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Economic Analysis of Production and Marketing of Jasmine in Hyderabad-Karnataka Region: A Case in Koppal District, India

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A B S T R A C T

Jasmine is one of the major commercial flower crops of south India. In Karnataka, jasmine has been cultivated in all most all districts. Hence, the study have been taken up by to examine the cost and returns structure of jasmine cultivation, identifying the marketing channels, assessing the marketing cost and to document the problems of production and marketing of jasmine in Koppal district. Thus, the data have been collected from 120 jasmine growers, 10 commission cum wholesale agent and 10 from retailers with the help of pretested well designed questionnaire. The collected data were subjected to various financial analysis *viz.*, discounted and undiscounted techniques. The results revealed that during 2011-12, Rs. 28,252.75 was required for establishment of jasmine garden in one acre out of which labour was to the tune of 43.67per cent and material cost was accounted 56.33 per cent. The gross and net returns were increasing from initial year of establishment. The financial analysis *viz.*, NPV, BCR, IRR and NPV revealed that establishment and maintenance of jasmine garden was economically viable. The flowers are marketed through farmers -commission cum wholesalers –retailers and consumers. The high rate of commission charge, pest incidence and lack of producer organization were the major problems of jasmine production and marketing.

Introduction

Jasmine is considered the queen of flowers and is called the “Belle of India” or the "Queen of fragrance" as it is exquisitely scented to soothe and refresh. Jasmine has their own importance since ancient times and is being used for decoration worshiping as well as in satisfying the aesthetic feelings. Several species of jasmine are grown in Karnataka. The term jasmine is derived from an Arabic word “Jessamine” and in Persian language it is called as “Yasmin” or yasmyn” which means fragrance. As many as 90

species of jasmine are grown in India, out of these 20 species are cultivated in south India. The most commonly cultivated Jasmine species are *Jasminum multiform* (kakada), *Jasminum samaba*c (gundumallige) *Jasminum grandiflorum* (Jaji Mallige) and *Jasminum auriculatum* (Soojimallige).

It is mainly used for extraction of scented oil. India exports thisoil mainly to England, United States of America, Holland, Sweden, Japan, Norway and European Union. Jasmine flowers are highly perishable and hence require careful handling and speedy disposal and hence the market remains localized. Location apart, perishability makes the flower trade complex and risky. In addition, the demand for flowers is not uniform and steady. Factors like location, season and socio-religious festivals affect the demand – supply relationship in the flower marketing. In Karnataka the jasmine flower cultivation has been taken up in almost all districts. Thus, a study has been designed to assess the cost and returns structure of jasmine cultivation, identifying the marketing channel and to ascertain the problems in production and marketing of jasmine Koppal district.

Materials and Methods

Koppal is one of the major jasmine growing districts in Karnataka. The jasmine crop is grown extensively by the farmers in the region. Therefore, Koppal district was purposively selected for the study. Based on the highest area under the jasmine crop in the year 2015-16, the villages were selected randomly for the study. The data on village-wise information relating to area under jasmine was obtained from the office of the Assistant Director of Horticulture of the Koppal taluk. The top four villages having the highest area under jasmine were selected from Koppal taluk (i.e., Hiligi, Hitnal, Shivapura and Kampasagara) for the purpose of the study. Thirty respondents were selected from each villages. Thus, a total of 120 farmers were selected and data collected with the help of pre-tested questionnaire. To study the marketing cost, margin and channels of marketing, 10 intermediaries were selected each from commission agents, wholesalers and retailer. The technique of financial analysis is the most important tool for evaluating the economic performance of any crop. It brings out the efficiency of capital use in production. The tabular representation and project analysis techniques used for financial analysis were *viz.*, Net Present Value (NPV), Benefit Cost ratio (B: C Ratio), Internal Rate of Return (IRR) and Pay Back Period (PBP).

