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Economic Feasibility Analysis Of Major Cutflower Crops In Tamil Nadu

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Abstract: This study explored economic feasibility analysis cutflower in Tamil Nadu, using, net present value, benefit cost ratio and internal rate of return. Descriptive statistics were used for analyzing the problems and prospect of floriculture industry in the state. Variable cost for important cutflower crops such as carnation, gerbera, lilium, chrysanthemum and rose were estimated. It ranges between 4.5 lakh/10000 m^2 area. The Net Present Value (NPV) of different cutflower crops was positive and ranges between 44-54 lakhs. Benefit cost ratio (BCR) was estimated to be 2.34, 2.01, 4.34, 43.00, 2.00, 2.36 and 3.96 for carnation, gerbera, lilium, chrysanthemum and rose, respectively. Internal Rate of Return of all cutflowers was found to be high i.e. more than 70 per cent in case of every cutflower crop studied. Sensitivity analysis of different cutflower crops indicated that benefit cost ratio was more than unity and value of Internal Rate of Return was found to be more than 80 per cent which proves that investment in cutflower crops is financially feasible. Lack of training and technical know-how, problems related to post-harvest management of cutflower, non-availability of cold storage facilities, unavailability of local market, and high transportation, cost were among problems faced by sample of cut flower farmers.

Keywords: Benefit Cost Ratio (BCR), Net Present Value (NPV), Internal Rate of Return (IRR), Cutlflower production, Hi- Tech, floriculture industry.

I. Introduction

The state of Tamil Nadu comprised of wide variations of topographical and agro-climatic conditions, which offers ample opportunities to the farming communities in selecting crop enterprises of their choices in different parts of the state, depending on their household and commercial needs (National Horticulture Board, NHB 2015). In the last few decades the diversification of cropping systems has taken place in favour of

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cutflowers crops resulting, the state gaining name in the field of off-season cutflowers & vegetable cultivation under protected conditions TANFLORA report 2016). The climate of the state is quite congenial for the production of significant cutflowers i.e. carnation, rose, gerbera, lilium etc, which can fetch (be sold for) high prices in market especially during the off-season.

Ajay Kumar (2000) in his book has mentioned that, commercial floriculture is an activity which has assumed same importance only in recent times. Liberalized economic policies of government and the development initiatives have encouraged large number of enterprises. Consequently Floriculture industry has been experiencing rapid growth necessitating the increasing demand for cutflower products items, which need to be capitalized for the benefit of the farming community.

Floriculture is fast growing commercial enterprise in the state of Tamil Nadu and has been identified as one of the emerging and potential enterprise by the researchers and planners of the state. Bose TIC (1999) had mentioned in his article in Business Standard "Tamil Nadufloriculture industry set to bloom" that, floriculture is now emerging as a major activity in the hills of Tamil Nadu. K.Singh (2001) in his study "Economics of wild Marigold Production and Distillation in Tamil Nadu" concluded that, the production of wild marigold is more profitable than other crops like maize, pulses, and wheat and oil seeds. Among the horticultural crops covering fruits, vegetables spices, medicinal and aromatic plants and the like, floriculture constitutes an important segment (Geetha Nair (2007)). Farmers and other entrepreneurs recognizing the potential of floriculture have resulted in commercial production of cut cutflowers in the state which has steadily picked up the use of technology such as polyhouses/greenhouses. Again, congenial climatic conditions of the state, increasing demands, expanding markets, remunerative price structures and lucrative farm income from floral-enterprises have attracted the attention of innovative farmers.

Floriculture has huge potential as cutflower enterprise in terms of returns and employment generation especially for the small farmers. It has lower overhead costs, smaller farmers production cost per cutflower is about Rs. 0.90 and Rs.2.40 for larger farmers (Selvaraj 2003). Notwithstanding the benefits and potential of floriculture in the state, little research has been conducted to assess the profitability of floriculture in the state. Additionally, there is requirement to study problems and prospects of floriculture

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industry in the state so that particular problem identification and measurement can be done for the industry growth can be enhanced.

