



A Case Study

Economics of Hi-tech floriculture-A study in rose

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SUMMARY : Floriculture has a bright future and prospects. There is a great export market for modern flowers. It is worthwhile for India to increase its production of flowers in view of the tremendous demand for flowers from European and western countries. The cost of growing flowers in India is less compared to Holland, Israel, France but the quality should be maintained. There was vast scope for furthering floriculture provided some facilities like research in cut flowers availability of good seed and planting materials are created. There was not much variation in the cost of establishment of Hi-tech rose units in Bangalore and Dharmapuri, where as cost of cultivation of Hi-tech rose was more in Bangalore compared to Dharmapuri. Freight charges account for the major cost of cultivation. Hi-tech rose unit in Bangalore was more profitable compared to Dharmapuri hi-tech rose unit.

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Cut flowers, Planting materials, Yield and returns

BACKGROUND AND OBJECTIVES

India has a wide range of climatic and soil conditions which enable cultivation of an array of horticultural crops such as fruits, vegetables, floricultural plants, plantation crops, spices, medicinal and aromatic plants.

Floriculture has emerged as one of the leading industries in the world. Over the past decade, this sector has emerged as a viable diversification option for generating large foreign exchange earnings. The world market in floriculture is estimated at US \$ 50 billion. The floriculture industry is growing at a rate of 17 per cent per annum. Major exporting countries are Netherlands (53%), Columbia, Ecuador, EU, Israel, Kenya, and Zambia. The major importing countries are Germany, UK, USA, France, and Netherlands. Domestic market is growing at rate of 25 per cent annually.

The export of cut flower for all countries is about 3500 tonnes which values about 35 crores. The major flower producing states are Karnataka, Tamil Nadu, Andhra Pradesh, West Bengal and Maharashtra.

The Department of Agriculture and Co - operation in February 1999 defined hi-tech floriculture as “any floriculture technology, which is modern, less environment dependent, capital intensive and has the capacity to improve the productivity and quality of any floriculture crop.”

Export of cut flowers:

Export of cut flower has been shown in Table 1. In 2000-2001 exported quantity was 4000 tonnes and in 2004-2005 it is decreased to 3470 tonnes. The export value of cut flowers in the year 2004-2005 was 35.35 crores compared to previous year which was 45.74 crores. Export value was increasing up to 2004 -2005 then it is decreased.

Growth of flower industry in India:

Area under flowers in India during 1993-1994 was 0.53 lakh ha which increased to 1.16 lakh ha in 2004-2005 (Table 2). The production of loose flowers also increased from 2.3 lakh MT in 1993 - 1994 to 6.5 lakh MT in 2004-2005. The production of cut flower also increased from 555 lakh stems to 1952 lakh stems. Export value of flowers in 1993-

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Table 1 : India export statistics of cut flowers

Sr. No.	Financial year	Quantity ('000 tonnes)	Export value (Rs. in crores)	Export value (In US million \$)
1.	2000-01	4.04	39.08	8.69
2.	2001-02	4.65	37.99	8.44
3.	2002-03	4.35	43.22	9.60
4.	2003-04	3.14	45.74	10.16
5.	2004-05	3.47	35.35	7.86

Source: APEDA, Ministry of Commerce and Industry

2004 was Rs. 188.3 lakh and it increased to Rs. 2110 lakhs during 2004-2005. It indicates that there is a lot of scope to increase the area under flowers.

Table 2: India's track record of floriculture- A decade of growth

Component	1993-94	2004-05
Area ('000 ha)	53	116
Production of loose flowers (lakh MT)	2.3	6.5
Production of cut flowers (lakh stems)	555	1952

Source: Thippaiah (2005)

Economics of hi-tech rose cultivation:

The average establishment cost for one hectare of rose garden under controlled condition was found to be Rs. 125.38 lakhs in Bangalore and Rs. 120.57 lakhs in Dharmapuri and with an average of Rs. 122.86 lakhs (Table 3). The most important component of the establishment cost was buildings and other structures of about Rs. 66.28 which constituted about 54 per cent of the establishment cost. Of these, greenhouses alone constituted nearly 44 per cent of the total establishment cost. The cost of green houses was calculated as Rs. 50.94 lakhs in Bangalore and Rs. 57.44 lakhs in Dharmapuri. For one hectare, Bangalore units had invested about Rs. 10.13 lakhs on cold storage units while the Dharmapuri units spent around Rs. 7.78 lakhs that constitute about 8 per cent and 6.5 per cent, respectively. The land cost was about Rs. 1.07 lakh in Bangalore and Rs. 0.84 lakh in Dharmapuri.

