ANALYSIS OF LILIUM CUT FLOWER SUPPLY CHAIN – A STUDY IN NILGIRIS DISTRICT

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TAMIL NADU AGRICULTURAL UNIVERSITY
COIMBATORE-641003

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Project submitted in partial fulfillment of the requirements for the award of the degree of

MASTER OF BUSINESS ADMINISTRATION *to the*

Tamil Nadu Agricultural University, Coimbatore – 641 003

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CERTIFICATE

This is to certify that the project report entitled "**ANALYSIS OF LILIUM CUT FLOWER SUPPLY CHAIN – A STUDY IN NILGIRIS DISTRICT OF TAMILNADU** " submitted in part fulfillment of the requirements for the degree of **MASTER OF BUSINESS ADMINISTRATION** to the Tamil Nadu Agricultural University, Coimbatore is a record of bonafide research work carried out by **Mr.PRAKASH.K.C** under my supervision and guidance and that no part of this project has been submitted for the award of any other degree, diploma, fellowship or other similar titles and that work has not been published in part or full in any scientific or popular journal or magazine.

Place : Coimbatore

Date :

(**Dr. S.D.SIVAKUMAR)**

CHAIRMAN

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Dr. K.M.SHIVAKUMAR

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I place at the feet of the Almighty, my humble heart filled eternal gratitude for the blessing showered upon me…!!

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(PRAKASH.K.C)

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ABSTRACT

ANALYSIS OF LILIUM CUT FLOWER SUPPLY CHAIN – A STUDY IN NILGIRIS DISTRICT

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The study was undertaken with the overall objective to analyze the supply chain for lilium cut flower in Nilgiris district. The study was undertaken with the following specific objectives.

- to examine the current practices in supply chain of Lilium cut flower in Nilgiris district,
- to conduct value chain analysis for Lilium cut flower,
- to identify the major constraints in supply chain of Lilium and
- to suggest suitable strategies for efficient supply chain management of Lilium in Nilgiris district.

The study was conducted in Ooty, Coonoor and Kotagiri panchayat union in Nilgiris districts as it occupied the major area in the production of hi-tech cut flower like lilium. A sample of 30 farmers, 25 intermediaries was selected from the study area by simple random sampling method. Data were collected from sample farmers by personal interview with the aid of a pretested interview schedule and published sources.

Results showed that majority of the sample farmers belonged to the age group of 31 - 40 years. All the sample farmers were literates and majority of them had higher secondary level

education (40.00 per cent). Agriculture was the primary occupation of all sample farmers. In case of land holding pattern, small and large sized farms accounted for major share of the total sample. Majority of the farmers (87 per cent) had more than six years experience in cultivating crops.

There were six supply chains existing for marketing of lilium cut flower. More than eighty five per cent of lilium moved from Nilgiris to Bangalore through channel I, II, V and VI. For export market, channel III and channel IV were predominant.

Channel I: Farmer - Commission agent - Wholesaler - Consumer
Channel II: Farmer - Wholesaler - Consumer.
Channel III: Farmer - Wholesalers - Exporter - Consumer.
Channel IV: Farmer - Auction center - Exporter - Consumer.
Channel V: Farmer - Wholesaler - Retailer - Consumer.
Channel VI: Farmer- local trader - wholesaler - consumer.

Channel II was used by large farmers alone for sending their produce to Bangalore. Channel I, V and VI were predominantly used by marginal and small farmers to sell their produce.

Marginal farmers constructed poly green house in 1600 sq mt. at a capital investment of Rs. 16.06 lakhs. The fixed cost and variable cost per season were Rs. 1.26 lakhs and Rs. 20.61 lakhs. The cost of production per stem was Rs. 22.54. The average price realized by a marginal farmer was Rs. 25.50 per stem. The net return per season was Rs. 0.48 lakhs.

Small farmers constructed poly green house in 3200 sq mt. at a capital investment of Rs. 18.60 lakhs. The fixed cost and variable cost per season were Rs.1.45 lakhs and Rs.20.96 lakhs. The cost of production per stem was Rs.20.79. The average price realized by a small farmer was Rs. 26.50 per stem. The net return per season was Rs. 3.44 lakhs.

Large farmers constructed poly green house in 3200 sq mt. at a capital investment of Rs. 24.06 lakhs. The fixed cost and variable cost per season were Rs. 3.40 lakhs and Rs. 20.81 lakhs. The cost of production per stem was Rs.19.52 The average price realized by a large farmer was Rs. 28.00 per stem. The net return per season was Rs. 7.35 lakhs.

The producers expressed that the high cost of imported planting material was the most important problem followed by pest and disease attack. Other important problems were lack of skilled man power, high labour cost, cost of fertilizers and plant protection chemicals.

The commission charges constituted the major share of the marketing cost of the producer followed by transport and packing cost for lilium cut flower. In the case of wholesaler and exporter transportation cost accounted for major share of the marketing cost followed by spoilage. The intermediaries expressed lack of quality as the most important problem followed by lack of consistency in supply. The other problems were high handling cost, poor storage facility and high transport cost.

ABSTRACT

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The study was conducted in Ooty, Coonoor and Kotagiri taluks in Nilgiris districts as it occupied the major area in the production of hi-tech cut flower like lilium. A sample of 30 farmers, 25 intermediaries was selected from the study area by simple random sampling method. Data were collected from sample farmers by personal interview with the aid of a pretested interview schedule and published sources. Results showed that majority of the sample farmers belonged to the age group of 31 - 40 years. All the sample farmers were literates and majority of them had higher secondary level education (40.00 per cent). Agriculture was the primary occupation of all sample farmers. In case of land holding pattern, medium sized farms accounted for 56.667 per cent of the total sample. Majority of the farmers (87 per cent) more than six years in cultivating of crops

There are six supply chains existing for marketing of lilium cut flower. More then eighty five per cent of lilium moved from Nilgiris to Bangalore through channel I, II, V and VI. For export market, channel III and channel IV are predominant.

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Channel VI: Farmer- local trader - wholesaler - consumer.

Eighty five per cent of lilium moved from Nilgiris to Bengalore mainly through value chain I, II, V and VI**.** Channel III and IV were for export market. Channel II was used by large farmers alone for sending their produce to Bangalore. Channel I, V and VI were predominantly used by marginal and small farmers to sell their produce. The peak season for lilum was from December, January and February. Due to lack of infrastructure, the farmers are forced to sell their produce during the post harvest season itself inspite of well-anticipated decline in prices consequent upon increased market arrivals. The resource poor farmers were unable to take the advantage of higher prices prevailing in the distant market except few large producers. In the process, it is the middlemen who take the lion's share in consumer's rupee. The results indicated that large number of intermediaries leads to lower share of producer in consumer's rupee. The marketing efficiency was computed by using Acharya's efficiency method. It was found that those selling their produce through channel II getting more benefit. However, the producer's share in consumer rupee was 84.15 per cent in channel II. Some of the strategies were suggested to the farmers related to arrangements like contract farming, co-operative society, group marketing and relationship with some corporate that would attempt direct procurement from farmer. The public sector extension needs to pro-actively engage with the organized retailers and design extension programmes that can enhance the capacity of producers and producer groups in producing better quality cut flowers. The study suggested the above measures which if followed would result in better quality of lilum cut flower with more producers' share and high marketing efficiency.