II. MATERIALS AND METHODS

Study area

Tamil Nadu is endowed with different agro-climatic conditions ranging from sub-tropical to dry temperate zones. Its climate ranges from sub-tropical to sub-arctic cold with an annual rainfall of 350 milimeters to 3800 millimeters. Its temperatures vary from -26 C to 43 C. (Agriculture of Planning Commission 2015). It has premium potential for growing off season cut cutflowers, as well as bulbs and seed multiplication. Area under floricultural crops in the state has arisen to 1010 ha during 2015-16 which has increased from only 36ha in 1995-2000. Ornamental crops grown according to maximum area are chrysanthemum, marigold, gladiolus, carnation, rose, potted plants, annuals, lilium, gerbera, daffodils, cutflower seeds and alstroemeria. (TANFLORA 2016).

Sample selection

The primary data were collected on specifically designed and pretested survey schedule through personal interview method. Two stage simple random sampling technique was for the selection of floriculturists. At the first stage the main cutflower growing districts of state were identified and three districts namely Hosur, Krishnagiri, Ooty, Kodaikanal were selected randomly. The list of floriculturists was prepared in consultation with the officers of the department of agriculture, horticulture and Institute of Indian council of Agriculture (ICAR). Finally, a sample of 150 floriculturists was selected randomly.

III. RESEARCH METHODOLOGY

Analytical Tools and Techniques

Descriptive statistics such as percentages and frequencies were used in the analysis of prospects of Hi-Tech floriculture and Problems in the industry. BCR, NPV and IRR were employed for the study of economic feasibility of the major cutflower crops.

Description of variables Working capital

This included the expenditures on the materials like planting material, plant protection, farm yard manure, organic and inorganic fertilizers, packing material, miscellaneous items and the expenditure on labour for accomplishing various production

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operations of different cutflower crops. In addition to this the expenditure are electricity charges, irrigation charges and transportation charges of produce at farmer's level were also included.

Fixed capital investment

The fixed capital investment included the expenditure on the land preparation, construction of polyhouse including drip/sprinkler irrigation along with accessories, water storage structure like water tanks, spray pumps and equipments.

Total capital investment

The total capital investment for different cutflower crops was estimated by using the formula: Total capital investment = Fixed capital investment + Working capital

Cost of cultivation: Cost of cultivation of cutflower crops was worked out by taking into consideration the variable and fixed cost and accordingly the returns over variable and total cost have been estimated by using the expressions:

Total variable cost = Working capital + Interest on total working capital @ 10 % on V yearly basis.

Fixed cost (FC) = Depreciation on fixed assets @ 10% + interest on fixed capital investment @ 10%.

Total cost = Fixed cost + Variable cost

Gross Return (GR) = Total production x Price per unit

Empirical Models

The financial analysis was done by adopting the approach used by Bentil and Bannor 2014. The financial models used are NPV, BC Ratio, IRR by considering the period of investment at 10 years and using the rate of discount at 10 per cent.

Net Present Value (NPV)

Net present value is the present worth of the net benefits or cash flow stream (Gittinger, 1996). Mathematically, the Net Present Value is estimated as follows:

$$NPV = \sum_{t=1}^{t=n} \frac{B_t - C_t}{(1+i)^t}$$

Where B_t denotes Benefit (Cash inflow) in year t, C_t denotes cost (Cash outflow) in year t, n denotes investment lifespan, I denotes cost of capital and t denotes time measured in years. If the calculated NPV is positive it implies the investment is viable, and where the NPV is equal to zero implies that the investment breaks even. The rule

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with NPV is to accept all mutually exclusive investments with a zero or greater NPV (Gittinger, 1996).

