670.25	1.30
8.	Plant Protection		Ltrs.	14.28	736.42	10516.00	2.92
9.	Incidental Charges		Rs.			1456.25	0.40
10.	Repairing Charges		Rs.			563.69	0.16
11.	Working Capital		Rs.			188882.21	52.42
12.	Int. on working Capital @ 6% /annum		Rs.			11332.93	3.15
13.	Depreciation		Rs.			5354.61	1.49
14.	Land Rev. Cess and Other taxes		Rs.			156.33	0.04
15.	Cost A ₁					205726.09	57.10
16.	Rent paid for leased in land		Rs.			0.00	0.00
17.	Cost A ₂		Rs.			205726.09	57.10
18.	Int. on Fixed Capital 10%/ annum		Rs.			4981.22	1.38
19.	Cost B ₁		Rs.			210707.31	58.48
20.	Rental value of land		Rs			96249.02	26.71
21.	Cost B ₂		Rs.			301975.10	83.81
22.	Family Human Labour	Male	Days	67.04	206.53	13845.63	3.84
		Female	Days	76.98	152.50	11739.45	3.26
	Subtotal		Days	144.02	177.65	25585.08	7.10
23.	Cost C ₁		Rs.			236292.39	65.58
24.	Cost C ₂		Rs.			327560.18	90.91
25.	10% of Cost C ₂		Rs.			32756.02	9.09
26.	Cost C ₃		Rs.			360316.20	100.00
27.	Yield per hectare	Main Produce	Qtls.	84.50	6845.35	578432.08	
28.	Per Quintal Cost of Production		Rs.			4264.10	

Maintenance Cost of Tuberose (II year)

This includes expenses incurred on input services like human labour utilized for fertigation, irrigation, plant protection, weeding and services of machineries and charges on material

inputs such as manures, fertilizers, plant protection chemicals, considered as maintenance costs during flowering period.

The per hectare cost of cultivation of Tuberose grown in open field condition for year II is presented in Table 4.

Table 4: Per hectare cost of cultivation of Tuberose (II year)

Sr. No	Particulars	Units		Input /ha.	Cost/unit (Rs.)	Total cost (Rs.)	% to cost C ₃
1.	Hired Human Labour	Male	Days	95.44	227.63	21724.85	6.84
		Female	Days	403.85	154.77	62504.44	19.68
	Subtotal		Days	499.29	168.70	84229.29	26.52
2.	Bullock labour		Pair Days	2.56	399.87	1023.67	0.32
3.	Machine charges		Hrs.	-	-	-	-
4.	Planting material		No.	-	-	-	-
5.	Manure		CL	13.37	481.15	6432.98	2.03
6.	Fertilizers	NPK	Kg.	327.46	30.35	9937.50	3.13
		Calcium nitrate	Kg.	9.70	240.10	2328.99	0.73
		Micro-nutrients	Kg.	13.25	125.04	1656.80	0.52
	Subtotal		Kg.	350.41		13923.29	4.38
7.	Irrigation Charges		Rs.			4670.25	1.47
8.	Plant Protection		Ltrs.	19.05	944.13	17985.61	5.66
9.	Incidental Charges		Rs.			1456.25	0.46
10.	Repairing Charges		Rs.			563.69	0.18
11.	Working Capital		Rs.			130285.03	41.02
12.	Int. on working Capital @6% /annum		Rs.			7817.10	2.46
13.	Depreciation		Rs.			5354.61	1.69
14.	Land Rev. Cess and Other taxes		Rs.			156.33	0.05
15.	Cost A ₁					143613.07	45.22
16.	Rent paid for leased in land		Rs.			0	0.00

17.	Cost A ₂		Rs.			143613.07	45.22
18.	Int. on Fixed Capital 10% / annum		Rs.			4981.22	1.57
19.	Cost B ₁		Rs.			148594.29	46.79
20.	Rental value of land		Rs.			113071.22	35.60
21.	Cost B ₂		Rs.			256684.28	80.82
22.	Family Human Labour	Male	Days	99.35	205.86	20452.66	6.44
		Female	Days	75.68	153.15	11590.24	3.65
	Subtotal		Days	175.03	183.07	32042.90	10.09
23.	Cost C ₁		Rs.			180637.19	56.88
24.	Cost C ₂		Rs.			288727.18	90.91
25.	10% of Cost C ₂		Rs.			28872.72	9.09
26.	Cost C ₃		Rs.			317599.90	100.00
27.	Yield per hectare	Main Produce	Qtls.	97.57	6962.85	679365.27	
28.	Per Quintal Cost of Production		Rs.			3255.10	

