Available Online at http://www.recentscientific.com

ISSN: 0976-3031

International Journal of Recent Scientific Research
Vol. 5, Issue, 11, pp.2117-2122, November, 2014

International Journal of Recent Scientific Research

RESEARCH ARTICLE

Production, Post Harvest Handling And Marketing Of Cut-Flowers In Tamil Nadu

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ARTICLE INFO

Article History:

Received 15th, October, 2014
Received in revised form 27th, October, 2014
Accepted 16th, November, 2014
Published online 28th, November, 2014

Key words:

Cut-flower; Marketing; Production.

ABSTRACT

The present field survey was an attempt to examine the production and marketing cost structure and profitability of some selected flowers such as Rose, tuberose, gerbera, gladiolus and marigold. Primary data were collected through stratified random sampling technique. The study covered primary market (Hosur), wholesale market (Dharmapuri district) and retail market (Dharmapuri district) for flower business. Data were collected from 20 farmers of two selected unions under Tamil Nadu of Dharmapuri districts. Besides, 30 local traders, 10 wholesalers cum retailers and 20 retailers were interviewed from the selected markets. The highest net return was earned from rose (Rs. 3, 53,927) followed by tuberose (Rs.1, 76,941), gladiolus (Rs.1, 33,069) and marigold (Rs.84,643). Total marketing cost per hundred flower was highest for retailer (Rs. 41.14) because of their diverse activities and lowest for wholesaler cum retailer (Rs. 5.66) due to their limited functions. On an average, the net marketing margin was highest for retailers (Rs. 28.10) and lowest for wholesaler (Rs. 9.03). The flower-farmers and intermediaries faced various production and marketing problems in the study areas. Based on the findings, some recommendations were made to overcome the problems that include development of storage facility, provision for scientific knowledge and training facility, and establishment of permanent flower wholesale and local markets, etc.

INTRODUCTION

Cut flowers are parts of plants, characteristically including the blooms or inflorescences and some attached plant materials, but not roots and soil. The production of cut flowers specifically known as the cut flower industry is a branch of floriculture industry. In Tamil Nadu, small-scale flower production initially started in late seventies by some innovative farmers with the production of tuberose, but large scale commercial production was started in mid eighties in Jhikargacha Upazila of Jessore district (Sultana, 2003). The most common, commercially grown flower species in Tamil Nadu are tuberose *(Polianthes tuberosa),* rose *(Rosa indica),* marigold *(Tagetes erecta, T. patula),* gladiolus *(Gladiolus spp)* and orchids. Tamil Nadu is well suited for cut flower and foliage production due to its favourable climate and other conditions such as scope to expand cultivation in unutilized homestead lands, cheap labour, relatively low capital investment in contrast with high value addition and good prospect for exports. Cultivation of flower is reported to give 3-5 times and 1.5-2 times more returns than obtained from rice and vegetable cultivation, respectively (Dadlani, 2003). At present, 10,000 hectares of land covers flower cultivation taking the lead by Dharmapuri district. More than 5,000 resilient farmers are growing flower and foliage in the country and about 150,000 people are directly or indirectly involved in floriculture business as their sole livelihood (Chowdhury, 2010). At present, the government has been emphasizing the need to accelerate diversified agricultural production. Floriculture with its ability to yield higher economic return per unit area is slowly gaining ground in the diversification plan in agriculture, which may help the typical crop farmers to improve their livelihood by shifting their business to flower production. After achieving certain level of food security, efforts in the crop diversification plans can accelerate the national and economic development of the country. However, floriculture has not received any direct attention or organized intervention for development. The achievements that have taken place silently in the floriculture sub-sector of agriculture, is almost entirely by the private sector initiative in an unorganised way and without support from the government. Therefore, if the flower industry is explored by farmers, traders, exporters and policy makers it can significantly contribute to the national economy by earning foreign exchange, generating employment and increasing GDP. Nevertheless, there is a lack of agribusiness studies on floriculture in Tamil Nadu. The present study thus attempts to cover the whole agri-business structure of cut-flowers as a commercial product. It may provide valuable information to the farmers, different intermediaries, policy makers of the Government and NGOs to formulate policy aimed at increasing production and marketing. The study was conducted with the specific objectives of analyzing the costs and returns structures of cut-flowers production, post harvest handling and marketing in Tamil Nadu.

