Research Paper

Economics of production of spider lily in south Gujarat

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ABSTRACT : This study was undertaken to determine economic analysis of production of spider lily in South Gujarat during the season 2015-16. The study was based on data collected randomly from 140 spider lily growers. Multistage sampling technique was employed for selection of sample. It analysed the cost and returns structure and economic feasibility. Simple tabular analysis, cost concepts, pay back-period, net present worth, benefit-cost ratio and internal rate of return have been used to draw the interface. The results revealed that, per acre cost of cultivation and per acre net return of spider lily were found to Rs. 112380 and 60698, respectively. Gross income, farm business income and family labour income was found to Rs.162861, Rs.111929 and Rs. 80284, respectively. The average return per rupee was worked out to Rs.1.45. Economical feasibility test (@ 9 % discount rate) revealed that spider lily crop had higher net present value (Rs. 181938), benefit-cost ratio (1.42:1), internal rate of return (>145%) and pay back period (2.12 year) which justified the worthiness of the investment. Major Bottlenecks in production were high wages rate, non - availability of labour in time, difficulties in pest and disease control etc.

KEY WORDS : Spider lily, Cost, Return, Economic feasibility

INTRODUCTION :

India has an ancient heritage when it comes to floriculture. Floriculture has emerged as an economically viable diversification option in the Indian agribusiness and has captured the interest of many new entrepreneurs into agricultural sector in recent times. Flower cultivation has been practiced in India since times immemorial but it only recent years that floriculture has been blossomed into a viable business sector.

Since last two decades there is increasing demand and supply of various types of flowers. As far as the floriculture is concerned Tamil Nadu, Karnataka, Andhra Pradesh, West Bengal, Maharashtra, and Gujarat are the major developed states. India produced 1754 thousand MT loose flowers and 543 thousands MT of cut flowers in the year 2013-14, with area of 255 thousands hectares.

On the Western coast of India, Gujarat has established itself a major player in the floriculture sector. The important flowers grown in Gujarat are Rose, Marigold, Mogra and Spider lily. Although, spider lily is not yet regarded as a major loose flower crop of India, it has attained an enviable position in the loose flower basket of South Gujarat. In fact spider lily is the most widely cultivated loose flower crop in South Gujarat covering

2227 hectares. The area and production of spider lily was 550 hectares and 1150 lakh bundles, respectively during the year 2002-03 which has increased to 3605 hectares in area and 35799 lakh bundles in production during the year 2014-15 (Anonymous, 2015).

MATERIALS AND METHODS :

To analyse the objectives of the study multistage sampling technique was followed in the selection of districts, talukas, villages and respondents. At first stage, two districts were selected from South Gujarat region having highest area under spider lily cultivation *i.e.* Navsari district and Valsad district. At second stage, two talukas were selected from each district *i.e.* Navsari and Jalapore taluka from Navsari district and Pardi and Dharampur taluka from Valsad district. Similarly at third stage, five villages were selected randomly from each taluka. Thus, total 20 villages were selected for the study. At forth stage 7 respondents were selected randomly from each village. Thus, total sample size was of 140 spider lily growers.

The data was collected pertaining to agricultural year 2015-16. The primary data was collected by survey method adopting personal interview of the selected respondents growing spider lily. To determine economic feasibility data was collected of last five years. The economical feasibility of investment in spider lily cultivation was judged by computing the following standard project evaluation techniques *viz.*, net present value, benefit-cost ratio, internal rate of return and pay back period.

Cost of cultivation :

The cost of cultivation of pointed gourd crops was worked out by using various cost concepts defined below:

Cost A1: It includes:
  – Value of hired human labour (Rs.)
  – Value of hired and owned animal labour (Rs.)
  – Value of hired and owned machine labour (Rs.)
  – Value of seed (both farm seed and purchased) (Rs.)
  – Value of manures (owned and purchased) and fertilizers (Rs.)
  – Depreciation (Rs.)
  – Irrigation charges (Rs.)

  – Land revenue (Rs.)
  – Interest on working capital (Rs.)
  – Amortized cost (Rs./ha).

Cost A_2: Cost A_1 + rent paid for leased in land.
Cost B_1: Cost A_1 + interest on fixed capital (excluding land)
Cost B_2: Cost B_1 + rental value of owned land + rent for leased in land.
Cost C_1: Cost B_1 + imputed value of family labour.
Cost C_2: Cost B_2 + imputed value of family labour.
Cost C_3: Cost C_2 + 10 per cent of cost C_2 as management cost.