Benefit cost ratio (BCR)

The discounted gross benefit divided by the discounted gross cost. The B/C ratio measures the social equity and economic efficiency of resource utilization from the stand point of the society. A decision of B/C ratio is to accept projects with a ratio above one that is B/C>1. Its formula for estimation is as follows:

$$BCR = \sum_{t=1}^{n} \frac{Bt}{(1+i)} \Big/ \sum_{t=1}^{n} \frac{ICt}{(1+i)}$$

B , C, n, t, i as defined for NPV

t t

Internal Rate of Return (IRR)

This is the discount rate that makes the NPV of an investment equal to zero, i.e.

$$NPV = \sum_{t=1}^{t=n} \frac{B_t - C_t}{(1+IRR)^t} = 0$$

Excel was used in estimating the IRR of the identified potential investments. To calculate the IRR using interpolation method, two discount rates are estimated; one that gives small positive NPV and another that gives small negative NPV. The rule of thumb is that, the difference between the two discount rates should not be more than 5%. The method of interpolation is employed using the formula expressed as:

$$IRR = LDR + D\left(\frac{NPV_{LDR}}{|NPV_{HDR}| + NPV_{LDR}}\right)$$

Where, LDR denotes lower discount rate, HDR denotes higher discount rate, NPV_{HDR} denotes NPV calculated using higher discount rate, NPV_{LDR} denotes NPV calculated using lower discount rate and D denotes difference between lower and higher discount rates (< 5%). The decision rule is to accept all independent projects having an Internal Rate of Return equal to or greater than the cost or opportunity cost of capital (Gittinger, 1996). Specifically, if the IRR is greater than the cost of capital it implies that the investment is viable, when it is equal to the cost of capital the project will break even and when smaller than the cost of capital the investment is not viable.

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Assumptions

1. 1USD= 66Rupees
2. Agricultural loan interest rate= 12%

IV. RESULTS & DISCUSSION

Table 1: Cost of cultivation for the production of Carnation

S.No.	Particulars	Expenditure (Rs)		Percent
1	Area (m^2)	982.25	1001	
2	Seed	192223.22	195946.18	37.32
3	FYM/Compost	6012.11	6128.53	2.14
4	Fertilizers	13761	14027.50	3.6
5	Plant protection	13765.44	14032.03	3.6
6	Soil treatment	10889.88	11100.78	3.06
7	Human labour	90223.22	91970.64	18.05
8	Other Charges (electricity charges	6001	6117.20	2.13
9	Post harvest management	7389.88	7532.99	3.4
10	Total Working Capital	340258.77	346848.88	65.29
11	Interest on Working Capital	17019.89	17343.39	4.21
12	Total Variable Cost	357220.66	364191.27	68.5
13	Cost of poly house	825001	840765.33	
14	Farm Machinery and equipments	35835	35835	
15	Total Fixed Investment	860835	876599.33	
16	Depreciation on Fixed Asset	86084.4	87660.83	17.25
17	Interest on Fixed Investment	86084.4	87660.83	17.25
18	Total Fixed Cost	172167.8	175320.66	33.5
19	Total Cost	529438.46	539510.93	101
	Production and Gross Returns Total			
1		267778.77	272895.55	
2	Price per unit	5.25	5.25	
3	Gross Return	1138056.55	1159802.84	
	Net Returns			
1	Returns over Variable Cost	780785.88	795612.56	
2	Returns over Total Cost	608619.08	620292.90	

Source: Author own computation from field survey (2015)

The average cost of cultivation of carnation is presented in Table 1. The table showed that total cost of materials for production of carnation was estimated to be Rs. 5.40 lakh for 1000 sqm area. Working capital for carnation is Rs3.48lakh. Analysis of various components of the working capital showed that, seed was the major component which accounted for 36 per cent and human labour constituted about 18 per cent of total cost. Other material inputs used were fertilizers, manures and plant protection material. The cost of chemical fertilizers and plant protection material were found around 3.5 per

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cent each of total cost. The value of other components like soil treatment, post harvest management etc. was observed to be very low and both accounted for about 3 per cent of total cost. The average production of the carnation had estimated value of 2.8 lakh stick/1000 sqm area annually. Average price for carnation estimated about 5-6 rupee per stick.

Gross return in carnation was about Rs. 11.5 lakh. Net returns over total cost of production were estimated at Rs. 6.3 lakh while net returns over variable cost were about Rs. 8.00 lakh.