Net present value

The Net Present Value represents the discounted value of the net cash inflows to the project. In the present study, a discount factor of 12 per cent was used to discount the net cash inflows representing the opportunity cost of capital. It can be represented by

$$NPV = \sum_{i=1}^{n} Yi\,(1+r)^{-i} - I$$

Where,

Yi = Net cash at the end of the year 'i'
r = discount rate
i = time period (i=1, 2, 3 … n years)
I- Initial investment

The project would be considered viable, if NPV is positive.

Benefit cost ratio

It is the ratio between the discounted cash inflows and discounted cash outflows and the ratio must be unity or more for an investment to be considered worthwhile. The benefit cost ratio (BCR) was worked out by using the following formula.

$$NPV = \sum_{i=1}^{n} Yi\,(1+r)^{-i} / I$$

Where,

Yi = Net cash at the end of the year 'i'
r = discount rate
i = time period (i=1, 2, 3 … n years)
I- Initial investment

The project would be considered viable, if NPV is positive.

Pay back period

The Pay Back Period (PBP) is the duration of time in years taken to liquidate the investment.

The payback period was estimated by summing up all the undiscounted net benefits over the years to make up the initial investment incurred for establishment.

$$PBP = \frac{\text{Initial investment}}{\text{Average annual net returns}}$$

Internal rate of return

The rate at which the NPV of project is equal to zero is nothing but Internal Rate of Return (IRR). The net cash inflows were discounted to determine the present worth following the interpolation technique as mentioned under;

IRR = Lower discount rate + Difference between the two discount rate X

$$\left\{ \frac{\text{Net present worth of the cash flows At lower discount rate}}{\text{Absolute difference between Present worth cash flows stream At the two discount rates}} \right\}$$

Results and Discussion

Establishment cost of jasmine garden

The establishment cost per acre of the jasmine garden was estimated for the year 2011-12, by considering the quantity of inputs and labour used at current market prices and age of gardens prevailed in the study area. The labour and material costs constitute main items of the establishment cost of the jasmine garden (Table 1). It could be observed from the table that the average per acre establishment cost incurred by the jasmine farmers was Rs. 28,252.75. Out of this, the labour and material costs accounted for 43.67 and 56.33 per cent, respectively. The average labour and bullock pairs used per acre were 109.58 man days and 3.23 bullock pair days respectively. The share of material cost in the total cost was 56.33 percent. In which maximum of 24.12 percent of cost incurred towards planting material followed by 13.44 percent of neem cake and FYM, 11.20 percent on plant protection chemicals, 10.61 percent on weeding, and 8.51 percent on land preparation.

Since jasmine is a perennial flower crop which continues to bear flowers upto 15 years. The total cost incurred for growing jasmine in the first year till its time of bearing constitutes the establishment cost. The initial investment/establishment cost of jasmine orchard (Rs. 28252.75/acre) which seems to be lower compared to the return from the investment. The same was apportioned among the number of years of economic yielding to estimate the annual cost of cultivation. The results were in confirmative with Kumar *et al.,* (2013) and Vanishree (2003) on jasmine in Chitradurga district. The cost of planting material accounted for 24.12 per cent of the total establishment cost. Study conducted by Guledgudda (1995) on jasmine also estimated plant material cost as 20.22 per cent of the

total establishment cost which supported the findings of the present study. This is due to buying of planting material from far-away places like Huvinahadagali and Vijayapura led to high transportation cost. Further, the cost of FYM and neem cake was the second important cost component and formed 13.44 per cent of the total cost since jasmine requires lot of neem cake and FYM during initial stage of establishment. The major item of labour cost was on weeding Rs. 2310.75 (10.61%). This was mainly due to the fact that weeding operation was done more than five times during the year of establishment.