Cost of production:
The cost of production is worked out by using following formula:

$$\text{Cost of production} = \frac{\text{Cost of production}}{\text{Quantity of main produce}}$$

$$\text{Cost of production} = \frac{\text{Cost of cultivation}}{\text{Total no. of flower bundles}}$$

Income measure:
Following income measures were used.

Gross income:
It is the total value of main product.
GI = (Qm x Pm) + (Qb x Pb)
where,
GI = Gross income.
Qm = Quantity of product.
Pm = Price of product.
Qb = Quantity of by product.
Pb = Price of by product.

Return over variable cost (RVC):
RVC = Gross income – Cost A_1.

Farm business income (FBI):
FBI = Gross income – Cost A

Family labour income (FLI) or return to family labour:
FLI = Gross income – Cost B_2

Farm investment income (FII):
FII: Gross income - Cost C_1

Net income:
Net income= Gross income - Cost C_3

ment

Returns to management:

RM= Gross income – Cost C_3

Returns per rupee (RPR):

RPR: Gross income/ Cost C_2

Net present value (NPV):

$$NPV : \frac{Y_n}{(1+r)^n} - I$$

where,

Y_n = Net cash inflows in the year n

R = Discount rate

I = Initial investment

N = No. of years.

Benefit cost ratio (BCR):

$$B : C\ ratio = \frac{\sum_{i=1}^{n} \frac{Bt}{(1+r)^n}}{\sum_{i=1}^{n} \frac{C1}{(1+r)^n}}$$

where,

B = Benifit in i^{th} year

C = Cost in n^{th} year

N = Number of year

r = Discount rate

Internal rate of return (IRR):

$$IRR = r_a + (r_b - r_a)\left(\frac{(NPV_a)}{|NPV_a - NPV_b|}\right)$$

where,

IRR= Internal rate of return

r_a = Lower discount rate (40 %)

r_b = Higher discount rate (150 %)

NPV_a = Net present value at r_a

NPV_b = Net present value at r_b

RESULTS AND DATA ANALYSIS :

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Cost of cultivation:

Per acre component wise cost for spider lily cultivation in different years of plantation has been studied and results were presented in Table 1 Per acre cost of cultivation (Cost C_3) of spider lily crop cultivation has

been estimated by considering the quantity of input and labour used. It could be observed from the table that the average per acre total cost incurred by the spider lily grower in first, second, third, fourth and fifth year were Rs. 104343, Rs. 1111871, Rs. 116559 and Rs. 122750, respectively.

The average cost of cultivation (Cost C_3) for five year has been estimated to Rs.112380. Among the different components of cost of cultivation, the highest share was of total human labour (31.27%) for picking of flower buds, weeding, spraying of pesticides and herbicides, application of manure and fertilizers and application of irrigation etc. followed by the rental value of owned land with 23.19 per cent of total cost.

It could be inferred from the Table 1 that the Cost-A constituted of paid out cost (Rs. 43054), depreciation (Rs. 4914) and interest on owned fixed capital (Rs. 5587). Cost-B_2 included Cost-B_1 (Rs.56520) and rental value of owned land (Rs. 26058). The rental value of owned land was estimated by taking 16 per cent of the value of the produce. Cost-C_1 constituted of Cost-B_1 (Rs. 56520) and family labour charges (Rs.19586). Cost-C_2 included Cost-B_2 (Rs. 82577) and family labour charges. Cost-C_3 was estimated by taking into account Cost-C_2 (Rs. 102163) and managerial cost $i.e.$ 10 per cent of Cost-C_2 (Rs. 10216).

The Cost-A (Rs. 55817) for first year was found the highest as compared to successive years. It was due to inclusion of cost of primary tillage operation, cost of planting material and labour charges incurred for planting of bulbs.

Return structure:

A perusal of Table 2 shows the average annual gross return realised per acre from spider lily cultivation was amounted to Rs. 162861 per acre. It increased from Rs. 91771 in first year to Rs. 201214 per acre in fifth year age group of plants.

Farm business income represent returns over variable cost (Cost-A). It is inferred from the Table 2 that on an average, the farm business income has been worked out to Rs. 111929 per acre. It increased from 35954 (1st year) to Rs.148340 (5th year). Farm labour income gives the returns over Cost-B_2. It varied between Rs.16017 (1st year) to Rs.110198 (5th year). On an overall basis per acre farm labour income has been estimated to Rs. 80284. Farm investment income represents returns over Cost-C_1 and it has been accounted to Rs. 86755 per

acre.