Table 2 : Cost of cultivation for Gerbera production

S.No.	Particulars	Expenditure (Rs.)		Percent
1	Area (m^2)	934.33	1001	
2	Seed	182419.66	195449.57	35.11
3	FYM/Compost	11417.66	12233.14	3.13
4	Fertilizers	16667.66	17858.14	4.12
5	Plant protection	7167.66	7679.57	2.34
6	Soil treatment	6084.33	6518.86	2.14
7	Human labour	123334.33	132143.86	24.06
8	Other charges	8501	9108.14	2.59
9	Post harvest management	5167.66	5536.71	1.97
10	Total Working Capital	360753	386521	68.46
11	Interest on Working Capital	18038.6	19327	4.37
12	Total Variable Cost	378790.6	405847	71.83
13	Cost of poly house	746667.66	800001	
14	Farm Machinery and equipments	35646	35646	
15	Total Fixed Investment	782312.66	835646	
16	Depreciation on Fixed Asset	78232.17	83565.5	15.58
17	Interest on Fixed Investment	78232.17	83565.5	15.58
18	Total Fixed Cost	156462.34	167130	30.17
19	Total Cost	535252.94	572975	101
	Production and Gross Returns			
1	Total Production	280507.66	300543.85	
2	Price per unit	4.75	4.75	
3	Gross Return	1051901	1127036.71	
	Net Returns			
1	Returns over Variable Cost	673111.4	721190.71	
2	Returns over Total Cost	516649.06	554061.71	

Source: Author own computation from field survey (2015)

Table 2 showed that total cost of materials for production of gerbera was Rs. 5.8 lakh/1000 sqm area per annum. Analysis of various components of the cost structure

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showed that, seed was the major component and accounted for 35 per cent of the total cost of cultivation. Human labour was other important component and it constituted about 3.5 per cent of total cost. The cost of chemical fertilizers was about 24 per cent of total cost, whereas the value of farmyard manure (FYM), plant protection, soil treatment was collectively around 4.5 per cent. The average total production of gerbera was estimated about 3 lakh sticks/1000 sqm area while price range per cutflower was 3-5 Rupees. Estimated gross return in gerbera was about Rs. 11.5 lakh and the return over variable cost and return over total cost of production were estimated at Rs. 7.23 lakh and 5.55 lakh respectively.

Table 3: Cost of cultivation for Lilium production

S.NO	Particulars	Expenditure (Rs)		Percent
1	Area (m^2)	1201	1001	
2	Seed	472350.2	393625.33	54.48
3	FYM/Compost	9381	7817.66	2.06
4	Fertilizers	23671	19726	3.68
5	Plant protection	8645	7204.33	1.98
6	Soil treatment	5031	4192.66	1.57
7	Human labour	106001	88334.33	13
8	Other charges	6001	5001	1
9	Post harvest management	7071	5892.66	1
10	Total Working Capital	638144.2	531787	73.25
11	Interest on Working Capital	31908.16	26590.3	4.61
12	Total Variable Cost	670051.36	558376.3	76.86
13	Cost of poly house	1020001	850001	
14	Farm Machinery and equipments	38551	38551	
15	Total Fixed Investment	1058551	888551	
16	Depreciation on Fixed Asset	105856	88856	12.07
17	Interest on Fixed Investment	105856	88856	12.07
18	Total Fixed Cost	211711	177711	24.14
19	Total Cost	881761.36	736086.3	100
	Production and Gross Returns			
1	Total Production	43161	35967.66	
2	Price per unit	36.45	36.45	
3	Gross Return	1530023	1275019.33	
	Net Returns			
1	Returns over variable cost	859972.64	716644.03	
2	Returns over Total cost	648262.64	538934.03	

Source: Author own computation from field survey (2015)

The table above shows that, the total cost of materials for production of lilium is estimated to be about Rs. 7.5 lakh for 1000 sqm area. Analysis of various components of

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the cost structure showed that, seed was the major component and accounted for 54 per cent of the total cost of cultivation. The value of human labour was constituted about 13 per cent of total cost. The value of other components like soil treatment, plant protection, post harvest management etc. was observed to be very low and every component accounted for less than 1 per cent of total cost. The average total production of the lilium was estimated 35970 bunch/1000 sqm area while the price ranges was 32-40 rupee per bunch. Gross return in lilium was about Rs. 13lakh/1000 sqm area. The return over variable cost and return over total cost were estimated at Rs. 7.17 lakh and Rs. 5.39 lakh, respectively.