Cost of cultivation of jasmine in different age group of gardens

The cost of cultivation includes all the costs, which were included in the annual maintenance costs and the interest on working capital and fixed costs as indicated in table 2. The average cost of cultivation per acre of jasmine flowers per acre was Rs.136365.10 per year, which included variable cost and fixed costs. These costs amounted to Rs. 108444.30 (79.52%), and Rs.27920.87 (20.84) respectively. The variable cost included annual maintenance cost and interest on working capital. The variable cost of cultivation of jasmine varied from Rs.64982.71 per acre in second year age group to Rs. 151163.54 in the case of more than five years age group. In the overall average cost of cultivation of jasmine, the proportion of total variable and fixed costs were 79.52 percent and 20.84 percent respectively. Further, the variable cost increased from 73.19 percent to 81.35 percent in second year age group to more than five years age group of plants accordingly. The fixed cost includes rental value of land, apportioned establishment cost, interest on fixed capital, land revenue and depreciation. The fixed cost accounted for Rs. 23797.87 per acre in two years age group to Rs. 34647.87 in more than five years age group. However, fixed cost noticed nominal increase in different age group gardens. The apportioned establishment cost Rs.1883.52 and land revenue Rs. 50.00 was the same for all age group gardens.

This increase in the total cost as the age of the plants advanced was due to the combined effect of increased use of labour and material inputs. However, the fixed costs remained more or less the same among the different age group of plants. For an average garden, the cost of harvesting was the major item of variable cost which amounted to Rs. 75000.50 per acre This was due to the fact that the wage rate of labour for harvesting was relatively high in the study area because of scarcity of labour and the harvesting charges were paid in relation to the quantity of flowers harvested. The findings of the present study which identified the harvesting activity as an important item of the labour cost were on line with the findings of the study of Kumar (2013). The rental value of land had the major share in the total fixed cost which amounted to Rs. 23800 per acre for an average garden. This was mainly due to the higher rental value of Thungabhadra command area and they were located very close to city.

Costs and returns structure for jasmine in different age group plants

The costs, and returns structure of jasmine in different age plants have been presented in table 3. The total cost including variable cost and fixed cost accounted to an average of Rs. 136365.13 i.e., from second year onwards the total cost ranges from Rs. 88780.57 to Rs. 185811.41 in more than five years age group of the plants The jasmine flower yields in second year was 2295.65 kg per acre and it increased to 3956.23 kg per acre in more than five year age group plants. The average net returns accounted to Rs. 80056.74 the same

was ranges from Rs. 37480.18 to Rs. 91124.69 from second year to more than five years age group garden. The cost of production ranged from Rs. 38.86 per kg in 3rd year age group plants to 46.06 in more than five year age group of plants which accounted to an average of Rs. 40.55 per kg. The cost of production had an increasing trend from 2nd to more than five year age of the plant.

It was interesting to note that the gross return over a period of time was found to be increasing from second year onwards till the end of fifth year. The similar phenomenon was observed in case of total returns also. The study conducted by Shreedevi (2012) also revealed the similar pattern of behaviour of returns. This was mainly attributed to the fact that the yield of flowers increased up to five years due to the increased use of inputs. As far as cost incurred per kg of flower production was concerned, it was observed that the cost nominally increased up to the age of five years from the establishment.

Financial feasibility of investment in jasmine gardens

To evaluate the feasibility of investment in jasmine orchard, the criteria such as net present value, benefit cost ratio, payback period and internal rate of return were employed and the results were presented in table 4.

Net present worth is the difference between the present value of series of inflow (returns) and outflows (costs) over the economic life period of the jasmine enterprise. The net present worth was Rs. 197359.59 per acre at 12 per cent discount rate. Thus it could be concluded that investment in jasmine enterprise was economically feasible and financially sound. The higher magnitude of net present value may be attributed to the fact that the initial investment and maintenance costs in jasmine garden have been lower in relation to returns.