METHODS

Data Collection

In Tamil Nadu flowers are cultivated commercially in few areas only. On the basis of high concentration, Dharmapuri

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district is considered as one of the leading cut-flowers producing zone in Tamil Nadu. 'Gandhi flower market', is popularly known as the centre of floriculture of Tamil Nadu, under Hosur of Dharmapuri district where there is an annual sale of Rs. 15 crore worth of flowers that covers 70 per cent of the country's total flowers for both domestic use and exportation (Khan, 2008). Therefore, the Hosur of Dharmapuri district was selected as the study area for primary market data. Furthermore, Hosur area of Dharmapuri district was also selected as the study area to collect data for the wholesale market, because Gandhi flower market is the only wholesale flower market in capital Bangalore which was established in 1990 (Qamruzzaman, 2009). Primary data were gathered by field survey using a questionnaire. For the preparation of the questionnaire a pilot survey was conducted with 10 respondents which include flower farmers, local traders, wholesalers cum retailers and retailers. Attention was paid to incorporate any new information that had not been asked in the draft schedule. The draft questionnaire was then modified and improved. Based on the experience gathered from the pilot survey, respondents for the present study were selected through stratified random sampling.[*] For this sampling method a database of flower farmers, local traders, wholesaler and retailers were collected from *Upazila* Agriculture Offices, Hosur Farmers and Traders Welfare Association[*] and Tamil Nadu Flower Small Business Association. Based on their information the respondents were classified into four groups: 1) Flower farmers 2) local traders 3) Wholesaler cum retailers and 4) Retailers. As each of these groups does unique jobs, they can be considered as appropriate strata of the population. A total of 90 samples which include 30 local traders, 10 wholesaler cum retailers, 20 retailers and 20 farmers were selected randomly and consequently interviewed at their work site. The survey was conducted during the period of January-February, 2013. The interviews focused on flower production costs and returns, marketing system, marketing costs and returns, constraints of flower business and the possible solutions of flower production for one year time period.

Data Analysis

Data from questionnaire interviews were checked, coded and entered into a database system using Microsoft Excel software. Economic analysis was carried out to determine production cost and return. The analysis was based on farm-gate prices of harvested flowers and current market prices of all other items, expressed in Tamil Nadu currency, in Rupees.

Production cost

The production cost of flowers refers to the total expenditure incurred by the growers for producing flowers in a particular area of land, relate to the level of inputs and the price of inputs. For the present study data on costs and returns of flower production were collected to clarify production cost and to assess the profitability. Total production cost is the sum of variable costs and fixed costs.

Variable cost

Variable costs are directly related to the scale of farm operations in a given time period. Variable costs in flower production are cost of labor, manure, fertilizer, planting material, irrigation, pesticides, interest on operating capital, etc. Harvesting cost refers to labour cost as the main component of harvesting. Interest on operating capital was calculated by using the following formulas:

Interest on operating capital

$$= \frac{\text{Running capital x rate of interest x time considered (months)}}{\mathbf{100x2}}$$

Fixed cost

Fixed cost in flower farming is mainly the rental value of land which was Rs. 18000/ha/year in the study area at the time of data collection.

Marketing cost

Marketing costs include the cost of all business activities necessary to ascertain the needs and wants of markets to facilitate the entire marketing process. Marketing cost items varies from flower farmers to different intermediaries involved in flower business. For farmers, marketing cost includes plucking and assembling, transportation, cleaning and sorting, grading, spoilage and damage, etc. Marketing cost of flower intermediaries includes the expenses incurred by different intermediaries for movement of the flowers through the marketing channel. Cost of different items such as assembling, loading and unloading, grading, packing, transporting, storage, market toll, spoilage, labour cost, salary, material, store rent and other costs were incurred by the intermediaries involved in flower marketing. The formula for calculating marketing cost is:

Marketing cost (Rs/ha) = Marketing cost (Rs/quintal) x yield (quintal/ha)

Total cost

Fixed costs and variable costs together make up total production cost. Thus, the total cost for farmers in producing flower enterprise encompasses total production cost plus marketing cost.