RESEARCH FINDINGS

SUPPLY CHAIN MANAGEMENT IN LILIUM CUT FLOWER – A STUDY IN NILGIRIS DISTRICT

Student: PRAKASH.K.C **Chairman: Dr.S.D.SIVA KUMAR**

The broad objective of study was to analyze the supply chain management in Lilium cut flower in Nilgiris district of Tamil Nadu. Results showed that majority of the sample farmers belonged to the age group of 31 - 40 years. All the sample farmers were literates and majority of them had higher secondary level education (40.00 per cent). Agriculture was the primary occupation of all sample farmers. In case of land holding pattern, medium sized farms accounted for 56.667 per cent of the total sample. Majority of the farmers (87 per cent) more than six years in cultivating of crops.

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Eighty five per cent of lilium moved from Nilgiris to Bengalore mainly through value chain I, II, V and VI**.** Channel III and IV were for export market. Since the focus of the study was on domestic market, these two channels were not analysed. Channel II was used by large farmers alone for sending their produce to Bangalore. Channel I, V and VI were predominently used by marginal and small farmers to sell their produce. Detail analysis of channel I, II, V and VI are presented in the following sections.

In Supply Chain I, the net price received by the farmer was Rs 24.55/stem, which constituted about 73.83 per cent of the consumer price. The marketing cost incurred by the commission agent accounted for about 2.10 per cent of final price and by the wholesaler was about 2.40 per cent of final price. Marketing efficiency of lilium through Acharyas approach was 2.41

In Supply Chain II, the net price received by the farmers was Rs. 28.40/stem, which accounted for about 84.15 per cent of the consumer price. The marketing cost incurred by the wholesaler constituted 2.37 per cent. Marketing efficiency of lilium through Acharyas approach was 4.61.

In the Supply Chain V, the net price received by the farmer was Rs 26.80/stem, which constituted about 71.47 per cent of the consumer price. The marketing cost incurred by the wholesaler accounted for about 2.13 per cent of final price and by the retailer was about 6.93 per cent of final price. Marketing efficiency of lilium through Acharyas approach was 1.91.

In the Supply Chain VI, the price received by the farmer was Rs 24.55/stem, which constituted about 72.74 per cent of the consumer price. The marketing cost incurred by the local trader accounted for about 2.22 per cent of final price and by the wholesaler was about 2.37 per cent of final price. Marketing efficiency of lilium through Acharyas approach was 2.28.

There was marginal difference in the price for farmer from different channels. Net price received by the farmer was maximum in channel II, primarilly because the number of intermediaries was least. Farmers marketing expenditure was maximum (3.45) in channel I and VI. Largely due to higher packing and commission charge. In supply chain I and VI the farmer himself had to pack to small packs which was more costlier, while in channel II the farmers packed stems in large boxes when selling directly to wholesaler.

CHAPTER I

INTRODUCTION

Flowers speak millions of unspoken words. No wonder they are there on almost every occasion. From birth to death in religious ceremonies, festivals, birthdays, weddings, anniversaries, receptions, flowers are there to convey profound human feelings. Presenting a bouquet and the flower arrangements in most of the drawing rooms, offices, hotels and hospitals have become the style of the day in the fast – moving modern world where there is hardly any time for sweet nothings. Since time immemorial, the importance of such a delicate creation of nature has always been appreciated.

Global scenario

Floriculture is an important and upcoming trade with high potential both in domestic as well as in export markets. Cut flower cultivation is known in 145 countries. In 2007 worldwide consumption of floriculture products is estimated around US $ 212.3 billion. Netherlands is the largest exporter of cut flowers (68 per cent of world exports) and pot plants (51per cent of world exports). The new centers of production are typically third world countries like Colombia (second largest exporter in the world), Ecuador, Ethiopia, Kenya, and India. Other players in this global industry are Israel, South Africa, Australia, Thailand and Malaysia. New Zealand, due to its position in the Southern Hemisphere, is a common source for seasonal flowers that are typically unavailable in Europe and North America. (Floriculture Today, 2007)

Fresh Cut flowers export account to nearly 94.6 per cent of the total export, clearly dominating the trade. In the fresh cut flower sector, worldwide roses dominate the market. The share of developing countries is 36 per cent amounting to € 328 millions. Prepared (Dry) cut flowers is only 2.96 per cent and that of Foliage is only 2.44 per cent of total imports of cut flowers and foliage (Floriculture Today, 2007). Details of European union- import share of cut flowers are presented in the Table 1.1.

Table.1.1. European Union - Import share of cut flowers

S.No	Product	Value (Million-USD) 2007	Percentage share of products	Percentage share of Developing countries	Developing country Suppliers Percentage share
1	Rose	919	28.05	36.00	Kenya (20%), Ecuador (6%), Uganda (2%), Zimbabve(2%)
2	Dianthus	227	6.93	53.00	Colombia (36%), Kenya (10%)
3	Orchids	87	2.66	22.00	Thailand (20%)
4	Gladiolus	8	0.24	1.00	Columbia (2%), Kenya (1%)
5	Chrysanthemum	268	8.18	-	-
6	Fresh cut flowers	1509	46.06	-	-
7	Other fresh cut flowers	1589	48.50	8.00	Kenya (4%), Ecuador (2%)

Source: Floriculture Today, (2007)

The combined total imports of Cut flowers by the European Union member countries account to nearly 70 per cent of world imports. The other prominent countries are USA, Germany, Japan and Switzerland.

Indian scenario

Flowers have been an integral part of Indian culture since time immemorial. However, export-oriented production of cut flowers in India has started only in the last one decade. India's share in the importing countries like Germany and UK is negligible. India has 26.62 per cent of area but under protected cultivation the area is hardly

measurable. Similarly though 96 per cent of roses in the Netherlands are supplied by developing countries, India which exports, mainly roses has a share of just 0.4 per cent in the Netherlands despite the potential. According to a report of the APEDA, the total area under flower crops was estimated around 60,000 hectares, which included 44,000 hectares under traditional flowers such as marigold, jasmine, aster, rose, chrysanthemum, tuberose and 16,000 hectares under modern flowers like carnation, rose, gerbera, lilium, gladiolous, anthurium.

More than 50 per cent of the floriculture units are based in South zone mainly in Karnataka, Andhra Pradesh, Tamil Nadu. Also West Bengal, Maharashtra, Rajasthan have large areas under floriculture. The domestic flower production goes on increasing annually. Karnataka is the leader in floriculture and the state has the highest area under modern cut flowers and 40 flower growing and exporting units, followed by Tamil Nadu.

India enjoys the advantages of favorable agro climate, arable land and skilled manpower. India has, therefore, a very high potential for production and export of cut flowers. The Government of India considers floriculture industry as a thrust area for development of exports.

Domestic market for flowers has been growing very fast with increase in usage by growing middle class in the cities. And, people in the trade estimate that the demand for flowers has been growing at a galloping pace, about 20 per cent each year. This kind of home market is a unique strength for India as most of other developing countries producing flowers for export do not have such an advantage. A large and growing market at home facilitates absorption of technology and experimenting with new products. Details of country wise floriculture export from India are presented in the Table 1.2.