The cost of establishing other structures including office buildings was Rs. 1.48 lakhs. The amount spent on equipment and implements was Rs. 2.24 lakhs, which constituted 1.82 per cent of the total establishment cost. The Bangalore units spent Rs. 2.39 lakhs per hectare while the Dharmapuri units spent Rs. 2.10 lakhs per ha towards equipment and implements. About Rs. 1.20 lakhs spent on fertigation unit which constitute about 50 per cent of the cost of equipments. The other major items in the establishment cost were air-conditioned van (Rs. 2.92 lakhs/ha) which constitute about 3 per cent of the total establishment cost and generators about 0.8 per cent (Rs. 0.96 lakhs/ha).

The material cost was Rs. 41.23 lakhs per hectare (34%) of which plant material cost was found to be the major item that was Rs. 36.29 lakhs which constituted about 30 per cent

Table 3: Cost of establishment of Hi-tech rose cultivation unit (Rs. in lakhs/ha)

Particulars	Bangalore	Dharmapuri	Pooled
Buildings and other structures			
Land	1.07 (0.85)	0.84 (0.70)	0.95 (0.77)
Green house structure	50.94 (40.63)	57.44 (47.64)	54.35 (44.24)
Cold storage structures	10.13 (8.08)	7.78 (6.45)	8.90 (7.24)
Packaging units	0.65 (0.52)	0.57 (0.47)	0.61 (0.50)
Office buildings	1.61 (1.28)	1.37 (1.14)	1.48 (1.20)
Sub-total	64.39 (51.36)	68.00 (56.40)	66.28 (53.95)
Equipments			
Sprayers	0.16 (0.13)	0.13 (0.11)	0.14 (0.11)
Fertigation unit	1.14 (0.91)	1.26 (1.05)	1.20 (0.98)
Bore wells	0.64 (0.51)	0.54 (0.45)	0.59 (0.48)
Trolleys	0.04 (0.03)	0.05 (0.04)	0.04 (0.03)
Grading equipments	0.42 (0.33)	0.12 (0.10)	0.26 (0.21)
Sub-total	2.39 (1.91)	2.10 (1.74)	2.24 (1.82)
Others			
Generators	0.99 (0.79)	0.94 (0.78)	0.96 (0.78)
Fence	0.54 (0.43)	0.32 (0.27)	0.42 (0.34)
Electricity installation	0.99 (0.79)	0.78 (0.65)	0.88 (0.72)
Office materials	0.13 (0.10)	0.12 (0.10)	0.17 (0.14)
A/C Van	3.43 (2.74)	2.45 (2.03)	2.92 (2.38)
Other vehicles	2.57 (2.05)	2.41 (2.00)	2.48 (2.02)
Head office fixed assets	0.57 (0.45)	0.68 (0.56)	0.63 (0.51)
Miscellaneous	4.85 (3.87)	4.44 (3.68)	4.63 (3.77)
Sub-total	14.06 (11.21)	12.23 (10.14)	13.10 (10.66)
Garden establishment cost			
Labour	2.59 (2.07)	1.76 (1.46)	2.15 (1.75)
Material			
Plant materials	38.73 (30.89)	34.07 (28.26)	36.29 (29.54)
Manure	1.47 (1.17)	0.91 (0.75)	1.17 (0.95)
Fertilizer	0.74 (0.59)	0.81 (0.67)	0.78 (0.63)
PPC	1.01 (0.81)	0.69 (0.57)	0.84 (0.68)
Sub-total	44.53 (31.52)	38.24 (31.72)	41.23 (33.56)
Total establishment cost (A+B+C+D)	125.38 (100)	120.57 (100)	122.86 (100)