Net income implies profit per acre after deducting Cost-C_2 from gross income. The overall net income from spider lily cultivation has been found to Rs. 60698. Among different age groups of spider lily crop, it varied between Rs. -4934 (1st year) to Rs. 89624 (5th year). Return to management has been estimated after deducting Cost-C_3 from gross income and it varied between Rs. -14605 (1st year) to Rs. 78465 (5th year) in different age groups of spider lily crop. On an average, per acre return to management has been found to Rs. 50481 per acre.

In first year all value measures of income were less as compared to other successive years. The main reasons behind this were flower bearing of spider lily crop started after completion of gestation period of about 6-7 months and high establishment cost incurred in first year of plantation.

On an average, the return per rupee of investment on spider lily cultivation has been estimated to Rs.1.45 on the basis of Cost-C_3. It indicates that an investment worth Rs. 1 on all the input used in the cultivation of spider lily crop yielded an output of worth Rs. 1.45.

Table 1: Item-wise cost of cultivation of spider lily in different age groups (Rs. acre)

Particulars	Age group of spider lily crop					
	1st year	2nd year	3rd year	4th year	5th year	Average
Human hired labour	12304 (11.57)	14599 (13.99)	16254 (14.53)	17260 (14.81)	17366 (14.15)	15557 (13.84)
Planting material/ bulbs	8360 (7.86)	-	-	-	-	1672 (1.49)
Tractor charges	4115 (3.87)	2015 (1.93)	2135 (1.91)	2295 (1.97)	2075 (1.69)	2527 (2.25)
Manures	6945 (6.53)	5835 (5.59)	5801. (5.19)	6424 (5.51)	6988 (5.69)	6699 (5.69)
Fertilizers	6190 (5.82)	6662 (6.38)	7092 (6.34)	7176 (6.16)	7240 (5.90)	6872 (6.12)
Insecticides/ pesticides	4291 (4.03)	4506 (4.32)	4731 (4.23)	5062 (4.34)	5265 (4.29)	4771 (4.25)
Irrigation charges	4740 (4.46)	4062 (3.89)	4524 (4.04)	4922 (4.21)	5256 (4.28)	4701 (4.18)
Miscellaneous	502 (0.47)	527 (0.51)	553 (0.49)	587 (0.51)	610 (0.50)	556 (0.49)
Depreciation	4717 (4.43)	4741 (4.54)	4988 (4.46)	5037 (4.32)	5088 (4.14)	4914 (4.37)
Interest on working capital	3652 (3.43)	2540 (2.43)	2729 (2.44)	2911 (2.50)	2985 (2.43)	2963 (2.64)
Cost-A	55817 (52.47)	45487(43.59)	48808 (43.63)	51675 (44.33)	52874 (43.07)	50932 (45.32)
Interest on owned fixed capital	5253 (4.94)	5604 (5.37)	5678 (5.08)	5454 (4.68)	5948 (4.85)	5587 (4.97)
Cost-B_1	61071 (57.41)	51091 (48.96)	54485 (48.70)	57129 (49.01)	58822 (47.92)	56520 (50.29)
Rental value of owned land	14683 (13.80)	24673 (23.65)	28251 (25.25)	30486 (26.16)	32194 (26.23)	26058 (23.19)
Cost-B_2	75754 (71.21)	75765 (72.61)	82737 (73.96)	87615 (75.17)	91016 (74.15)	82577 (73.48)
Family labour	20952 (19.70)	19093 (18.30)	18964 (16.95)	18348 (15.74)	20575 (16.76)	19586 (17.43)
Cost-C_1	82022 (77.11)	70184 (67.26)	73449 (65.66)	75476 (64.75)	79397 (64.68)	76106 (67.72)
Cost-C_2	96706 (90.91)	94858 (90.91)	101701 (90.91)	105962 (90.91)	111591 (90.91)	102163 (90.91)
Managerial cost	9671 (9.09)	9486 (9.09)	10170 (9.09)	10596 (9.09)	11159 (9.09)	10216 (9.09)
Cost-C_3	106376 (100.00)	104343 (100.00)	111871 (100.00)	116559 (100.00)	122750 (100.00)	112380 (100.00)

Figures in parenthesis indicate percentage to Cost-C_3 **Source :** Field survey

Table 2: Income measures for spider lily in different age group (Rs./acre)

Measures of income	Year of plantation					
	1st year	2nd year	3rd year	4th year	5th year	Overall
Gross income	91771	154209	176571	190539	201214	162861
Farm business income	35954	108722	127764	138865	148340	111929
Family labour income	16017	78444	93835	102924	110198	80284
Farm investment income	9749	84024	103122	115063	121818	86755
Net income	-4934	59351	74870	84577	89624	60698
Returns to management	-14605	49865	64700	73981	78465	50481

Source: field survey

Economical feasibility of investment on spider lily cultivation:

The result of economical feasibility analysis were shown in Table 3.