Table 1.2. Country wise floriculture exports from India (2006-07)

S.No	Countries	Exports Rs (Lakhs)	Percentage to total
1	USA	4375.37	25.28
2	Netherlands	2550.47	14.73
3	Japan	2188.12	12.64
4	UK	1730.26	10.00
5	Germany	1595.77	9.22
6	Italy	913.23	5.28
7	France	515.02	2.98
8	Belgium	364.07	2.10
9	UAE	387.27	2.24
10	Switzerland	214.51	1.24
11	Australia	467.81	2.70
12	New-Zealand	88.46	0.51
	Total	17311.00	100.00

Source: Floriculture Today, (2007)

Export from India to USA large at 25.28 per cent followed by Netherlands, Japan and UK. Details of India's product wise floriculture exports are presented in the Table 1.3.

Table 1.3. India's floriculture exports (2006-07)

S.No	Name of the product	Average exports (Rs. Lakhs)	Average quantity (MT)	Percentage to total
1	Cut flowers- dry	5159.58	7386.89	37.44
2	Foliages-dry	4597.30	7434.40	33.39
3	Cut flowers-fresh	3499.30	3932.70	25.37
4	Bulbs, tubers	158.94	2530.34	1.53
5	Foliages-fresh	56.39	133.36	0.39
6	Other potted plants	267.08	428.40	1.94
7	Flowering potted plants	44.01	61.70	0.32

Source: Floriculture Today, (2007)

Dry cut flower accounted for 37.44 per cent of the export from India followed by dry foliages and fresh cut flowers.

Cultivation of hi-tech cut flowers in Tamil Nadu

In Tamil Nadu, Nilgiris district has the major share of hi-tech cutflower production, since it is more suitable for hi- tech cut flower production. Nilgiri District is the "Agri-Export Zone for Flowers" announced by the Government, approved by APEDA, in order to give a helping hand to the farmers of this district. Nilgiris has abundant potential in cut flower industry, because this region has suitable quality of arable land, water and climate; lowest production cost due to ideal climatic conditions, very good connectivity by road to surrounding major cities like Bangalore, Coimbatore, Chennai, good connectivity by air from Bangalore to Coimbatore and flowers producing from this district are of world standards, fetching premium price in the domestic and international markets.

Major cut flower crops successfully grown in Nilgiris are Carnation, Lilium, Alstroemeria, Limonium, Chrysanthemum, Gerbera, Anthurium, Gladiolus, Bird of Paradise, Statice, etc., Out of these cut flower crops, Carnation and Liliums are cultivated in large hectarage in Nilgiris because, these flowers produced from this region are best in the country and can be compared with the best grown in any part of the world,. Good vase life and packability, best return per unit area and ideal climatic, edaphic and the best quality water and environmental conditions prevailing here facilitate production of world-class flowers.

Lilum

Lilium (*Lilium asiaticum*.L) is a member of the Liliaceae family. Lilium flower is valued for its excellent keeping quality, wide array of colours and forms and ability to rehydrate after continuous transportation. The flower is mainly used for interior decoration with fresh flower arrangement in corporate office, restaurants, designer showroom, five star hotels, private bungalow/houses and for arrangements in religious ceremonies, weddings, receptions and for bouquets preparation.

The lily assortment is comprised of four groups – longiflorum, Asian Hybrids, Oriental hybrids and longiflorum x Asian hybrids. Lilium longiflorum (Japanese lily or funeral lily) has trumpet-like flower, leaves that are very close together and a strong, sweet fragrance. Flowers are often white with two or three blooms per stem.

Lilium Asian Hybrids often bare more blooms (around five in total) than the longiflorum variety and one less strongly scented. Frequently available in Yellow and Orange, these flowers have dark spots and stems of approximately one meter in length. Lilium Oriental hybrid have pink/purple or white flowers, or are two coloured. Flowers are larger and more strongly scented than those of the Asian Hybrids. Lilium longiflorum x Asian Hybrids has light fragrance flowers and are commonly available in apricot or salmon colour, with two blooms per stem.

Due to high cost of production under green houses in Europe and USA, its cultivation is shifting to more naturally growing regions (like Ooty, Kotagiri and mid

hills of Himachal Pradesh) where they are being produced at lesser cost. Moderate climatic control measures that are economical can deliver quality lilium at the internationally competitive prices year round.

Lilium is one of the top five cut flowers and is grown in hilly regions of Himachal Pradesh (Kulu/Dehradun) and mid-hill/hilly regions of Tamil Nadu (Kotagiri/Ooty/Coonoor in Nilgiris) and during winter periods in plains of Tamil Nadu (Hosur/Coimbatore) Karnataka (Bangalore), North East / Central India (Lucknow) and Western India (Pune). Lilium is grown under poly house conditions and requires shade net during summer.

Lilium bulbs are imported from Holland (stored at -1.5ºC in dark) and bulb can be grown for cut flowers once in its life time. The promising varieties of lilium recommended for commercial cultivation in Nilgiris are Dreamland, Navonna, Brunello; Caramella, Elite, Prunotto, Vermeer; Mothers Choice, Acapulco, Star Gazer and Medusa.

Problem focus

Value of any product is spread through its value chain. A firm can optimize its total customer value by managing activities in the supply chain in an integrated manner, treating them as one continuous chain. The supply chain constitutes a value delivery network. Superiority in supply chain is thus a major competitive advantage (Kotler, 2004)

The supply chain is the full range of activities from the selection of seed through processes along the chain, to delivery of the final product to the consumer. It includes input suppliers, producers, processors, packers and movers, wholesalers, traders, retailers, and export/import distributors. An efficient supply chain management system provides an incentive to farmers to produce more and convey changing needs of the consumers to enable farmers to take up production planning based on market forces. Efficient marketing system needs vertical and horizontal integration of production, post-harvest management, storage, processing and distribution to make an integrated supply chain. (Bammann, 2007)

Marketing of fresh cut flower owing to their perishable nature and lack of cold storage facilities creates a problem of marketing. The supply of most cut flowers is seasonal and their production is concentrated in few areas in favorable situation of soil and climatic conditions.

However, the cut flower supply chain is still characterized by inefficiencies, diseconomies of scale, lack of investments and inadequate infrastructure, resulting in high prices, poor yields. Because of long distance that often separate producing areas from / consuming one, a large proportion of spoilage being sometimes noticed as large as thirty percent. It might be due to defective method of harvesting, packing, handling and inefficient way of transportation, seasonal gluts and less demand by consumers. An efficient marketing system becomes very important in case of cut flowers, which consumer has to buy on his requirements (Horticultural Research Station, Ooty)

In spite of the growing demand for cut flower, the supply of cut flower is not properly organized. Value additions in different stages are not standardized and farmers are finding it difficult to undertake value addition. Hence it is necessary to study the supply chain of identified cut flower. The present supply chain, intermediaries involved, price spread, problems in production of Lilium need to be studied for effective supply chain management for lilium cut flower.

The specific objectives of the study are as follows

- to examine the current practices in supply chain of Lilium cut flowers in Nilgiris district,
- to conduct value chain analysis for Lilium cut flowers,
- to identify the major constraints in supply chain of Lilium and
- to suggest suitable strategies for efficient supply chain management of Lilium in Nilgiris district.