Benefit cost ratio is the criterion indicates the rate of return per rupee invested in jasmine enterprise. The benefit cost ratio at 12 per cent discount rate was 3.09 which was more than unity and indicated that investment in jasmine enterprise was financially viable. Thus, it could be concluded that investment in jasmine garden was economically feasible and financially viable. Similar findings were reported by Kumar (2013) observed that the benefit – cost ratio for jasmine was 2. This could be because of less initial investment for establishment of jasmine orchard. Payback period is the period required to recover the initial investment incurred in establishing the garden and in the present study the payback period was found to be 2.06 years. This clearly indicated that it would take around two years to recover the entire investment. However, this criterion neglects the net returns realized by the farmers in the subsequent years which may be more significant in the case of long term enterprise like jasmine. This clearly indicated that a shorter period of two years would be required to get back the initial investment. This could be attributed to the fact that the initial investment itself was lower, besides a higher rate of returns. The value of IRR generally depends on the magnitude of returns realized in each year over the economic life period and more particularly in the initial years of jasmine enterprise. It may be noted here that, the IRR was found to be very high, compared to the opportunity cost of capital or rate of interest paid on borrowed capital. Indicating that the investment in jasmine garden was highly profitable, economically feasible and financially sound. Hence, it could be inferred that the investment in jasmine enterprise was found to be economically feasible, financially sound and highly profitable.

Table.1 Establishment cost of Jasmine garden (2011-12)

Sl. No.	Particulars	Man days No.)	Bullock days (No.)	Amount (Rs.)	Per cent
A. Labour cost					
1	Land preparation	8.56	3.23	2471	8.51
2	Trenching	18.92	-	1892	6.52
3	Manures &Fertilizers application	6.71	-	671	2.31
4	Irrigation and preparation of Water canal	19.57	-	1957	6.74
5	Filling pits and planting	14.52	-	1452	5.00
6	Weeding	30.81	-	2310.75	10.61
7	Spraying PPC	10.49	-	1049	3.61
	Total Labour Cost (A)	**109.58**	**3.23**	**11802.75**	43.67
B. Material cost					
1	Planting material	1400 Cuttings		7000	24.12
2	Fertilizer (NPK)	115	kg	2300	7.92
3	Neem cake and FYM	5.2	tons	3900	13.44
4	Plant Protection Chemicals			3250	11.20
	Total Material Cost (B)			**16450**	56.68
	Total Cost (A+B)			**28252.75**	

Table.2 Cost of cultivation of jasmine garden of different age groups

Sl. No.	Particulars	Age of the garden (in Years)					
		2	**3**	**4**	**5**	**>5**	**Average**
I.	**Variable cost /Labour**						
1	Pruning	323	507.5	864	727.5	857.5	655.9
2	Weeding	2268	3339	5432	5584	7556.25	4835.85
3	Earthing up	480	518.75	756	756	1022	706.55
4	Application of manures and Fertilizers	1832	2456.25	2631	3112.5	3909.5	2788.25
5	Irrigation	1838	2131.25	2467.5	2467.5	2231.25	2227.1
6	Harvesting	42065	60667.5	76581	86286	109401.25	75000.15
7	Spraying PPC	1845	2431.25	3295.5	3067.5	2703.75	2668.6
	Total Labour cost	**50651**	**72051.5**	**92027**	**102001**	**127681.5**	**88882.4**
	Material cost						
1	FYM loads	4565	5439.5	4884	4884	5520	5058.5
2	Fertilizers (kgs)	3015.5	4145.7	5416.56	5868.8	5397.84	4768.88
3	Plant Protection Chemicals	2500	2675	2675	2675	2675	2640
Total Material cost		**10080.5**	**12260.2**	**12975.56**	**13427.8**	**13592.84**	12467.38
	Interest on working capital @ 7%	4251.21	5901.82	7350.18	8080.02	9889.20	7094.485
Total Variable cost		64982.71 (73.19)	90213.52 (77.64)	112352.74 (81.22)	123508.82 (80.87)	151163.54 (81.35)	**108444.3** (79.52)
II. Fixed cost							
1	Land rent	20000	22000	22000	25000	30000	23800
2	Land revenue	50	50	50	50	50	50
3	Apportined est. cost	1883.52	1883.52	1883.52	1883.52	1883.52	1883.517
4	Interest on fixed capital @ 8.5%	1864.35	2034.35	2034.35	2289.35	2714.35	2187.349
Total Fixed cost		23797.87 (26.81)	25967.87 (22.36)	25967.87 (18.78)	29222.87 (19.13)	34647.87 (18.65)	27920.87 (20.84)
Total cost		**88780.57**	**116181.38**	**138320.60**	**152731.68**	**185811.41**	**136365.1**