Table 4 : Cost of cultivation for Chrysanthemum production

S.N.	Particulars	Expenditure (Rs)		Percent
1	Area (m^2)	934	1001	
2	Seed	125001	133977.42	32.72
3	FYM/Compost	8001	8575.49	3.03
4	Fertilizers	13951	14952.77	4.54
5	Plant protection	8768.66	9397.21	3.22
6	Soil treatment	4117.66	4418.29	2.04
7	Human labour	55667.66	59669.17	15.13
8	Other charges	5001	5360.06	2.27
9	Post harvest management	6334.33	6789.14	2.61
10	Total Working Capital	226834.33	243123.54	58.56
11	Interest on Working Capital	11342.67	12157.13	3.88
12	Total Variable Cost	238176	255279.67	61.44
13	Cost of poly house	746401	800001	
14	Farm Machinery and	35551	35551	
15	Total Fixed Investment	781951	835551	
16	Depreciation on Fixed Asset	78196	83556	20.78
17	Interest on Fixed Investment	78196	83556	20.78
18	Total Fixed Cost	156391	167111	40.56
19	Total Cost	394566	422389.67	101
	Production and Gross Returns			
1	Total Production	53467.66	57307.18	
2	Price per unit	16.85	16.85	
3	Gross Return	847447.66	908303.96	
	Net Returns			
1	Returns over Variable Cost	609272.66	653025.29	
2	Returns over Total Cost	452882.66	485915.29	

Source: Author own computation from field survey (2015)

The table shows total cost of materials for production of chrysanthemum was estimated to be about Rs. 4.23 lakh for 1000 sqm area. Analysis of various components of the cost structure showed that seed component is an important component and

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accounted for major proportion i.e. 33 per cent of the total cost of cultivation. The value of human labor constituted about 15 per cent of total cost. Other material inputs used were fertilizers, manures and plant protection material. The cost of chemical fertilizers and the value of FYM/compost accounted for 5 and 3 per cent of the total cost, respectively, whereas the value of plant protection accounted for 3 per cent of the total cost. The value of other component like post harvest management and other expenses like electricity charges, water charges etc. were observed to be very low and accounted for almost 1 per cent of total cost. The average total production of the chrysanthemum was estimated about 57307 bunches/1000 sqm area. Gross return in Chrysanthemum was about Rs. 9.09 lakh. The return over variable cost and return over total cost of production were estimated at Rs.5.54 lakh and 4.86 lakh, respectively.

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Table 5: Cost of cultivation for the production of Rose

S.No.	Particulars	Expenditure (Rs.)		Percent
1	Area (m^2)	651	1001	
2	Seed	93601	144001	33.28
3	FYM/Compost	2726	4193.30	1
4	Fertilizers	8751	13462	4.02
5	Plant protection	4601	7077.92	2.59
6	Soil treatment	4251	6539.46	2.47
7	Human labour	45001	69231.77	16.52
8	Other charges	4501	6924.07	2.55
9	Post harvest management	9251	14231.77	4.19
10	Total Working Capital	172676	265654.9	60.55
11	Interest on Working Capital	8634.75	13283.69	3.98
12	Total Variable Cost	181309	278937.5	63.53
13	Cost of poly house	520001	800001	
14	Farm Machinery and equipments	35851	35851	
15	Total Fixed Investment	555851	835851	
16	Depreciation on Fixed Asset	55586	83586	19.74
17	Interest on Fixed Investment	55586	83586	19.74
18	Total Fixed Cost	111171	167171	38.47
19	Total Cost	292479.8	446107.5	101
	Production and Gross Returns			
1	Total Production	111042.5	170834.1	
2	Price per unit	6.86	6.86	
3	Gross Return	760635.3	1170208	
	Net Returns			
1	Returns over Variable Cost	579326.5	891271	
2	Returns over total Cost	468156.5	724101	