It is revealed from the Table 4 that, the per hectare cost of cultivation of Tuberose at cost A₁, cost A₂, cost B₁, cost B₂, cost C₁, cost C₂ and cost C₃ were Rs. 143613.07, Rs. 143613.07, Rs. 148594.29, Rs. 256684.28, Rs. 180637.19, Rs. 288727.18 and Rs. 317599.90 respectively. The major share of cost of cultivation goes towards cost A₁ and A₂ (45.22 percent). In cost A₁ share of hired human labour was 26.52 percent, fertilizers 4.38 percent, plant protection 5.66 percent. The cost B₁ contributes to 46.79 percent, cost B₂ contributes

to 80.82 percent. The share of family labour was 10.09 percent. The per hectare yield obtained was 97.57 quintals with gross returns of Rs. 679365.27. The per quintal cost of production for Tuberose was Rs. 3255.10.

Per hectare cost of cultivation of Marigold

The per hectare cost of cultivation of Marigold grown in open field condition is presented in Table 5.

Table 5: Per hectare cost of cultivation of Marigold

Sr. No	Particulars	Units	Input /ha.	Cost /unit (Rs.)	Total cost (Rs.)	% to cost C ₃	
1.	Hired Human Labour	Male	Days	26.06	250.04	6516.05	3.68
		Female	Days	175.79	150.01	26369.69	14.87
	Subtotal		Days	201.85	162.92	32885.74	18.55
2.	Bullock labour		Pair Days	1.04	447.73	465.64	0.26
3.	Machine charges		Hrs.	8.74	900.48	7870.19	4.44
4.	Planting material		No.	17977.66	1.61	28992.12	16.35
5.	Manure		Qtls.	14.88	525.60	7820.88	4.41
6.	Fertilizers	NPK	Kg.	169.99	23.24	3949.79	2.23
		Calcium nitrate	Kg.	1.89	240.65	454.82	0.26
		Micro-nutrients	Kg.	3.93	124.84	490.64	0.28
	Subtotal		Kg.	175.81		4895.25	2.76
7.	Irrigation Charges		Rs.		4459.87	2.52	
8.	Plant Protection		Ltrs.	3.69	1070.76	3951.11	2.23
9.	Incidental Charges		Rs.		1304.71	0.74	
10.	Repairing Charges		Rs.		541.40	0.31	
11.	Working Capital		Rs.		93186.91	52.56	
12.	Int. on working Capital @ 6% /annum		Rs.		5591.21	3.15	
13.	Depreciation		Rs.		4729.77	2.67	
14.	Land Rev. Cess and Other taxes		Rs.		209.65	0.12	
15.	Cost A ₁				103717.54	58.50	
16.	Rent paid for leased in land		Rs.		0	0.00	
17.	Cost A ₂		Rs.		103717.54	58.50	
18.	Int. on Fixed Capital 10% / annum		Rs.		1885.73	1.06	
19.	Cost B ₁		Rs.		105603.27	59.56	
20.	Rental value of land		Rs.		45970.08	25.93	
21.	Cost B ₂		Rs.		149687.62	84.43	
22.	Family Human Labour	Male	Days	35.78	250.01	8945.47	5.05
		Female	Days	16.95	150.01	2542.69	1.43
	Subtotal		Days	52.73	217.87	11488.16	6.48
23.	Cost C ₁		Rs.		117091.43	66.04	
24.	Cost C ₂		Rs.		161175.78	90.91	
25.	10% of Cost C ₂		Rs.		16117.58	9.09	
26.	Cost C ₃		Rs.		177293.36	100.00	
27.	Yield per hectare	Main Produce	Qtls.	116.80	2372.25	277078.38	
28.	Per Quintal Cost of Production		Rs.		1517.92		

It is revealed from the Table 5 that, the per hectare cost of cultivation of Marigold at cost A₁, cost A₂, cost B₁, cost B₂, cost C₁, cost C₂ and cost C₃ were Rs. 103717.54, Rs.