Scope of the Study

This study will throw more light on the various factors, which determine the supply of Lilium Cut flower from Nilgiris. The study of supply chain will help the farmers to understand the role of supply chain members, price spread and strategies so developed based on the analysis will pull more number of footfalls in existing system and ultimately increase the sales and profit. This study would provide the farmers a very basic idea on the quality of cut flower and help to promote its value addition in each stage of supply

chain.. The findings of the study will help the farmers in formulating their strategies and for designing effective sourcing programmes.

Limitation of the study

The study is based on primary data collected from a sample of producers, local traders, commission agents, wholesaler, retailer and exporters. As none of the farmer maintained proper farm records, they furnished the required information from their memory and experience; therefore, the collected data were subjected to recall bias. The information collected from the intermediaries was based mostly on the records maintained by them. However maximum efforts have been taken to minimize bias by proper crosschecks. Since the study was limited to a particular area, the utility of the findings is also limited for general application. Hence, adequate care should be taken while generalizing the results.

Organization of the Thesis

The thesis has been presented under the following chapter,

Chapter I : **Introduction :** Cut flower industry review, objectives, problem focus, scope and limitations of the study are presented.

Chapter II : **Concepts and Review :** Concepts used in the study and review of pact studies are given.

Chapter III : **Design of the Study :** Research design, methodology followed and the analytical techniques used are discussed.

Chapter IV : **Description of the Study area :** A general and agro-climate characteristic features of the study area are described.

Chapter V : **Results and Discussion :** The findings of the analysis are presented and discussed.

Chapter VI : **Summary and Conclusion :** A summary of the results of the study is presented along with inferences and suggestions for the farmers.

CHAPTER II

CONCEPTS AND REVIEW

Review of concepts and past studies related to the present study will give a holistic picture and better understanding of the selected research problem in proper perspective. So in this chapter, a review of the relevant concepts and the findings of past studies are presented.

Cost

Johl and **Kapur (1971)** defined costs as the total amount of funds used in production. They further divided the cost into cash and non-cash cost. Cash cost included the resources that were produced and used immediately in the production process. In general the cash costs were incurred while purchasing non-durable inputs like fertilizers, casual labors, fuel, oil, which did not last for more than one production period. Non-cash cost consisted of depreciation and payments to resources owned by the farmers such as depreciation to tractor equipments, buildings, payment made to management and interest for owned capital.

Barnard and **Mix (1973)** have classified cost in farming into fixed cost and variable cost. Fixed cost represented farming expenses as an over head nature and did not change with the level of output. Taxes, depreciation, rent and interest formed the fixed cost.

Sundaresan and Thanasekaran (1984) by studying production and marketing of grapes divided the cost into establishment cost and maintenance cost. The cost of production was worked out by considering both direct and indirect cost. The direct cost included annual operational costs. The indirect cost included the annual share of establishment cost, interest and depreciation on fixed.

Randev *et al*., (1987) divided the cost of cultivation of Almond into establishment cost and maintenance cost. Establishment cost consisted of all the expenditures on goods and services required for the establishment of orchards. This included preparation of land and layout, digging and filling pits, cost of planting materials and fencing. The maintenance cost

included cost of manures and fertilizers, plant protection measures, labour and interest on working capital and opportunity cost of land.

Raju and Rao (1990) used six different costs in rice production namely cost A_1, A_2, B_1, B_2, C_1 and C_2. Cost A_1 included all actual expenses in cash and kind incurred in production. Cost A_2 comprised cost A_1 plus rent paid for leased in land. Cost B_1 included cost A_1 plus interest on value of owned capital assets excluding land. Cost B_2 comprised cost B_1 plus rental value of owned land plus rent paid for leased in land (net of land revenue). Cost C_1 denoted cost B_1 plus imputed value of family labour. Cost C_2 included cost B_2 plus imputed value of family labour.

Varma and Agarwal (1992) while explaining the cost concepts, defined variable costs as those costs which would vary proportionately with the increase or decrease in sales or output.

Ahuja (1997) identified fixed costs as those costs that were incurred in hiring the fixed factors of production whose amount would not be altered in the short run.

According to Saini and Sharma (1997), fixed cost would include depreciation on equipments excluding land and interest on fixed capital.

Maheshwarappa *et al* (1998) while studying economics of production and marketing of sugarcane referred variable cost in terms of human labour, bullock labour, tractor power, seed, manures and fertilizers, plant protection chemicals, irrigation, repair and maintenance cost and interest on working capital.

Gurjar and Varghese (2005) while studying cost of cultivation of rabi crops in Rajasthan defined operational cost as sum of cost of hired human labour, family labour, bullock labour, machine labour, seed, farm yard manure, fertilizers, insecticides, irrigation charges and interest on working capital. They defined fixed cost as cost of land revenue and taxes, depreciation on implements and buildings, rent paid for leased in land, rental value of owned land, interest on fixed investment, and they also defined total cost as sum of operational cost and fixed cost.

Thakur and Sharma (2005) while studying the organic farming for sustainable agriculture, classified the cost as cost A1, cost A2, cost B, cost C and cost D. Cost A1 included cost of seed and seedlings, value of FYM, compost, fertilizers, pesticides, other chemicals used, bullock labour, hired human labour, hired machinery, interest on working capital, depreciation and repairs of farm tools and machinery. Cost A2 included cost A1 plus rent paid on leased in land. Cost B consisted of cost A2 plus imputed rental value of owned land less rent paid on leased in land plus interest on fixed capital. Cost C consisted of Cost B plus imputed value of family labour. Cost D consisted of cost C plus management cost at the rate of 10 per cent of cost C.

In the present study, establishment cost includesd cost of preparatory cultivation, cost of lilium bulbs, planting, farm yard manure and fertilizers and irrigation. Maintenance cost includes intercultura1 operations and weeding, manures and fertilizers, irrigation and harvesting. Fixed cost includes annual share of establishment cost of green house, depreciation on fixed cost and interest on fixed capital. The variable cost includes cost of planting material, manures and manuring, irrigation and harvesting.

Returns

Johl and Kapur (1971) defined gross farm income as equivalent to total production times the price. Return to fixed farm resources was considered as an amount equal to gross return minus variable cost. It is also known as return over variable cost.

Tandon and Dhondyal (1971) defined gross return as the difference between the total money income which a farmer would receive from the sale of the produce and the total expenses incurred in producing it.

Chauhan *et al*. (1972) defined gross income as the value at prevailing prices of retained as well as marketed crop output and also the income from allied activities as dairy, goats and poultry.

Kahlon *et al* (1972) defined gross income as income from farm and non-farm sources and also borrowings from institutional and non-institutional resources.

According to Carlin and Reinsel (1973), gross income included the income derived through farm and non-farm sources. Non-farm income included wages and salaries, rental income, interest, dividends, retirement pension, social security and other transfer payments.

Khare (1973) included in farm income, the income from subsidiary occupation, wages and salaries. He defined income as receipts net of operating expenses.

Mani (1982) calculated farm income by adding the value of crop and livestock products, value of farm yard manure, sale of livestock, returns from hire charges of farm equipment and bullock labour and non-farm income from such sources as services.

Murugadass (1990) defined gross income as the realization made by the sale of the produce and net income as the residue of gross income after deducting the cost of cultivation.

Singh *et al* (1996) pointed out that the net income would include the difference between cost of production and total value of the products.

Jeyakumar (1999) conceptualized income as the sum total of income received by all members of the family working in different categories or the same kind of work. The source of income included farm, non-farm and any assistance from government programme.