It can be seen from the table that net present value was estimated to Rs. 181938 per acre. The net present value was positive and of higher magnitude for spider lily crop. The criterion of Benefit : Cost ratio was considered to know the rate of return per rupee of investment in spider lily cultivation. The decision on the B : C ratio frame work was to select the project where the ratio was more than one. The B : C ratio was 1.42:1 at 9 per cent discount rate for five year period. Similar findings were also supported by Bahirat and Jadhav (2011).

The criterion of internal rate of return was to accept the project with IRR more than the magnitude of return realised in each year over the economic value generally depends on the magnitude of returns realized in each year over economic period and more particularly in the initial years of spider lily crop cultivation. The IRR was found to be very high (>145.34 %). IRR was more than opportunity cost (9 %) of capital. The result obtained are in confirmative with the results achieved by Vanishree (2007) on jasmine (250 %) and Sharma *et al.* (2014) on rose (106 %) and carnation (93 %) showed that the internal rate of return was much higher than the discounted rate used for evaluating the perennial crops.

The period required to recover initial investment incurred in establishing spider lily crop was found to be 2.12 years. This could be attributed to the fact that the initial investment itself was lower, besides higher rate of returns. Thus, these all criterion indicated that investment in spider lily crop cultivation was economically feasible and financially sound.

Bottle necks in production of spider lily crop:

From Table 4 it could be observed that 91.43 per cent of the respondents expressed high wages rate of labour as the major constraint in production of spider lily flowers. Non-availability of labour in time and difficulties in pest and disease control were also found major problems which were expressed by 87.86 per cent and 79.29 per cent, respectively. The other problems were inadequate loan supply by the financial institution (76.43 %), high cost of pesticides (74.29 %), non-availability of quality planting material (70 %), high cost of fertilizer (68.57 %), non-availability of planting material in time (59.29 %), non-availability of loan in time (57.85 %) and non-availability of fertilizer in time (51.43 %). Similar types of production problems were also observed study conducted by Bagade *et al.* (2008) and Sudhakar (2013) on rose and gerbera, respectively.

Table 3 : Economical feasibility of investment on spider lily cultivation

Sr. No.	Particulars	Value
1.	Net present value (Rs./acre)	181938
2.	Benefit – Cost ratio	1.42:1
3.	Internal rate of return (%)	145.34
4.	Pay back period (year)	2.12

Source: Field survey

Table 4: Bottle necks in production of spider lily crop

Sr. No.	Constraints	Frequency	Per cent	Rank
1.	High wages rate of labour	128	91.43	I
2.	Non-availability of labour in time	123	87.86	II
3.	Difficulties in pest and disease control	111	79.29	III
4.	In adequate loan supply by the financial institutions	107	76.43	IV
5.	High cost of pesticides	104	74.29	V
6.	Non-availability of quality planting material	98	70.00	VI
7.	High cost of fertilizer	96	68.57	VII
8.	Non-availability of planting material in time	83	59.29	VIII
9.	Non-availability of loan in time	81	57.85	IX
10.	Non-availability of fertilizer in time	72	51.43	X

Conclusion and policy implication:

The study revealed that average total cost of cultivation has been incurred Rs.112380 per acre for all age group of spider lily crop. The study indicated that spider lily was a labour intensive crop as farmer incurred highest share of 31.27 per cent of cost of cultivation on labour charges.

On overall basis, per acre farm business income, family labour income, farm investment income, net income and return to management have been estimated to Rs. 111929, Rs. 80284, Rs. 86755, Rs. 60698 and Rs. 50481, respectively. The return per rupee has been worked out to Rs.1.45 on the basis of Cost-C_3.

Economical feasibility test (@ 9 % discount rate) revealed that spider lily crop had higher net present value (Rs.181938), benefit-cost ratio (1.42:1), internal rate of return (>145%) and pay back period (2.12 year) which justified the worthiness of the investment.

The major constrains faced by spider lily growers in study area were high wages rate of labour followed by non-availability of labour in time and difficulties in pest and disease control etc.

The results of the study clearly showed that there is an ample potentiality to cultivate spider lily flower crop on sample farms through adaption of improved technologies along with optimum utilization of resources. Regular supply of inputs at reasonable prices and availability of labour at reasonable rate are the immense need of the present hour.

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