Note: Figure in parenthesis indicates percentage to the total

Table.3 Cost and returns structure of different age group of jasmine garden

Sl. No.	Particulars	Age of the garden (in Years)					Average
		2	3	4	5	>5	
1	Cost of cultivation (Rs./acre)	88780.57	116181.38	138320.60	152731.68	185811.41	136365.13
2	Yield (kg/acre)	2295.65	3152.12	3562.12	3689.25	3956.23	3331.07
3	Gross returns	126260.8	189127.2	231537.8	258247.5	276936.1	216421.87
4	Net returns Rs./acre)	37480.18	72945.82	93217.20	105515.82	91124.69	80056.74
5	Cost of production (Rs./kg)	38.67	36.86	38.83	41.40	46.97	40.55
	Cost of cultivation - Imp. Value of labour	38129.57	44129.88	46293.60	50730.68	58129.91	47482.73
	Net returtns + Labour cost	88131.18	144997.32	185244.20	207516.82	218806.19	168939.14

Table.4 Financial feasibility of jasmine garden

Sl. No.	Particulars	Values
1	Net Present Value (NPV)	197359.59
2	Benefit:Cost ration (BCR)	3.09
3	Pay Back Period (PBP)	2.06
4	Internal Rate of Returns (IRR)	185

Note: Discount rate calculated at 12 per cent

Table.5 Marketing cost incurred by the farmer in the sample market (Rs./qtl)

Sl. No.	Particulars	Hosapete market	Gangavati market	Koppal market
1	Packing cost	5.62	5.62	5.62
2	Transportation cost	250	375	200
3	Commission charges	1000	1000	850
4	Spoilage losses	50	50	50
Total (Rs./qtl)		1305.62	1430.62	1105.62

Table.6 Problems faced by the Jasmine farmers

Sl. No.	Particulars	Number of farmers	Percentage
I	**Production problems**		
1	Pest and disease problems	120	100.00
2	Water scarcity	25	20.83
3	Labour scarcity during weeding & harvesting	92	76.67
4	Lack of technical guidance	45	37.50
5	Lack of credit facility	40	33.33
6	Shortage of PPC	23	19.17
II	**Marketing problems**		
1	High commission charges	74	61.67
2	Fluctuation in jasmine prices	95	79.17
3	Need of cooperative marketing for jasmine	75	62.50
4	**Transportation problems**		
a.	Transportation charges	46	38.33
b.	Connecting roads	21	17.50
c.	Frequency of buses	18	15.00

Marketing of jasmine flowers

Marketing functions

The marketing process of jasmine in the study area involved assembling, packing, transportation and selling functions. Better packing always helped in maintaining the quality and in reducing the losses during transit on account of spoilage. Packing of flowers was generally done in gunny bags, having a capacity of 30 to 40 kgs flowers. They are sprinkled with cold water or the bags containing flowers are dipped in cold water to keep the flowers fresh till they reach the hands of the commission agents.

Almost all the flowers of jasmine from the study area were sent to Hosapete market by buses and Gangavathi and Koppal were the minor markets. Four stakeholders involved in the marketing of jasmine i.e., farmers, commission agent cum wholesaler, retailers and consumers. The commission agents cum wholesalers arrange for the sale of flowers in these markets for which they charged a higher rate of commission of the sale proceeds from the producer-seller in the respective markets (Hosapete, Gangavathi and Koppal markets).

Marketing channels

One marketing channels through which jasmine are marketed in the study area are Channel – I: Producers – commission agents cum wholesalers – retailers –consumers.

The commission agent cum wholesaler arranged for the sale of jasmine flowers by open auction method and thereby created competition among the retailers/buyers. The retailers bought the flowers from the commission agent-cum-wholesalers and prepared various articles from jasmine flowers like big and small garlands, bouquets, veni, etc., depending on the demand for each article and sold them directly to the consumers.