Gurjar and Varghese (2005) while studying cost of cultivation of major rabi crops in Rajasthan defined gross returns as sum of value of main product and value of byproduct of crop and also defined net income as gross income minus total cost.

Radha and Chowdary (2005) while studying the economics of seed production in cotton defined net income as gross income minus cost C3.

Thakur and Sharma (2005) while studying organic farming for sustainable agriculture defined net income/profit as gross income minus total cost.

In this study, returns refers to income received from sale of Lilium cut flower.

Marketing Cost

According to **Kulkarni (1964)** marketing cost included handling charges, local taxes, assembling charges, transport charges, handling by wholesalers and retailing charges to consumers. Jain (1971) stated marketing cost as the actual expenses required in bringing goods and services from the producers to the consumers.

Dhull and **Gangwar (1975)** defined marketing cost as the actual cost incurred by each agency involved in the marketing channel for performing their functions. This includes transportation, loading and unloading, weighing, cleaning, market fee, commission, sales tax, processing cost and wastage.

Sivakumar (1996) explained that marketing cost included all those expenditure incurred by the farmers and all intermediaries in bringing out the produce from the farm gate to the exporters. It included commission charges, cost of transport, storage cost, loading, unloading, weighing and establishment charges.

According to **Mukherjee** and **Shajahan (1998)** the marketing cost included market tax, transport, wastage, rent, etc. Rajoo (2002) defined marketing cost as the expenses incurred by farmers and other agencies such as pre-harvest contactors, wholesalers, secondary wholesalers and retailers for performing their functions in the movement of produce from the farmers to the final consumers.

Acharya and **Agarwal (2004)** stated marketing cost as the cost involved in moving the commodities from the producers to consumers *i.e*., the cost of performing the various marketing functions and of operating various agencies.

Kumaravel (2005) and **Sivagurunathan (2006)** referred marketing cost as the actual expenses incurred by farmers, wholesalers, vendors and retailers for performing their functions in the movement of produce from the farmers to the consumers.

In this study, Marketing Cost refers to all the expenses incurred by the farmers or marketing intermediaries in performing various marketing functions.

Supply chain

Christoper and **Martin (1993)** stated that supply chain represented an intricate network of suppliers, distributors and customers who share carefully managed information about demand, decisions and performance, and who recognize that success for one part of the supply chain means success for all.

Johnson (1996) evaluated that a process of strategically managing the movement and storage of materials, parts and finished inventory from suppliers through the firm and on to the customers.

Towill (1997) defined supply chain an integrated process based on flawless delivery of basic and customized services.

Beamon (1999) defined that supply chain as an integrated process where raw materials are transformed into final products and delivered to customers.

Hicks (1999) stated that supply chain is a systematic effort to provide integrated management to meet customer needs and expectations from the suppliers of raw matrials through manufacturing to end customers.

Rajoo (2002) defined supply chain as the complete network or links involved right from farm to the consumers for the produce.

In this study supply chain defined as a network that consists of farmers, local traders, commission agents, retailers, wholesalers and exporters in which value addition for the selected cut flower take place.

Supply chain management

Handfield and **Nicholas (1999)** defined supply chain management involved the combination of art and scince that goes into improving the way the company finds the raw components it needs to make a product or service, manufacturers that product or service and delivers it to customers.

Raghuram and **Rangaraj (2000)** referred to supply chain management (SCM) is managing the flow of goods, services and information between suppliers, manufacturers, wholesalers, distributors, stores, consumers and end-users.

According to **Kotler (2004)** supply chain management started earlier than physical distribution; attempted to procure the right inputs (raw materials, components, and capital equipment) and convert them efficiently into finished products; and dispatch them to the final destinations.

In this study, supply chain management is considered as the way of managing the flow of goods, services and information between farmers, local traders, commissin agents, retailers, wholesalers, and exporters.

Value Chain

Porter (1985) explained value chain is a chain of activities. Products pass through all activities of the chain in order and at each activity the product gains some value. The chain of activities gives the products more added value than the sum of added values of all activities.

Kaplinsky and Morris (2001) describe the value chain as the full range of activities which are required to bring a product or service from conception through the different phases of production (involving a combination of physical transformation and the input of various producer services) delivery to final consumer and final disposal after use.

According to **Richard and Besigye** (2005) the value chain refers to relationship established between actors involved directly and indirectly in a productive activity with the aim of adding value in each stage of the value chain. It involves alliances among producers, processors, distributors, traders, regulatory and support institutions, which, departing from a market demand for their products and services, establish a joint vision to identify mutual needs and work jointly in the achievement of goals, willing to share the associated risks and benefits, and invest time, energy, and resources in meeting these goals.

Baker (2006) defined that value chain concept traces product flows, shows value addition at different stages, identifies key actors and their relationship in the chain.

Bammann (2007) defined that value chain is made-up of a series of actors from input suppliers, producers and processors to exporters and buyers engaged in the activities required to bring a product from its conception to its end use.

In the present study, value chain is defined as the sequential set of primary and support activities that an enterprise performs to turn inputs into value-added outputs for its external customers.

Value Chain Analysis

Porter (1985) defined value chain analysis as the examination of the value chain of an enterprise to ascertain how much and at which stage value is added to its goods and services, and how it can be increased to enhance the product differentiation.

According to **Kaplinsky** and **Morris (2001)** Value Chain Analysis is used to identify potential sources of a company's economic advantage in its industry. The analysis separates a firm into its major activities in order to understand the behavior of costs, the associated value added, and the existing and potential sources of differentiation. It depends on an understanding of how the firms own value chain relates to, and interacts with, the value chains of suppliers, customers and competitors. Companies gain competitive advantage by performing some or all of these activities at lower cost or with greater differentiation than competitors.

Richard **and** Besigye **(2005)** stated that value chain analysis was used as a tool to establish a joint vision and identify common needs and existing supply capacity and market barriers, in order to develop intervention strategies.

Handfield and **Nichols** (2005) referred to value chain analysis as an examination of value chain activities in order to undertake them more efficiently, effectively and economically.

In the present study, value chain analysis is defined as the examination of the value chain of lilium to ascertain how much and at which stage value is added to it.

Review of Past Studies

Arshad (1983) evaluated the efficiency of coconut marketing system in Malaysia and observed that the efficiency suffered from various inefficiencies in the form of imperfection that existed in market structure, practices and performances. Farm level constraints and lack of marketing facilities had resulted in low quality product, which in turn induced the middlemen to indulge in unethical trading practices.

Srivastava (1984) in his study on price spread for vegetables showed that the retailers' share increased with an increase in consumer's price, whereas the producer share decreased with an increase in the consumer's price. He concluded that the benefit derived from an increase in the consumer price did not go to the producers. Instead the retailer absorbs it.

Nadwadkar (1991) in his analysis on marketing efficiency and price spread of vegetables in Maharastra reported that the marketing cost incurred are grading charges, packing charges, packing materials, transport, weighing, commission and miscellaneous expenses. They regarded higher proportion of intermediaries' profits as the indicators of inefficiency of the marketing system.

Goletti and **Babu** (1994) in their study on market liberalization and integration of maize markets in Malawi, identified price asymmetry in the marketing system. They inferred that only decrease in price is transmitted to farmers and not the price increase. They have suggested market integration to overcome price asymmetry.