Gross return

The gross returns of the selected flowers were calculated by multiplying the yields of the selected flowers in hundred per hectare and prices per respective hundred flowers. The formula was:

Gross return (Rs/ha) = Yield (quintal/ha) x sale price (Rs/ quintal)

Net return/profit

Net return is obtained by the difference between the gross return and total cost. To determine the per hectare profitability of flower production for the selected farmers the following equation were applied.

$$\Pi = \sum PiYi - (\sum PiXi + TFC + TMC)$$

Where,

Π = Net return from flower production
Pi = Per unit price (Rs./quintal)
Yi = Yield (quintal/ha)

[*] A stratified sample is one obtained by separating the population elements into non-overlapping groups, called strata, and then selecting a sample from each stratum (Scheaffer et al. 1990). Arens and Loebbecke (1981) noted that the most common reason for stratification is to reduce the sample size needed to achieve a desired level of precision and reliability.

Xi = Total quantity of it inputs used for flower production
TFC = Total fixed cost
TMC = Total marketing cost for farmers

Marketing margin

A marketing margin may be defined as (i) a difference between the price paid by consumers and that obtained by producer, or (ii) the price of a collection of marketing services which is the outcome of the demand for and the supply of such services (Tomek and Robinson, 1977, p. 109). In the present study the marketing margins and net margins of different intermediaries were estimated by the following formulas:

i. Gross marketing margin = Sale price - purchase price
ii. Net marketing margin = Gross marketing margin - marketing cost

The chain of intermediaries through which the transaction of goods takes place between producer and consumers constitutes a marketing channel ((Kohls and Uhl, 1980, p. 8). The flower-marketing channels in Tamil Nadu are vast and complex. For the limitation of time, money and resource personnel the study covered limited channels of flower marketing in the study areas (Figure 1).

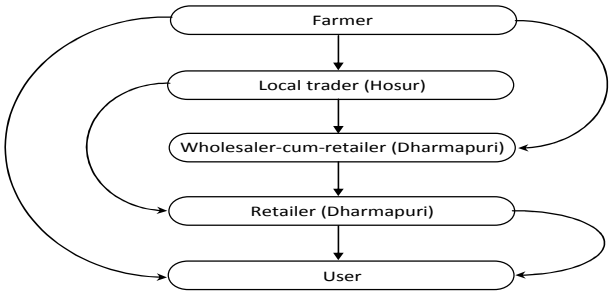

Figure 1 Marketing channels of selected flower in the study areas

The following channels 0063an be identified on the basis of Figure 1.

Channel-I Farmer local trader wholesaler-cum-retailer retailer user
Channel- II Farmer local trader retailer user
Channel- III Farmer local trader wholesaler-cum-retailer user
Channel- IV Farmer wholesaler-cum-retailer retailer user
Channel- V Farmer user

RESULTS AND DISCUSSIONS

Production cost of selected flowers

Table 1 Per hectare inputs use by different flowers

Input	Tuberose	Rose	Gladiolus	Marigold
Labour (man-days)	390	422	190	205
Manure (kg)	3500	8000	3500	4000
Urea (kg)	750	1400	800	840
TSP (kg)	650	1200	500	680
MP (kg)	600	900	440	510
Bone meal (kg)	-	1000	-	-
Mustard. Oilcake (kg)	-	1100	-	-

