Investment Analysis on Greenhouse Cut flower Rose Cultivation in Krishnagiri District of Tamilnadu

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ABSTRACT

Horticulture crops play a unique role in economy by improving the income of the farming community. Cultivation of these crops is labour intensive and as such they generate a lot of employment opportunities for the rural population; and also it plays a vital role in the prosperity of the country. Green house technology is commercially practiced in 115 countries in production of horticultural crops. In India NHB launched this scheme in 2005-2006 and Tamilnadu is one among the 18 states in Tamilnadu. The study was carried out in Krishnagiri district of Tamilnadu. Multistage sampling method was used to select the sample growers. This study estimated that the establishment cost of greenhouse at Rs11,21,173. The average cost of production per bunch in Rs.21.63 and net return per bunch was calculated as Rs.28.37 per bunch. It also found that one greenhouse one unit produced 21,900 bunches per year and earned the profit of Rs6,21,391.The investment analysis and Sensitivity analysis revealed that greenhouse cultivation was a viable project for the farmers.

Keywords- Protected cultivation, benefit cost, discount rate, cost of cultivation

1. INTRODUCTION

Horticulture crops play a unique role in economy by improving the income of the farming community. Cultivation of these crops is labour intensive and as such they generate a lot of employment opportunities for the rural population; and also it plays a vital role in the prosperity of a country. Green house cultivation is commercially practiced in 115 countries. The world scenario shows the area under protected cultivation to be nearly 623 302 hectares while total estimated world greenhouse vegetable production area is 402 981. Of the total world greenhouse vegetable area, soilless/hydroponic culture systems account for 95 000 ha **(Sabir,2013).** The National Horticultural Board has assisted projects of commercial horticulture over about 61404 hectares. Since inception of this scheme in the year 1999 -2000. During the year 2015 -2016, it has assisted 1238 projects of commercial horticulture and released subsidy to the tune of Rs. 16166.70 lakh (NHB Annual report 2015-16).

Floriculture is the art and knowledge of growing flowers to perfection. It deals with the cultivation of flowers and ornamental crops from the time of planting to the time of harvesting. It also includes production of planting materials through seeds, cuttings, budding, grafting and marketing of flowers and flower products.

It includes cultivation of flowering and ornamental plants for sales or for use as raw materials in cosmetics, perfume industry and also pharmaceutical sector. Therefore, the study was undertaken to know the economic viability of greenhouse cultivation as general objectives. The specific objectives are i) to assess the cost of production and return on greenhouse rose cultivation in the study area, ii) to determine the break even quantity and to identify the problems in greenhouse rose cultivation.

2. MATERIALS AND METHODS

The study was carried out in Krishnagiri district of Tamilnadu. Multistage sampling method was used to select the sample growers. In first stage Krishnagiri district was selected based on the highest area under flower crops in Tamilnadu. In second stage based on the number of greenhouse units, Hosur and Thali blocks were selected and in the last stage 60 sample respondents were randomly selected from the greenhouse beneficiaries list.

The present study is based on primary data collected from sampled farmers by using well structured interview schedule to ascertain their farm income from green house rose cultivation in the study area. The data collected on establishment cost of green house, cost of production of rose were analysed with the appropriate tools and the tools are described below:

2.1 Cost of cultivation: It was estimated by adopting cost concepts like cost A, B and C.

Cost A_1: It consists of all actual expenses in cash and kind incurred in production by the owner operator. It includes value of hired human labour, value of manures and fertilizers, value of plant protection chemicals, interest on working capital, land revenue and depreciation on fixed capital assets.

Cost B_1: Cost A_1 plus imputed rental value of owned land and Interest on owned fixed capital. **Cost C:** Cost B_1 plus imputed value of family labour.

2.2 Break even analysis: Break even analysis has been taken to find the quantity where a farms gets no loss no profit situation. Here break even quantity was calculated for the greenhouse cultivation of rose by using the following formula.

$$\text{Break even quantity} = \frac{F}{(P-V)}$$

Where:

F= Total fixed cost (Rs),

P= Average selling price per bunch * (in Rs) and

V=Average variable cost per bunch(in Rs).