Bagde *et al.* (1996) in their study on dynamics of marketing of selected fruits in Nagpur, used Shepherd formula in working out the marketing efficiency. He identified two marketing channels, one in which producer, pre-harvest contractor, commission agent and retailer were involved, and in the other producer, commission agent and retailer were involved. He found that producer's share in consumer's rupee was just 39.34 per cent in the case of apples, whereas retailer gets 41.06 per cent of the share. He found that marketing

efficiency was more for seedless grapes compared to apples and mangoes in Nagpur.

Devaraja (2000) in his study on channels and price spread in fruits and vegetables marketing in Mysore district, Karnataka identified five channels of marketing for horticultural produce. He found that commission charges dominated the marketing cost upto an extent of 65 per cent followed by transportation cost. He also found pre-harvest contractors prevail in fruit marketing and urgent steps are needed to stop this practice by improving the market conditions.

Baruah and **Barman** (2001) in their study on marketing of cauliflower in Barpeta district, Assam identified that lack of storage facilities was the main problem faced by farmers.

Rajoo (2002) analysed the price spread in supply chain of sapota from Chitradurga district of Karnataka. He has used Acharya and Agarwal's formula and Calkin's index to evaluate the efficiency of marketing channel. He has concluded that the marketing efficiency was very high in the case where the farmers sold their produce directly to the Rallis Kisan Kendra.

Rajavel (2005) assessed the price spread in supply chain of carrot from Hoskote taluk of Bangalore district of Karnataka. He has concluded that the marketing efficiency was very high in the case where the farmers sold their produce directly to the consolidation centre at Hoskote.

CHAPTER III

DESIGN OF THE STUDY

The methodological framework used in the study is presented in this chapter. The sampling design, methods of data collection and measurement of variables and the analytical tools used are explained.

Sampling Design

In Tamil Nadu, Nilgiris district plays a major role in hi-tech cutflower production. Among the districts of Tamil Nadu, Nilgiris district is suitable for high tech cutflower production.

There are four Panchayat Unions in Nilgiris district. Among the four Panchayat Unions, based on the maximum area under cut flower production three Panchayat Unions viz., Kotagiri, Ooty and Coonoor were selected. Ten farmers were selected from each of the selected Panchayat Unions. Thus the total sample size of farmers was 30. The members involved in supply chain of cut flower such as local traders, commission agent and wholesaler were identified and in each category five members were selected by simple random selection method. Thus the total sample included 30 farmers and 25 members in the supply chain.

Method of Data Collection

Data was collected from the sample farmers and the members in supply chain by personal interview using well structured interview schedule. Information from secondary sources like government institutes, government publications, other publications and annual reports were also used.

Tools of Analysis

Keeping in view the objectives of the study, appropriate methods were employed to analyse the collected data. The analytical techniques used in the study are presented.

a) Descriptive analysis

Averages and percentages were estimated to understand the characteristics of sample farm households such as age, educational status, size of operational holdings, production and marketing of major cut flowers and cost and returns from major cut flowers production.

b) Cost analysis

The details of fixed cost and variable cost of Lilium cut flower in Nilgiris district are presented and discussed in this cost analysis. Fixed Cost included depreciation and intereston fixed capital on Poly Greenhouse, Drip system, Tools and Equipments, Packing cum Store house etc,. Variable Cost included Planting material, Fertilizer and Manure, Insecticide and Pesticide, Labour requirement, Harvesting, Grading, Packing and Transport, Electricity charges etc,.

Marketing Efficiency

Marketing efficiency is a measure of market performance. The movement of goods from producers to the ultimate consumers at the lowest possible cost consistent with the provision of service desired by the consumers is termed as efficient marketing.

a) Shepherd's Formula

Efficiency of supply chain was calculated with the help of the following formula. The higher this ratio, higher would be the efficiency and vice versa. This can be expressed in the following form:

$$ESC = [(V/I)-1]$$

where,

ESC = Index of Efficiency of Supply Chain

V = Value of goods sold

I = Total marketing cost

b) Calkin's index

The Calkin's index of marketing efficiency is estimated using the following formula.

$$\text{Marketing efficiency} = 1 + \left(\frac{\text{Sum of profit or margin}}{\text{Sum of marketing cost}} \right)$$

The lower the value of the index, higher would be the efficiency.

c) Acharya's Approach

According to Acharya (2003), an ideal measure of marketing efficiency, particularly for comparing the efficiency of alternate markets channels should take into account all of the following:

a) Total marketing costs (MC)

b) Net marketing margin (MM)

c) Prices received by the farmer (FP)

d) Prices paid by the consumer (RP)

Further, the measure should reflect the following relationship between each of these variables and the marketing efficiency.

i) Higher the (a), the lower the efficiency

ii) Higher the (b), the lower the efficiency

iii) Higher the (c), the higher the efficiency

iv) Higher the (d), the lower the efficiency

As there is an exact relationship among four variables, i.e. a+b+c = d, any three of these could be used to arrive at a measure for comparing the marketing efficiency.

The following measure is suggested by Acharya,

ME = FP ÷ (MC + MM)

Garrett's Ranking Technique

In the Garrett's scoring technique, the respondents were asked to rank the factors or problems and these ranks were converted into percent position by using the formula

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

where,

R_{ij} = Ranking given to the i^{th} attribute by the j^{th} individual

N_j = Number of attributes ranked by the j^{th} individual.

By referring to the Garrett's table, the percent positions estimated were converted into scores. Thus, for each factor the scores of the various respondents were added and the mean values were estimated. The mean values thus obtained for each of the attributes were arranged in descending order. The attributes with the highest mean value was considered as the most important one and the others followed in that order.

Supply chain management

According to Kotler (2004) supply chain management started earlier than physical distribution; attempted to procure the right inputs (raw materials, components, and capital equipment) and convert them efficiently into finished products; and dispatch them to the final destinations.

A supply chain typically consists of

- Inbound distribution or logistics,
- Firm operations,
- Outbound distribution or logistics,
- Marketing and
- Channel value chain.

These activities are supported by

- Purchasing or procurement,
- Research and Development,
- Human Resource Management and
- Infrastructure

The following six Supply Chain were identified in the study area.

Supply Chain I

Producer → Commission Agent → Wholesaler → Consumer
(Nilgiris) (Nilgiris) (Banglore) (Bangalore)

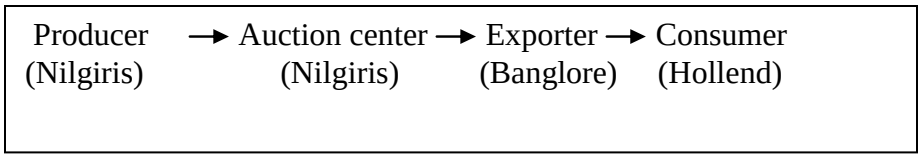
Supply Chain II

Producer → Wholesaler → Consumer
(Nilgiris) (Banglore) (Banglore)

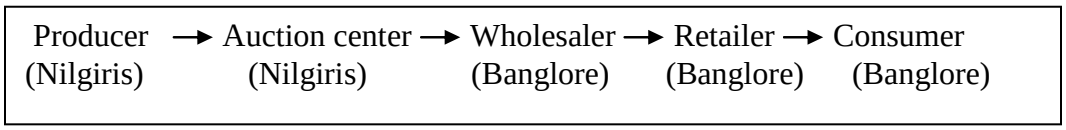
Supply Chain III

Producer → Wholesaler → Exporter → Consumer
(Nilgiris) (Nilgiris) (Banglore) (Hollend)

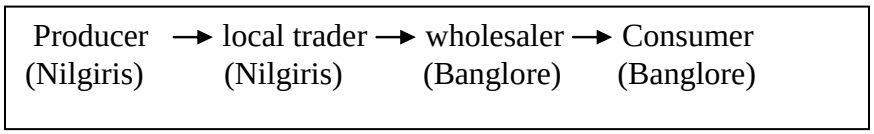
Supply Chain IV



Supply Chain V



Supply Chain VI



Value Chain analysis

Porter (1985) explained value chain is a chain of activities. Products pass through all activities of the chain in order and at each activity the product gains some value. The chain of activities gives the products more added value than the sum of added values of all activities.