Source: Field survey, 2013

A comparison of the cost of production and its breakdown to components provides a better understanding of cost structure and relative production efficiency. This section compares flower production costs for different species. Farmers generally use labour, planting materials, manure, fertilizer, irrigation and pesticides in flower production. The use of labour per hectare varied from 190 management-days for marigold to 422 management-days for rose production. Huge amount of manure was used in the production of flowers. The highest amount of manure per hectare was applied to rose fields (7500kg) followed by marigold (3500kg), gladiolus (3000 kg) and tuberose (3000 kg). Urea, D.A.P and M. P. were the common fertilizers used in the flower production. In addition bone meal and mustard oil cake were also applied in rose cultivation. The highest amount of fertilizer per hectare was used by rose (5200 kg) followed by tuberose (1800 kg), marigold (2000 kg) and gladiolus (1740 kg) (Table 1). Per hectare total production cost of rose was estimated at Rs.l, 90,969.6 followed by Rs. 1,08,488.3 for gladiolus, Rs. 10,608.38 for tuberose and Rs. 84,842.06 for marigold (Table 2).

Marketing cost of farmers for selected flowers

Marketing cost per hundred of the selected flowers for farmers are presented in Table 3. The spoilage and damage was the major cost item for all the selected species. The cost of spoilage and damage for tuberose was Rs.2.9 per hundred flowers followed by Rs. 5.45 for rose, Rs. 4.1 for gladiolus and Rs. 0.8 for marigold. The total marketing cost was found to be highest for rose (Rs. 10.45) followed by gladiolus (Rs. 9.14), tuberose (Rs. 6.30) and marigold (Rs. 1.32).

Yield and return of selected flowers

Table 4 shows that the average yields per hectare of tuberose, rose, gladiolus and marigold were 8000, 6500, 4500 and 40,100 hundred respectively. Average prices for tuberose, rose, gladiolus and marigold were Rs. 80, Rs.160, Rs.140 and Rs.8.50 per hundred respectively. It is clear from Table 4 that highest gross return per hectare was obtained from rose (Rs. 6,95,910) followed by tuberose (Rs. 4,00,000), gladiolus (Rs. 4,60,810) and marigold (Rs. 2,95,740).

Production and marketing cost of selected flowers

Per hectare production and marketing costs of the selected flowers for farmers are presented in Table 5. Thus, total cost of producing selected flowers for farmers has been calculated by adding up production cost and marketing cost (Table 5). The total cost was found highest for rose cultivation (Rs. 2,38,856) followed by gladiolus (Rs. 1,28,840), tuberose (Rs. 1,25,653) and marigold (Rs. 1,12,008).

Table 5 also reveals that the share of marketing cost in total cost was highest for marigold (35 per cent) followed by tuberose (23 per cent), rose (19 per cent) and gladiolus (16 per cent), while production cost was 66, 79, 82 and 85 per cent for the respective flowers.

Net return from selected cut-flowers

It was observed that the flower production was a profitable business as the per hectare net return for tuberose, rose, gladiolus and marigold were Rs. 1,76,941, Rs. 3,53,927, Rs. 1,33,069 and Rs. 84,643 respectively, in which rose stood for the highest (Table 6).

Marketing cost of intermediaries

Local traders (farm level) performed the functions of purchasing flowers from the farmers and transporting it to wholesaler-cum-retailers and retailers in Dharmapuri district. Table 7 reveals that the average estimated marketing cost incurred by local trader was Rs. 13.40 per hundred flowers. Transportation was the highest cost item

Table 2 Per hectare cost of production for selected flowers (Rs/ha)

Input	Tuberose	Rose	Gladiolus	Marigold
Human labour	30000	28700	14000	15100
Planting material	18000	42000	54000	10000
Supporting material	-	15150	-	-
Fertilizer	29125	49625	26670	28330
Pesticide	6000	16000	4500	4000
Irrigation	8000	12000	5000	6000
Interest on operating capital	6484.375	18464.58	6818.25	4540.093
Total variable cost	80,609.38	1,74,968.6	98,500.25	70,786.08
Total cost of production	98,607.38	1,80,964.6	1,24,566.3	82,426.08

Source: Field Survey, 2013

Table 3 Marketing cost of cut-flowers for farmers (Rs. per 100 flower)

Cost item	Tuberose	Rose	Gladiolus	Marigold
Plucking and assembling	0.9	1.4	1.25	0.3
Transportation	0.77	0.9	0.9	0.25
Cleaning and sorting	0.75	0.9	0.75	0.1
Grading	0.32	0.45	0.42	0.2
Loading and unloading	0.5	0.7	0.75	0.1
Spoilage and damage	2.9	5.45	4.1	0.8
Other	0.25	0.3	0.25	0.02
Total	6.30	10.45	9.14	1.32

Source: Field Survey, 2013.