[**One bunch comprises of 20 rose flowers*].**

2.3 Investment analysis: The investment analysis was carried out for the investment on greenhouse establishment cost and it worked out for seven years as the expected life period of greenhouse is seven years.

For the collected data on greenhouse establishment cost, NPV,BCR and IRR was worked out by using discounting technology **(Subba Reddy,2017).**

Net present value (NPV): NPV is the difference between the sum of the present worth of benefits and sum of the present worth of costs for given discount rate.

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

B_t = Benefits in t thyear

C_t = Costs in tthyear

n = Number of years

r = Discount rat

Benefit- cost ratio(BCR) is the ratio of present value of benefits can be generated per rupee of investment. The benefit cost ratio is the ratio of the sum of present value of benefits to present value of cost for a given discount rate. It is mathematically expressed as

$$BCR=\frac{\sum_{t=1}^{t=n}\frac{B_t}{(1+r)^t}}{\sum_{t=1}^{t=n}\frac{C_t}{(1+r)^t}}$$

When the Benefit – cost ratio exceeds one, the investment is considered as viable.

Internal rate of return (IRR) is the discount rate that makes the net present value of future cash flow equal to the initial cost of the investment. i. e., Equivalently, IRR is the discount rate that gives the value as Zero NPV.

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

2.4 Sensitivity analysis: The sensitivity concept has been employed to examine the sensitivity of the average cut flower grower towards risk and uncertainty of increase of production cost, reduction in yield and reduction in price, cost and price structure.

Sensitivity analysis has been done to find the difference between increase or decrease and actual cost, yield (number of flower) and price respectively for the rose and another floriculture cultivation. This has been another important measurement to check the market situation.

2.5 Garrett ranking technique: Garrett's ranking technique was adopted to analyse the problems, expressed by the respondents in the production of rose. The order of merit given by the respondents was converted into ranks using the formula.

$$\text{Per cent position} = \frac{100(R_{ij}-0.5)}{N_j}$$

Where Rij- rank given for i^{th}factor by the jth respondent

Nj- Number of factors ranked by j^{th} respondent

The per cent position of each rank thus obtained was converted into scores by referring to the table given by Garrett. Then for each factor, the scores of individual respondents were added together and divided by total number of respondents from whom the scores were added. These mean scores for all the factors were arranged in ascending order and ranks were assigned and important problems were identified (i.e) Huge investment, lack of skilled labour, pest and disease problem, price fluctuation, lack of cold storage, high cost of packing and transportation, delay in availing subsidy, time delay in financial institution. The data were analyzed and tabulated after applying the statistical techniques like percentage and rank orders.

3. RESULTS AND DISCUSSION:

In this section the analysed results of the investigations are presented and discussed under the following topics:

a) Establishment cost of greenhouse rose production

b) Cost and returns of rose cultivation

c) Net Present value (NPV), Benefit cost ratio (BCR), Internal rate of return (IRR).

d) Problems in greenhouse farming.

3.1 Establishment cost of greenhouse and drip irrigation per units

Green house cultivation is investment intensive and hence estimation of the average cost of construction of green house is felt essential. The National Horticulture Board, determine a economic size greenhouse as 1000 sq and counted as one unit. Hence analysis was undertaken to find the cost of construction of greenhouse unit of 1000 m^2 and the results are presented in Table-1.

It could be seen from above table that the total cost involved in establishing a greenhouse a unit was estimated at Rs.11,21,173.00, of this greenhouse construction constituted Rs.920010.00 (82 per cent) and drip irrigation constituted 201163.00 (20.65 per cent) respectively.

3.2 Cost of cultivation and returns of greenhouse of Rose

Cost of cultivation and returns of greenhouse rose cultivation is presented in Table – 2.