CHAPTER IV

DESCRIPTION OF THE STUDY AREA

A proper perspective of the study region covering a brief description of geographical features such as location, climate, rainfall and agro –socio-economic features such as agriculture, population and literacy are absolutely essential to have a better understanding of the study area and to draw meaningful conclusion in this section.

Location

The entire area of the Blue Mountains constitutes the present district of Nilgiris. Total area of the district is 2452.50 Sq.km. Nilgiris district lies between 11° and 11° 55' of North latitude and 76° 13' and 77° 2' of East longitude, with Kerala on the West, the Karnataka State on the North and Coimbatore district on the East and South. Ooty is the capital of the District and is the largest and the most important hill station in South India, spanning a geographical area of 1018.61 Sq km. It is an extensive valley enclosed on all sides but the West by a lofty range of hills. It is the most picturesque and habitable mountains, forming the nucleus of the Eastern and Western Ghats. In Nilgiris District the topography is rolling and steep. About 60 per cent of the cultivable land falls under the slopes ranging from 16 to 35 per cent.

District Administration

The Nilgiris District comprises six taluks viz., Ooty, Kundah, Coonoor, Kotagiri, Gudalur and Pandalur. These taluks are divided in to four Panchayat Unions viz., Ooty, Coonoor, Kotagiri and Gudalur besides two Municipalities, Wellington Contonment and Aruvankadu Township. The District consists of 56 Revenue Villages and 15 Revenue Firkas. There are two Revenue Divisions in this district *viz*., Coonoor and Gudalur. There are 35 Village Panchayats and 13 Town Panchayats in this district.

Topography

The district is located on the Hills with an average elevation of 2000 to 2980 metres from Mean Sea Level. Ooty is located at an altitude ranging from 950 m (Masanagudi) to 2200 m (Ooty) above Mean Sea Level with the highest peak being Doddabetta at a height of 2623 metres. This high mean sea level is most important for cultivation of hi-tech cut flowers in Nilgiris districts.

Demography

The district has an area of 2452.50 sq.km. The details on population of this district is presented in Table 4.1.

Table 4.1 Area and Population of Nilgiris District

Regions	Total Population	Male Population	Female Population	Sex Ratio
Rural	307532	151874	155658	1025
Urban	454609	226477	228132	1007
Total	762141	378351	383790	1014

(Source: www.nilgiris.tn.gov.in)

According to the 2001 India census, Nilgiris district had a population of 762141 and 59.65 per cent urbanized in which Males constituted 50 per cent of the population and females constituted 50 per cent. Nilgiris district has an average literacy rate of 81.44 per cent, higher than the national average of 59.5 per cent: male literacy is 84 per cent, and female literacy is 75 per cent. In Nilgiris district, 9 per cent of the population is under 6 years of age.

There are several tribes living in the Nilgiris, whose origins are uncertain. The best known of these are the Toda people, whose culture is based upon cattle, and whose red, black and white embroidered shawls, and silver jewelry is much sought after. The district is also home to the Paniya tribes and the Badaga people.

Tamil is the principal language spoken in the Nilgiris. Many people speak and understand English. Malayalam, Kannada and Hindi are also used to an extent. The Nilgiris is also home to the Toda language, spoken by the Toda people. The Badaga people, who number around 250,000, speak the Badaga language. The language of Paniya is spoken in the western parts of the district where the Paniya tribes live. As per the 2001 Census, Hindus formed the majority of the population (78.60 per cent), followed by Christians (11.45 per cent), Muslims (9.55 per cent) and others (0.4 per cent).

Climate and Rainfall

Modern agriculture requires precise information on rainfall, knowledge about drought, floods and agro – climatic conditions to plan for effective cropping patterns as well as to execute suitable soil and moisture conservation components / interventions. The climate of Nilgiris district is basically temperate and determined largely by the physiographic and geographic location with respect to sea and monsoon. The Nilgiris district comes under the hilly Zone of Tamil Nadu. During summer the climate remains to the Maximum of 21 degree Celsius to 25 degree Celsius and the minimum of 10 degree Celsius to 12 degree Celsius. During the winter the temperature prevails up to the maximum of 16 degree Celsius to 21degree Celsius and minimum of 2 degree Celsius. The average annual rainfall is 1920.80 mm of which about 30% is received during the South West monsoon period from June to September. The months of June, July, September, October and November receives a rainfall that is more than the annual average rainfall. The district has highest average number of rainy days with 7.3 days per month.

There are three distinct agro climatic regions.

1. The Thuneri firka which is a rain shadow area.

2. The Kundha firka which receives moderate rainfall.

3. Ooty urban area which receives heavy rainfall

Annual Rainfall

The distribution of rainfall during 2005 to 2008 is given in the Table 4.2. The District usually receives rain both during South West Monsoon and North East Monsoon.

Table 4.2 Annual Rainfall (2001-2008)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Dist. Total
Normal /Year	17.6	13.2	24.3	79.6	133.3	231.5	405.7	270.6	152.2	186.9	127.9	52.9	1695.7
2005	32.9	16.3	3.6	65.9	358.4	341.9	109.5	221.1	271.2	326.7	236.5	1.6	1985.6
2006	18.7	4.5	29.9	197.2	30.6	146.5	451.1	229.5	205.4	239.6	264.4	53.2	1920.6
2007	16.1	0.0	56.3	52.0	232.1	235.5	314.3	166.3	221.0	293.0	231.0	21.4	1747.1
2008	7.8	18.3	7.3	63.5	92.2	437.5	398.5	353.9	210.9	234.5	76.88	144.2	2045.5

(Source: www.indiastat.com)

The entire Gudalur and Pandalaur, Kundah Taluks and portion of Udhagamandalam Taluk receive rain by the South West Monsoon and some portion of Udhagamandalam Taluk and the entire Coonoor and Kotagiri Taluks are benefited by the rains of North East Monsoon. There are 16 rainfall registering stations in the district. (Average annual rainfall of the District is 1920.80 m.m.)

Relative humidity

The mean maximum relative humidity of Nilgiris district is 76.9 per cent and the mean minimum relative humidity is 75.8 per cent.

Soil Type

The soil of the district falls under three major types - clay, clayey loam and loam with laterite sub-soil. The depth of the soil usually varies from one to three feet and that of the sub-soil from 10 to 14 feet. The sub- soil is invariably porous.