Table 4 Per hectare yield and returns of selected flowers

Particulars	Tuberose	Rose	Gladiolus	Marigold
Yield (hundred/ha)	8,000	6,500	4,500	40,100
Price (Rs /100 flowers)	80	140	140	8.50
Total return (Rs/ha)	4,00,000	6,95,910	4,60,810	2,95,740

Source: Field Survey, 2013

sometimes to users. The average marketing cost of wholesaler-cum-retailer was worked out to be Rs. 5.68 per hundred flowers, in which spoilage shared the highest (47.37 per cent). The retailers were involved in the functions of purchasing flowers from wholesaler-cum-retailers and selling it to the users. The average marketing cost incurred by local trader was Rs. 41.42 per hundred flowers. Total marketing cost was estimated at Rs. 59.42 per hundred flowers, of which retailers' share was 69.26 per cent while local traders and wholesaler-cum-retailers incurred 21.20 per cent and 9.51 per cent respectively.

Marketing margin for different intermediaries

Marketing margins of different groups of intermediaries were calculated separately to examine their relative performance of marketing activities. The gross marketing margin of local traders

Table 5 Per hectare production and marketing cost of selected flowers

Flowers	Production cost (Rs.)	Marketing cost (Rs.)	Total cost (Rs.)
Tuberose	96,609.38 (79)*	26,450 (21)	1,25,653 (100)
Rose	1,90,969.6 (82)	41,013.7(18)	2,38,856 (100)
Gladiolus	1,08,488.3 (85)	19,252.52 (15)	1,28,840 (100)
Marigold	72,780.08 (66)	38,227 (34)	1,12,008 (100)

*Figures within parentheses indicate the percentages of the total. Source: Field Survey, 2013

Table 6 Per hectare return from selected flowers

Particulars	Flowers			
	Tuberose	Rose	Gladiolus	Marigold
Gross return (Rs./ha/yr)	3,00,000	5,85,910	2,60,810	1,95,650
Total cost (Rs./ha/yr)	1,23,059	2,31,983	1,27,741	1,11,007
Net return (Rs./ha/yr)	1,76,941	3,53,927	1,33,069	84,643

Source: Field Survey, 2013.

was Rs. 21.61 and the net marketing margin was Rs. 9.01 per hundred flowers. The gross marketing margin of wholesaler-cum-retailers was worked out at Rs. 16.40 while the net marketing margin was Rs. 5.61. On the other hand, the gross marketing margin for retailers was estimated at Rs. 69.24 and consequently the net marketing margin was calculated at Rs. 28.09 (Table 8).

Table 7 Total marketing cost of selected flowers for different intermediaries

Cost items	Local trader	Wholesaler-cum-retailer	Retailer	Total (Rs per 100 flowers)	
				Cost	Percentage
Transportation	5.88	-	-	5.88	9.90
Assembling cost	0.36	-	-	0.36	0.61
Packing cost	4.91	-	-	4.91	8.27
Loading and unloading	-	0.76	-	0.76	1.28
Cleaning and sorting	0.48	0.59	-	1.07	1.28
Market toll	0.65	1.30	-	1.95	1.80
Spoilage		2.68	9.21	11.89	20.02
Basket	-	-	4.60	4.60	3.28
Refine + cellophane	-	-	1.79	1.79	7.74
Thread	-	-	0.88	0.88	3.01
Scotch tape	-	-	0.87	0.87	1.48
Salary of manager	-	-	4.19	4.19	1.46
Wages of labour	-	-	7.9	7.9	7.05
Electricity charge	-	-	2.08	2.08	13.30
Cost of water	-	-	0.64	0.64	3.50
Store rent	-	-	6.43	6.43	1.08
Cost of advertisement	-	-	0.77	0.77	10.82
Others	0.32	0.33	1.79	2.44	1.30
Total	13.40	5.68	41.42	59.40	4.11
Percentage	21.20	9.51	69.26	59.42	100

Source: Field Survey, 2013.