It could be seen from the table that among the components of cost of cultivation Interest on fixed capital (31.95) occupied a major share followed by labour wages accounted 28.77 per cent and depreciation of protected cultivation (18.93 per cent). These three components put together constituted (75 per cent) of the cost of cultivation of protected cultivation of rose. And family labour charge contribution also a significant

(7.80 per cent). It could be observed that the cumulative of cost A (operational expenses) constituted (58.85 per cent) and cost B as (92.40 per cent).

3.3 Cost of production and Returns of protected cultivation of rose

Cost of production/bunch $= \frac{CostC}{\text{No.of Bunches produced}}$

$= \frac{473608.08}{21900}$

= 21.63/ bunch

Profit Per bunch = Sale price / bunch – cost of production / bunch

= 50 – 21.06

= 28.37 / bunch

The cost of production analysis was found to be that the average cost of production per bunch in Rs.21.63 and net return per bunch was calculated at Rs.28.37 per bunch.

Return

Based on cost of cultivation gross and net returns were calculated and presented in Table-3.

Above table shows that the return analysis from one unit of greenhouse rose cultivation produced 21,900 bunches per year. The sale proceeds were Rs.1095000 per year and net return was Rs.621391.92.

3.4 Breakeven point

Breakeven point $= \frac{F}{(P-V)}$

$= \frac{143146.68}{(50-21.06)}$

= 4946.32 bunches

The Break even analysis found that the green house has to produce 4946 rose bunches / year to attain the no loss or no gain level. Beyond this production increase the profit level of the farmers.

3.5 Investment analysis on greenhouse cultivation of rose:

The protected cultivation of rose involves intensive investment. Hence economic viability analysis is felt important for the study. The various investment analysis viz., Net present value, Benefit cost ratio, Internal

rate of return are used to analyse and the results are presented in the section.The investment and benefits for greenhouse cultivation of rose are presented table-4 and 5.

The table 5 showed that the net present value of investment made on greenhouse cultivation of rose at 15 per cent and 30 per cent discount rate was Rs.499248.8and 93169.28 respectively. It also revealed that the investment made on protected cultivation of rose plant is economically viable of investment and the BCR at 15 per cent and 30 per cent were 1.21 and 1.05, indicated that investment on greenhouse cultivation is a viable project.

The IRR was 36 per cent indicated that the project can be executed; because at 36 per cent interest rate make the net cash flow equal to zero. The higher the IRR indicated higher the rate of return.

Table 5 and 6 revealed that by increasing the cost of project by 10 per cent BCR was 1.10 it indicated that even increase in the cost the projects yield 10 per cent return and it also checked by decreasing the benefit by 10 per cent, the BCR was 1.08. It revealed that the project has to withstanding capacity to the level of 10 percent increase or decrease in cost and return.

3.6 Problems in protected cultivation of rose production

The collected data on problems narrated by the farmers are analysed and presented in Table - 8

It could be seen from the table that among the eight problems listed by the farmers huge investment cost was ranked first with the mean score of (73.50), followed by Lack of skilled labour (71.25), pest and disease (54.28) with a second and third rank respectively.

Price fluctuation, lack of cold storage facilities were ranked as fourth and fifth with mean score of 52.50 and 52.40.

4. CONCLUSION:

A total view of the above of findings enabled verification of the hypotheses and to draw specific conclusions. The analysis revealed that majority of cut flower (rose) in the sample farms were in commercial bearing stage and output could be enhanced by proper application of recommended level of inputs. In the economic feasibility analysis of cut flower (rose) cultivation, it was found that the inputs and outputs for increase the cut flower (rose) yield.

This study also found that huge investment, lack of skilled labour, lack of cold storage facilities were the major problem for the protected cultivation of rose. Hence it found that greenhouse rose cultivation was a viable project for the farmers.