Figures in parentheses indicate percentages to the total establishment cost

of the total establishment cost. Labour cost constituted about 2 per cent which was Rs. 2.15 lakhs on an average was spent on labour. However, in Dharmapuri, the amount spent on labour was less compared to Bangalore units. Manure cost accounted for almost Rs. 1.17 lakhs per ha and about Rs. 0.78 lakhs was spent on fertilizers and Rs. 0.84 lakhs on plant protection chemicals per hectare. On the whole, there was no much

difference in the establishment cost between Bangalore and Dharmapuri units. The pooled data showed that per hectare establishment cost was Rs. 122.86 lakhs.

Cost of cultivation of Hi -tech rose:

The cost of cultivation of one hectare of Hi -tech rose is given in Table 4, that was worked out to Rs. 121.82 lakhs. The average annual cost of cultivation was higher in Bangalore (Rs. 140.88 lakhs per hectare) when compared to Dharmapuri (Rs. 104.45 lakhs). The variable cost per hectare was Rs. 85.25 lakhs, which was 70 per cent of the total annual costs. The fixed cost was around Rs. 36.57 lakhs, which was about 30 per cent of the total annual costs. The fixed cost included interest on fixed capital which was calculated at the rate at which the commercial banks were lending to the hi -tech rose growers, amortized establishment cost (6.8 %) and depreciation of equipment, implement and machinery (11.8 %). There was not much difference in the fixed costs between Bangalore and Dharmapuri. On an average Rs. 13.94 was spent towards interest for the fixed capital. Depreciation is the major component of the fixed cost, accounted as Rs. 14.38 lakhs.

The variable cost in the case of Bangalore Hi -tech units were worked to Rs. 105 lakhs and it was 55 per cent higher than that of the Dharmapuri. Among the variable cost, freight cost and EEC cess levied by the importing countries formed

the major part accounting to 43 per cent and 28 per cent of the total variable costs, respectively. The next important cost item in hi -tech rose cultivation was grading and packing cost (Rs. 7.82 lakh). And the labour cost was about Rs. 3.84 lakhs.

Yield and returns of Hi -tech rose cultivation:

Table 5 depicts the yield and returns of Hi -tech rose cultivation. Bangalore units produced about 34.35 lakh flowers per hectare and it surpassed the productivity of Dharmapuri farms by over 58 per cent. On an average, from one hectare of Hi -tech firm, about 27.74 lakh flowers were produced. Of the total harvested flowers, nearly two -third of the quantity was exported and the remaining one -third was sold in the domestic market either as stems or as pieces. The average price of exported flower was Rs. 8.45/stem and it highly varied between season, quality of flowers, producer's profile etc. Whereas the price received by the producer per flower, which is sold in the domestic market was just Rs. 1.40 in Bangalore, Rs. 1.50 in Dharmapuri and Rs.1.46 on an average for both the regions. The gross returns generated from hi -tech units in Bangalore were 50 per cent more than that of Dharmapuri. The gross returns were Rs. 208 lakhs and Rs. 135 lakhs per hectare, respectively for Bangalore and Dharmapuri units. On an average, Hi -tech units got net returns worth Rs. 48.07 lakhs per hectare.