Marketing costs incurred by the producers in the sample markets

Marketing cost incurred by the producers in the sample markets is presented in table 5. It could be seen from the table that, in Hosapete market under identified marketing channel the significant item of cost was the commission charges which accounted for 76.59 per cent (Rs.1000 per quintal), in Gangavathi markets it accounted 69.59 per cent (Rs. 1000 per quintal) and in Koppal market it accounted 78.88 per cent (Rs. 850 per quintal).The next important item was the transport cost which accounted for 19.14 per cent (Rs.250 per quintal), 26.21 per cent (Rs. 375 per quintal) and 18.09 per cent (Rs. 200 per quintal) in Hosapete, Gangavathi and Koppal markets respectively. The reason for higher proportion of commission charges in this channels was mainly attributed to the fact that majority of the farmers borrowed loans from commission agents who agreed to sell their flowers to that commission agents only. Hence, the farmers were under the obligation of these commission agents that paved the way for exploitation. The study conducted by Shreedevi (2014) on orchids revealed that the commission charges had been very high in the orchids marketing and hence the activities and practices of commission agent needs to be properly regulated and controlled by the authorities of the government for improving the marketing efficiency.

The foregoing discussion revealed that commission charges and transportation charges were the major items of marketing cost. This calls for initiating control measures on the part of the government to regulate the activities of commission agents and to reduce the commission charges to safeguard the interest of jasmine growers, besides creating

infrastructure facilities for transport of flowers to distant places.

Problems in production and marketing of jasmine flowers

Opinion survey was conducted about the production and marketing constraints of jasmine flower growers and the results were presented in table 6.

Problems in production of jasmine flowers

From the table, it could be observed that all the jasmine farmers expressed severe pest and disease problems in production of jasmine flowers. Scarcity of labour during weeding and harvesting was also one of the major problems which were expressed by 76.67 per cent of the farmers. The other problems were lack of technical guidance to the tune of 37.50 per cent, lack of credit facility (33.33%), water scarcity (20.83%) and shortage of plant protection chemicals (19.17%). The incidence of budworms, mites, thrips and leafy diseases were very severe. As against this, the use of plant protection chemicals was in excess of requirements as it was seen from the costs incurred on plant protection chemicals. This was due to the imperfect knowledge about pest and diseases. Jasmine cultivation was labour intensive enterprise which required more number of labours during the weeding and peak harvesting seasons. As the jasmine cultivation has been a highly labour intensive enterprise, majority farmers were taken up this enterprise on a small scale.

Problems in marketing of jasmine flowers

Nearly 80 per cent of respondents opined that high fluctuation of jasmine price was the major problem in the marketing of flowers. More than 60 per cent of the farmers expressed that lack of cooperative/producer organization and high rate of commission charge by commission agent were also major marketing problem. Regarding transportation problems, 38.33 per cent of farmers expressed that they had to bear huge charges for transportation produce from production point to commission agent. The other problems felt by the farmers regarding connectivity to markets (17.50%), and lower frequency of bus facilities (15%). The frequent and sudden price fluctuation of jasmine was the major marketing problems. This may be because of lack of flower grower association at the production centre. Establishment of flower producers cooperative may reduce the frequent fluctuation of the prices to the certain extent. High commission charge is also due to the credit taken by the farmers for jasmine production and hence they bound to sell the produce to the same commission agent. Hence, credit facility to jasmine growers may be extended with liberalized documentation by organized financial institutions. These problems are in coordination with results of Shreedevi (2014).

Investment in establishment and maintenance of jasmine garden in small scale in Hyderabad-Karnataka region is found to be economically feasible as average cost of cultivation and net returns per acre were Rs. 136365.13 and Rs. 80056.74 respectively. The financial analysis indicated that the jasmine enterprise is profit generating activity. The commission agent charges, fluctuation in price, lack of producer cooperatives and scarcity of labour during weeding and harvesting season were the major problems of production and marketing of jasmine.

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