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Table-1

Establishment cost of greenhouse and drip irrigation per unit

S.No	Particulars	Amount(Rs)	Per cent
Cost of green house			
1	Cost of Pipe /4 ton	607806.00	54.21
2	Cost of gutter sheet/100 kg	8300.00	0.74
3	Cost of foundation pipe	203004.00	18.10
4	Cost of clothing material	100900.00	9.00
	Total (I)	**920010.00**	**82.05**
Cost of Drip irrigation			
1	Cost of Drip in line	91340.00	**8.14**
2	Cost of Misting	103341.00	9.21
3	Cost of Service line	3035.00	0.30
4	Cost of Misting 1	3447.00	0.30
	Total (II)	**201163.00**	**20.65**
	Total cost (I+ II)	**1121173.00**	**100.00**

Table-2: Cost of cultivation of protected cultivation Rose

(1000sq.m)

S.No	Particulars	Cost (Rs)	Per cent
1	Cost of cutting(20% cost)*	21246.67	4.50
2	Labour wages	136279.30	28.77
3	Value Plant protection chemicals	4670.00	1.00
4	Value of Fertilizer	10530.00	2.50
5	Value of Farm yard manure	11830.00	2.21
6	Land preparation	1500.00	0.31
7	Depreciation on protected cultivation (8%) of protected cultivation establishment cost	89693.84	18.93
8	Value of insurance	3000.00	0.63
9	Cost A (1-8)	278750.00	58.85
10	Rental value of land for 1000sq m/year @ Rs: 30000/ac	7500.00	1.60
11	Interest on fixed capital@13.5% (protected cultivation + drip)	151358.00	31.95
12	Cost B (9-11)	437608.00	92.40
13	Family labour wages	36000.00	7.60
14	Cost C (12&13)	473608.00	100.00

***cost of cutting apportioned for 5 years.**

Table-3: Return

S.No	Particulars	Amount (Rs)
1	Total flower production/yr/unit	21900 bunches/yr
2	Sale price for flowers/Bunch	Rs 50/bunch
3	Gross return	1095000.00
4	Net return **(3 - Cost C)**	621391.92

Table-4: Cost and Benefits of protected cultivation of rose production

Year	Cost	Benefit
1	1395215	565000
2	290000	600000
3	325000	650000
4	350000	700000
5	410000	780000
6	415000	860000
7	415000	900000

Table-5 Net present value, Benefit cost ratio, Internal rate of return

Particulars	**Discount rate**		
	15	**30**	**40**
Net Present Value	499248.8	93169.28	-44886.49
Benefit Cost Ratio	1.21	1.05	-
Internal Rate of Return (per cent)	-	-	36

Table-6

Sensitivity analysis (Increasing the cost by 10 per cent)

S.NO	Cost (Increased by 10%)	Benefit	Discount factor @ 15%	Present worth cost	Present worth benefit
1	1534737	565000	0.8695	1334554	491304.3
2	319000	600000	0.7561	241209.8	453686.2
3	357500	650000	0.6575	235062.1	427385.6
4	357500	700000	0.5717	204401.8	400227.3
5	451000	780000	0.4971	224226.7	387797.9
6	456500	860000	0.4323	197357.5	371801.7
7	456500	900000	0.3759	171615.3	338343.3
	Total			2608427	2870546
	NPV	**262119**			
	BCR	**1.10**			

Table-7

Sensitivity analysis (Decreasing the benefits by 10 per cent)

S.NO	Cost	Benefit	Discount factor @ 15 per cent	Present worth costt	Present worth benefit
1	1395216	508500	0.8695	1213231	442173.9
2	290000	540000	0.7561	219281.7	408317.6
3	325000	585000	0.6575	213692.8	384647
4	325000	630000	0.5717	185819.8	360204.5
5	410000	702000	0.4971	203842.5	349018.1
6	415000	774000	0.4323	179416	334621.6
7	415000	810000	0.3759	156013.9	304509
	Total			**2371298**	**2583492**
	NPV	212194.1			
	BCR	1.08			

Table-8 Problems in greenhouse cultivation of rose production

S.No	Particulars	Mean score	Rank
1	Huge investment	73.50	I
2	Lack of skilled labour	71.25	II
3	Pest and disease problem	54.28	III
4	Price fluctuation	52.50	IV
5	Lack of cold storage	52.40	V
6	High cost of packing and transportation	48.15	VI
7	Delay in availing subsidy	42.75	VII
8	Time delay in financial institution	40.70	VIII