(46.63 per cent) for local traders. Wholesaler-cum-retailers performed the function of purchasing flower from the local traders (farm level) and sold those to retailers and

Table 8 also reveals that the net marketing margin was highest for retailers (Rs. 28.09), which indicates that the retailers are the most beneficiary intermediaries in marketing channel of cut-flower.

Production problems faced by flower farmers

For convenience, the problems and constraints faced by the selected flower farmers in the study area have been categorized under four general groups such as economic, technical, marketing and social and other, presented in Table 9.

Problems faced by intermediaries

The problems faced by different intermediaries of flower business are presented in table 10. This includes problem of capital, price instability, lack of storage and market information, etc.

Table 8 Marketing margin for different intermediaries (Rs per 100 flower)

Particular	Local trader	Wholesaler-cum-retailer	Retailer
Purchase price	76.63	96.73	113.06
Sale price	98.25	113.18	182.30
Gross marketing margin	21.61	16.40	69.24
Marketing cost	12.60	5.61	41.14
Net marketing margin	9.01	10.79	28.09

market requires a concerted effort on the part of the government as well as the private entrepreneurs to develop floriculture industry on scientific lines. On the basis of the findings of the study, the following recommendations were made for the improvement of existing production and marketing system of flower.

- Storage facilities should be established both in public and private sectors.
- Farmers need to be trained in the scientific production practices and technology related to this new enterprise.
- Traders need scientific knowledge and training on handling, grading, processing and displaying flower in attractive way for sale.
- Market information should be made available to the farmers and intermediaries regularly.
- Government and local government may take necessary steps to establish permanent wholesale and local market.
- The floriculture sector should be patronized by the Government to harmonize the public-private partnership (PPP).

Table 9 Problems faced by the farmers in producing flower

Reported problem	No of respondents n=20	Percentage
Economic problems		
Lack of capital or institutional credit	15	75
High price of fertilizer and insecticides	20	100
Technical problems		
Lack of scientific knowledge and training	10	50
Lack of quality seeds or plants	11	55
Insufficient irrigation	12	60
Attack by pest and disease	15	75
Lack of extension work	16	80
Marketing problems		
Inadequate and underdeveloped transportation and communication system	12	60
Low market price	14	70
Lack of adequate market facilities	13	65
Dominance of intermediaries	14	70
High market toll	12	60
Lack of market information	15	75
Social and other problems		
Loss of production due to thief	12	60
Flower damage by animals	11	55
Spoilage	15	75

Source: Field Survey, 2013.

Table 10 Problems faced by different intermediaries

Reported problem	Flower traders			
	Local trader	Wholesaler- cum-retailer	Retailer	All
Inadequate capital	9 (60)*	3(60)	11(55)	23 (57.5)
Price instability	12 (80)	4(80)	18 (90)	34 (85)
Lack of adequate market information	13 (86.66)	3 (60)	15 (75)	31 (77.5)
Lack of storage facilities	14(93.33)	4(80)	16 (80)	34 (85)
Unsold flower	-	3(60)	18 (90)	21 (55.5)
Inadequate space within the shop	-	-	11(55)	11(27.5)
Fluctuation of demand	13 (86.66)	4(80)	16 (80)	33 (82.5)
Strike and hortal	11(73.33)	3(60)	14 (70)	28 (70)

*Figures within parentheses indicate the percentages of the total. Source: Field Survey, 2013.

CONCLUSIONS

The findings of the present study indicate that production of flowers is a profitable business for farmers. The return over cost is almost double, which indicates high profitability. Also, trading of flower is a profitable venture for different intermediaries.

It can be said that flower cultivation and marketing has wider scope in Tamil Nadu, so the farmers and intermediaries could certainly be benefited financially if performance of marketing system of flower becomes well developed. The growing demand of cut-flowers in the domestic as well as in the export

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