Source: Author's own computation from field survey (2015)

The table shows that total cost of materials for production of rose was estimated to be about Rs. 4.7 lakh for 1000 sqm area. Analysis of various components showed that seed was the major component and accounted for 33 per cent of the total cost while other major component i.e. human labour was constituted about 16.5 per cent of total cost. The material inputs used were fertilizers, manures and plant protection material. The value of fertilizers and plant protection measures accounted for3.5 per cent and 2.5 per cent of total cost, respectively. From the analysis it was observed that the use of fertilizer was more than recommended dose. The value of other post management related operations was accounted for 3.5 per cent of the total cost. In the study area the average total production of the rose was estimated about 1.75 lakh sticks/1000 sqm area in one year while price range was 6-9 rupee per stick.

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Gross return has also been worked out and it can be seen from the table that gross return in Rose was about Rs.11.5 lakh. The return over variable cost and return over total cost were estimated at Rs. 9.00 lakh and Rs. 7.25 lakh, respectively.

Table 6: Financial feasibility of significant cutflower crops

S.N.	Name of Crop	Financial indicators		
		BC Ratio at 10%	NPV at 10%	IRR at 10%
1.	Carantion	2.38	4041288.98	93.5%
2.	Gerbera	2.02	3033596.59	80.2%
3.	Lilium	1.90	4421660.14	85.1%
4.	Chrysanthemum	2.40	3031451.24	80.1%
5.	Rose	2.90	3056906.22	106.7%

Source: Author own computation from field survey (2015)

Benefit Cost Ratio (BCR)

BC Ratio of selected cutflower crops i.e. carnation, gerbera, lilium, chrysanthemum and rose was calculated and it was found maximum in case of rose 2.90. It indicates that rose is more profitable enterprise than other cutflower crops.

Net Present Value (NPV)

Net present worth of an investment is the difference between the present value of series of inflows (returns) and outflows (costs) over the economic life period of different cutflower crops. It was observed that NPV was positive in all the cutflower enterprises. It ranges between Rs. 31-45 lakhs for different cutflower crops and was observed to be highest in lilium (45 lakh) followed by carnation (41 lakh).

Internal Rate of Return (IRR)

This criterion measures the rate of return that can be realized by reinvestment of the returns in cutflower crops. Hence, the IRR indicates an important basis of investment and scores over other criterion of evaluation, which does not consider the reinvestment opportunities. IRR was highest in rose (107 %) followed by carnation (94%).

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Table 7: Sensitivity analysis of significant cutflowers

S.N.	Name of Crop	Financial indicators								
		NPV at 10%			BC Ratio at 10%			IRR at 10%		
		5 %	10 %	15 %	5 %	10	15 %	5 %	10 %	15 %
1.	Carnation									
i)	Increase in Cost	3936752.14	3832215.30	3727678.5	3.29	3.21	3.14	90.55	81.56	87.57
ii)	Decrease in Returns	3691646.04	3342003.10	2992360	3.25	3.13	3.01	85.89	80.22	73.53
2	Gerbera									
i)	Increase in Cost	2922763.34	2811930.10	2701096.9	2.94	2.87	2.81	77.81	75.48	73.14
ii)	Decrease in Returns	2731964.98	2430339.37	2128710.8	2.91	2.81	2.71	73.80	67.42	61.00
3	Lilium									
i)	Increase in Cost	4225604.45	4029548.76	3833493.1	2.8	2.7	2.6	82.02	78.98	75.93
ii)	Decrease in Returns	3951593.99	3481527.85	3011461.7	2.8	2.7	2.6	77.76	70.44	63.07
4	Chrysanthemum									
i)	Increase in Cost	2961761.64	2892072.01	2822382.4	3.32	3.25	2.18	78.66	77.20	75.73
ii)	Decrease in Returns	2771091.62	2510731.98	2250372.3	3.27	3.15	3.03	74.65	69.15	63.62
5	Rose									
i)	Increase in Cost	3003855.56	2950804.90	2897754.3	3.8	3.71	3.63	105.1	103.5	102
ii)	Decrease in Returns	2823217.80	2589529.38	2355841	3.75	3.6	3.46	99.83	92.95	86.06

Source: Author own computation from field survey (2015)

In sensitivity analysis working capital was increased by 16 per cent and it was estimated under two situations.