Table 4: Cost of cultivation of Hi-tech roses			(Rs. in lakhs/ha)
Particulars	Bangalore	Dharmapuri	Pooled
Fixed costs			
Interest on capital (16% p.a)	13.99(9.94)	13.89(13.31)	13.94(11.45)
Amortized establishment cost of structure	8.90(6.32)	7.65(7.32)	8.25(6.77)
Depreciation of equipments	13.37(9.50)	15.30(14.64)	14.38(11.81)
Sub-total	36.28(25.75)	36.84(35.27)	36.57(30.02)
Variable costs			
FYM and oil cakes	0.08 (0.06)	0.06 (0.06)	0.07 (0.06)
Fertilizers	2.45 (1.74)	1.79 (1.72)	2.11 (1.73)
Pesticides	2.23 (1.59)	1.16 (1.12)	1.67 (1.38)
Electricity charges	1.00 (0.71)	1.33 (1.28)	1.17 (0.97)
Labour cost	4.64 (3.30)	3.11 (2.97)	3.84 (3.15)
Office rent and stationary	2.02 (1.44)	1.13 (1.08)	1.56 (1.28)
Contingency	4.98 (3.54)	3.22 (3.09)	4.06 (3.33)
Domestic marketing charges	0.57 (0.41)	0.36 (0.35)	0.46 (0.38)
Grading and packing	9.58 (6.80)	6.21 (5.95)	7.82 (6.42)
Freight charges	45.79 (32.51)	28.99 (27.76)	36.99 (30.36)
Commission charges	0.49 (0.35)	0.33 (0.31)	0.41(0.33)
Export marketing charges	1.97 (1.40)	1.30 (1.25)	1.62 (1.33)
EEC cess	28.74 (20.40)	18.64 (17.85)	23.45 (19.25)
Sub-total	104.60(74.25)	67.61 (64.73)	85.25 (69.98)
Total annual cost (A+B)	140.88 (100)	104.45 (100)	121.82 (100)

Note: Figures in parentheses indicate percentages to the total cost of cultivation

Table 5: Yield and returns of Hi-tech rose cultivation

Particulars	Bangalore	Dharmapuri	Pooled
Exported flowers(in lakhs)	22.90	14.50	18.50
Locally sold flowers (in lakhs)	11.46	7.24	9.25
Total harvested flowers (in lakhs)	34.35	21.74	27.74
Export market price (Rs./flower)	8.37	8.58	8.45
Domestic market price (Rs./flower)	1.44	1.50	1.46
Gross returns (lakh rupees)	208.1	135.2	169.9
Total annual cost (lakh rupees)	140.88	104.45	121.82
Total variable cost (lakh rupees)	104.60	67.61	85.25
Net returns			
Over total costs (lakh rupees)	67.2	30.7	48.1
Over variable costs (lakh rupees)	103.5	67.5	84.6

Investment analysis of Hi -tech rose cultivation:

The economic life of the green house is 5 years. The opportunity cost of capital is assumed to be 15 per cent. The Net Present Value of investment in Bangalore (221.56) was much higher when compared to Dharmapuri (106) which is almost double of that of Dharmapuri (Table 6).

Table 6 : Investment analysis of Hi-tech rose cultivation (Per ha)

Particulars	Bangalore	Dharmapuri	Pooled
Economic life (years)	5	5	5
Net Present value (lakh Rs.)	221.56	106.00	160.91
Benefit-cost ratio	1.42	1.31	1.39
Internal rate of return (%)	78	48	63

Discount factor was taken as 15 per cent per annum

The benefit-cost ratio (BCR) for investment made on hi -tech rose cultivation was 1.42 and 1.31, respectively for Bangalore and Dharmapuri which indicates that hi -tech units yielded better returns for the investment made in Bangalore

than in Dharmapuri that is hi -tech units yield Rs. 1.39 for every rupee of investment.

Internal rate of returns of investment made in hi -tech rose cultivation was 63 per cent. Bangalore firms had more profitable with Internal Rate Returns of 78 per cent compared to Dharmapuri whose Internal Rate of Returns was 48 per cent. So, it is profitable to invest in the hi-tech floriculture units (Table 6).

Conclusion:

There was not much variation in the cost of establishment of hi-tech rose units in Bangalore and Dharmapuri, where as cost of cultivation of hi-tech rose was more in Bangalore compared to Dharmapuri. Freight charges account for the major cost of cultivation. Hi-tech rose unit in Bangalore was more profitable compared to Dharmapuri hi-tech rose unit. The net returns in Bangalore hi-tech rose units were more than the Dharmapuri hi -tech rose units. Investment on hi -tech rose unit is economically feasible.

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