103717.54, Rs. 105603.27, Rs. 149687.62, Rs. 117091.43, Rs. 161175.78 and Rs. 177293.36 respectively. The major share of cost of cultivation goes towards cost A₁ and A₂ (58.50

percent). In cost A₁ share of hired human labour was 18.55 percent, planting material 16.35 percent, machine charges 4.44 percent, fertilizers 2.73 percent, plant protection 2.23 percent. The cost B₁ contributes to 59.56 percent, cost B₂ contributes to 84.43 percent. The share of family labour was 6.48 percent. The per hectare yield obtained was 116.80 quintals with gross returns of Rs. 277078.38. The per quintal cost of production for Marigold was Rs. 1517.92.

Per hectare cost, returns and profitability of selected flowers

Year wise cost of cultivation, gross returns, net returns and input output ratio from Rose, Tuberose and Marigold are presented in Table 6.

The total yield in terms of flowers of Rose as received was

590.48 qtl during its economic life out of which 269.62 qtl and 320.86 qtl flowers were produced during first and second year respectively. The total gross returns from Rose was amounted to Rs. 2887695.66 which is the sum of Rs. 1215918.80 and Rs. 1671776.86 during first and second year respectively. The total cost of cultivation of Rose was worked out to Rs.

1067736.04, which is the total cost amounting to Rs. 497727.85 and Rs. 570008.19 during first and second year respectively. The total net returns accounted to Rs. 1819959.62 which included Rs. 718190.95 and Rs. 1101768.67 during first and second year respectively. The input output ratio was observed to be for total 2.71 and 2.44 and 2.93 during first and second year respectively.

Table 6: Per hectare cost, returns and profitability of selected flowers

Sr. No.	Particulars	Unit	Rose			Tuberose			Marigold
			I Year	II Year	Total	I Year	II Year	Total	I Year
1.	Yield	qtl/ha	269.62	320.86	590.48	84.50	97.57	182.07	116.80
2.	Gross returns	Rs.	1215918.80	1671776.86	2887695.66	578432.08	679365.27	1257797.35	277078.38
3.	Cost of cultivation	Rs.	497727.85	570008.19	1067736.04	360316.20	317599.90	677916.10	177293.36
4.	Net returns	Rs.	718190.95	1101768.67	1819959.62	218115.88	361765.37	579881.25	99785.02
5.	Input output ratio		2.44	2.93	2.71	1.61	2.14	1.86	1.56

The total yield in terms of flowers of Tuberose as received was 182.07 qtl during its economic life out of which 84.50 qtl and 97.57 qtl flowers were produced during first and second year respectively. The total gross returns from Tuberose was amounted to Rs. 1257797.35 which is the sum of Rs. 578432.08 and Rs. 679365.27 during first and second year respectively. The total cost of cultivation of Tuberose was worked out to Rs. 677916.10, which is the total cost amounting to Rs. 360316.20 and Rs.317599.90 during first and second years, respectively. The total net returns accounted to Rs. 579881.25 which included Rs. 218115.88 and Rs. 361765.37 during first and second year respectively. The input output ratio was observed to be for total 1.86 and 1.61 and 2.14 during first and second year respectively.

The total yield in terms of flowers of Marigold as received was 116.80 qtl during its economic life. The gross returns from Marigold was amounted to Rs. 277078.38. The cost of cultivation of Marigold was worked out to Rs. 177293.36. The net returns accounted to Rs. 99785.02. The Input output ratio was observed to be 1.56.

Conclusions

The total cost of cultivation of Rose was Rs. 1067736.04 for two years, in Tuberose was Rs. 677916.10 for two years and in Marigold was Rs. 177293.36. The cost of human labour, planting material is comparatively higher than other input costs. The major items of cost of cultivation were hired human labour, planting material, machinery charge, manures, fertilizers and imputed rental value of land.

The flower production in open field condition is labour intensive enterprise. Most of the sample growers purchased planting material for Rose and Tuberose from Pune market and seeds/seedlings for marigold from local/ Nagpur market. Nearly all sample growers used tube wells for irrigation.

The net returns received for Rose and Tuberose was Rs. 1819959.62 and Rs. 579881.25 for two years respectively and in Marigold it was observed Rs. 99785.02.

The average input output ratio at cost C₃ was found 2.71, 1.86 and 1.56. It is greater than 1, therefore cultivation of selected flowers in open field is profitable. Thus, the net profit

increased with the increase in the size of holdings. The input-output ratio at cost C₃ was highest in Rose followed by Tuberose and Marigold production.

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