1. Gross returns were reduced by 11 and 16 per cent.
2. Cost was increased by 11 and 16 per cent of working capital.

Sensitivity analysis indicated that in every situation benefit cost ratio was more than unity and value of IRR was more than 62 per cent which showed that investment in each cutflower crop is feasible.

Problems and prospects of Hi-Tech Floriculture

Various innovative cut flower farmers are adopting hi- tech. floriculture practices as commercial activity and they are also getting higher returns from their produce. Besides getting the higher outcomes, farmers are also facing some production and marketing related problems.

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O.P. Sehgl (1998) in his study observed that lack of technical persons, poor handling of cutflowers and marketing are the major bottlenecks in the cutflower (rose) on industry of Tamil Nadu. Various problems faced by the respondents of the study area and their view regarding future prospects of floriculture on different aspects were studied and are discussed in present section.

Table 8: Problems related to production of cutflowers faced by the sampled respondents

S.N. Particulars	Response Number	Percent
1. Non availability of seeds/planting material of improved	76	51
2. Costly inputs	55	37
3. Low quality inputs	19	13
4. Lack of technical know-how and training	54	37
6. Proper design of greenhouse structure	10	07

Source: Author own computation from field survey (2015)

It was found that non-availability of the quality planting material i.e. seeds/cuttings/bulbs/corms etc. was the major problem faced by 57 per cent of the sampled floriculturists. Sampled respondents (37 per cent) were also facing the problem of lack of training and technical know how. It was found that technical specification of polyhouses was not any major problem.

Table 9: Problems related to post harvest management faced by sampled respondents

S.N. Particulars	Response Number	Percent
1. Lack of knowledge about appropriate stage of harvesting	43	29
2. Non-availability of grading facilities	43	29
3. Packing material is costly /not available in time	31	21
4. Cold storage facilities are not available in the local area	91	61
5. Cold storage is costly	88	59

Source: Author own computation from field survey (2015)

The problems of post- harvest management mainly arise on account of perishable nature of produce. The problems related to postharvest management of cutflowers have been analyzed and are presented in Table 9. It was observed that in the nearby areas non-availability of cold storage facilities was reported to be the major problem which was being faced by the 61 per cent of the sampled respondents. It was also reported by the 59

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per cent sampled respondents that the cost of cold storage in the market is quite high.

Table 10: Problems related to marketing faced by the sampled respondents

S.N.	Particulars	Response Number	Percent
1.	Prevalence of low prices in local and distant market	46	31
2.	Lack of regulated markets	46	31
3.	Cutflower markets are at distant place	97	65
4.	High transportation cost to distant market	88	59
5.	Lack of adequate market information	46	31
6.	Lack of link roads	31	21
7.	Delayed payment by traders	46	21
8.	Malpractices by traders	40	27

Source: Author's own computation from field survey (2015)

Farmers sold their cutflowers in the local or distant market depending upon the demand and price of the produce. The market prices found to fluctuate widely depending upon demand and supply in the market. It was very important for the farmers to have appropriate and updated market information from various sources about the price of the produce to be sold in market. Beside these factors, farmers were also facing other marketing problems like, distant market (65), high transportation cost (59 per cent), lack of regulated market (31 per cent) etc. (Table 10). The problems of delayed payment and malpractices in the market by the traders were also reported by 31 and 27 per cent of the respondents, respectively.

Table 11

Opinions of the sampled respondents regarding future prospects of floriculture

S.N.	Prospects	Response Number	Percent
1.	Input availability is being improved through the private enterprise	85	57
2.	Development of new varieties by research institutes	73	49
3.	High Productivity	76	51
4.	Demand of floriculture enterprise is increasing	67	45
5.	Improvement in income level of people	88	59
6.	Cutflowers are relatively profitable	91	61
7.	Increasing price trend of floriculture enterprises	61	41
8.	Government policies and incentives	100	67

Source: Author's own computation from field survey (2015)

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Floriculture has gained a great deal of commercialization on account of increasing demand in main cities in recent past. The enterprise is also becoming popular among the farming communities due to the availabilities of cutflower production technologies as well as through the incentives of the government. Varieties of cutflowers in the form of loose cutflowers, cut cutflowers, pot and other ornamental plants can be grown under polyhouses and open conditions of the state. Balamurugan 2016 had also concluded that, the prospects for development of crops such as fruits, floriculture, capcicum and musroom are very bright since the state has several innate agro-climatic advantages. The views of the sampled floriculturists regarding the future prospects of floriculture on different aspects were taken and have been compiled in Table 11.

Majority of the sampled respondents i.e. 67 per cent felt that the government is providing large number of incentives for the promotion of the enterprise. It was also indicated by 60 per cent of the sampled respondents that, floriculture was a profitable activity when compared with other farm enterprises. About 59 per cent of the sampled respondents were of the view that the demand of the cutflowers in the market is showing an increasing trend due to the improvement in income level of the people. Similarly, about 57 per cent of sampled respondents indicated that the private sector is coming forward to meet the growing demand of the farmers with respect to critical inputs and infra-structure related to construction of polyhouses.

CONCLUSIONS AND RECOMMENDATIONS

Variable cost for important cutflower crops like carnation, gerbera, lilium, chrysanthemum and rose was estimated. It ranges between 3-6 lakh/1,000 m^2 area. It was found highest in lilium followed by gerbera, carnation, rose and chrysanthemum. Seed and human labour were the major constituents among different cost of working capital. Fixed investment was made for construction of polyhouses, irrigation structure and it was estimated about 9 lakh/1,000 m^2 area. Similarly, gross returns were also calculated and these were found highest in lilium.

Net Present Value (NPV) of different cutflower crops was positive and ranges between 30-44 lakhs. Benefit cost ratio (BCR) was estimated to be 2.38, 2.02, 1.90, 2.40 and 2.90 for carnation, gerbera, lilium, chrysanthemum and rose, respectively. IRR of all cutflowers was found to be encouraging and it was quite high i.e. more than 71 per cent in case of every cutflower crop which indicated the higher rate of return from cutflowers.

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Sensitivity analysis of different cutflower crops indicated that benefit cost ratio was more than unity and value of IRR was found to be more than 71 per cent which proves that investment in cutflower crops is financially feasible.

Sampled floriculturists were facing various production problems it was found that nonavailability of the quality planting material i.e. seeds/cuttings/bulbs/corms etc. was the major problem faced by 51 per cent of the sampled floriculturists. Sampled respondents (36 per cent) were also facing the problem of lack of training and technical know- how. It was found that technical specification of polyhouses was not any major problem. In addition to problems related to production, sampled respondents were also facing problems related to post-harvest management of cutflowers. It was observed that in the nearby areas nonavailability of cold storage facilities was reported to be the major problem which was being faced by the 66 per cent of the sampled respondents. It was also reported by the 60 per cent sampled respondents that the cost of cold storage in the market is quite high. Farmers were also facing marketing problems like lack of organized market (31 per cent), unavailability of local market (66 per cent) and high transportation cost (61 per cent). In addition to this, sampled farmers (21 per cent) from rural areas were suffering the problems to carry their produce to distant markets, due to lack of network of link roads.

It was revealed that floriculture enterprise has bright future prospects and it would be helpful in improving the socio-economic status of the farming community. The view of the sampled floriculturists regarding the future prospects of floriculture was taken and majority of the respondents (66 per cent) felt that the government is providing large number of incentives for the promotion of the enterprise. This study lends credence to the fact that potential for cutflower crop production in Tamil Nadu is quite high. Present study however, has significant implication for farming community to adopt flori products as their source of employment with protected cultivation i.e. hi-tech floriculture. Government has also to step the focus on cold storage facilities in area, wider dissemination of scientific & technical information, to farmers through regular training programs & seminars.

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