The report of the All India Soil and Land Use survey carried out by the Central Soil Conservation Board includes the Nilgiris District in the Red and Laterite soil region II and classifies the soil of the plateau as Ootacamund soil series. In the Nilgiris District the soil is mainly derived from igneous and metamorphic rocks. The soils vary in depth from a few inches to several feet.

The soils may be roughly classified into:

(a) The black soil which is a rich loam and best of all

(b) The brown soil, which is a clay loam, comes second best in productiveness of ten Over lying the dry laterite in sub-soil

(c) The yellow soil which is stiff clay and requires drainage

(d) The red soil, which is not as stiff as the yellow soils which often, contains a lot of Kaolin brought under potatoes by manuring.

Nilgiris district was predominantly covered by rich organic fertile soil. It offered the most favorable conditions for growing temperate cut flowers and vegetables.

Soil Problems

The low percentage of calcium is an important feature of the soil of this district. Soil is generally acidic in reaction and it is rich in organic matter. The succession of the intensely cold winter season, with its high diurnal range of temperature, by the warm summer with the fierce glare of the noon day sun, coupled with lack of protective grown vegetation, low and dry on soil and the undulating nature of the country cause the intense soil erosion. The onslaught of the Southwest monsoon, breaking out in the summer with

its heavy downpours, accompanied by fierce winds cannot be easily withstood by the exposed and vulnerable soil. The result is widespread soil erosion of all types and intensities from the insidious surface and finger erosions to the spectacular landslips. Large landslips blocking the Mettupalayam - Ootacamund hill railway as well as the main roadway for some days is a common feature almost every year. The nature of the soil and the lie of the underlying rock layers contribute to this. The cupidity, shortsightedness and avarice of the agricultural population leads them to resort to irrational, agricultural practices, resulting in the rapid disappearances of the valuable topsoil from their lands and the consequent loss of fertility. In the overgrazed villages grazing grounds and around the Todamunds cattle rack erosion is common and highly eroded spots exposing the yellowish or pinkish substratum are of widespread occurrence.

Bank erosions of streams and rivers resulting in meandering beds are frequently met with. Very often the streamlets in vulnerable areas change into large gullies and deep ravines (Horticultural Research Station (HRS), Ooty).

Land Use Pattern

The total geographical area of Nilgiris district was 2366.89 Sq.km. The area under forest accounted for 59.34 per cent. The area that is not good for Cultivation accounted for 5 per cent. The fallow lands accounted for 8 per cent and cropped area accounted for 23 per cent of the total geographical area. The details of land use pattern are furnished in Table 4.3.

Table 4.3 Land Utilization Pattern of Nilgiris district (2007-2008)

S.No	Classification	Taluk						District total
		Ooty	Kundah	Coonoor	Kotagiri	Gudalur	Pandalur	
1.	Forest	61163	19471	20204	32559	4107	5073	142577
2.	Barren and uncultivable land	788	973	562	695	91	266	3375
3.	Land put to non Agrl use Cultivable Waste	3259	381	2764	1168	1206	1197	9975
4.	Permanent Pasture	1049	213	23	501	20	212	2018
5.	Land under miscellaneous tree crops	923	1224	908	1661	67	295	5078
6.	Current fallow	1786	424	604	97	288	339	3538
7.	Other Fallow	1947	426	415	2215	7	59	5069
8.	Net Area sown	1248	383	31	0	14	179	1855
9.	Total Cropped Area	15854	8267	13455	13124	16386	13914	81000
10.	Geographical area	88002	31762	22884	39665	50638	21534	254485

Source: Evaluation and Applied Research Department, Govt. of Tamil Nadu.

Irrigation Source

The source of irrigation mainly depends on the summer showers, South West and North East monsoons. The crops are mainly rain fed. Check Dams have been constructed wherever it is possible to exploit natural springs. The incessant rains throughout the seasons leads to the formation of rivers like Bhavani, Moyar, Kundha, Pykara and various other streams supplement water for drinking and irrigation. Pykara, Mayar and Kundha rivers contribute for the hydroelectric projects enhancing the socio-economic status of the state.

Crops

The Nilgiris District is basically a horticulture district and the entire economy of the district depends upon the success and failure of horticulture crops like Potato, Cabbage, Carrot, Tea, Coffee, Spices, flowers and Fruits. The mainly cultivated is plantation Crops, viz., Tea, Coffee, Vegetables and flowers. Potato, Vegetables and Flowers are raised in Udhagai and Coonoor, Kotagiri Taluks. Paddy and Ginger are grown in Gudalur and Pandalur Taluks. Paddy is also grown in Thengumarahada area in Kotagiri Taluk. Besides these crops, Ragi, Samai, Wheat, Vegetables etc., are also grown in small extent throughout the district.

Floriculture

Traditionally the farmers growing loose flowers and Rose cut flower in Nilgiris district. After growing demand for hi-tech cut flower farmers going to produce hi-tech flowers in Nilgiris district. Nilgiris District is blessed with varied agro-climatic conditions suitable for cultivation of different types of cut flowers for export. The flowers from this district are of good quality, fetching premium price compared to the produce from the other areas of India. With the climatic advantage prevailing in the Nilgiris, many growers have started growing various kind of flowers like Carnation, Lilium, Alstroemeria, Limonium, Chrysanthemum, Gerbera, Anthurium, Gladiolus, Bird of Paradise, Statice, Fillers etc., The expert group on floriculture development in India

set up by the Govt. of India, Identified that Nilgiris had abundant potential for cut flower production.

Reasons why Nilgiris is very potential:

a). The highest quality of land, water and climate in the sub-continent.

b). Cost of production is lowest due to ideal climatic conditions with least pest management.

c). Small size farms with direct growers have helped in quality conscious finished products.

d). Very good connectivity by road to the surrounding major towns and cities like Bangalore, Chennai, Coimbatore, Trivandrum.

e). Good connectivity by air from Bangalore – Coimbatore.

f). Already a land where people are used to plantation corps like tea thereby an already agriculture society.

g). The quality of flowers produced in Nilgiris are of world standards.

The Government of Tamilnadu, in order to give a helping hand to the farmers of this district, has announced this district as the Agri-Export Zone for Flowers. The Government as approved by APEDA, have issued orders for setting up of Agri-Export Zone for flowers in Nilgiris with an overall project cost of Rs. 15.89 crores.

According to the survey conducted by UPASI – KVK, there are 58 cut flower units spread through out different taluks of Nilgiris, Out of which 37 units are in Ooty, ten in Coonoor and eleven in Kotagiri.

The area under floriculture in Nilgiris has increased from 3 hectare in 2002 to 59.69 hectares during the current year and the floriculture segment will grow leaps and bounds in the year to come. There are under list of different cut flower crops in Nilgiris given in the Table 4.4. Around 60% of the units were established during 2004-2005.

Table 4.4. Area under different cut flowers in Nilgiris district

S. No	Name of the Crop	Area (in Ha)	Percentage to total
2	Lilium	16.20	27.14
3	Bird of Paradise	13.50	22.62
3	Carnation	12.67	21.23
4	Gerbera	6.00	10.05
5	Alstroemeria	4.50	7.50
6	Cutfoliage	3.40	5.70
7	Gladiolus	2.10	3.52
8	Limonium	1.12	1.88
9	Statice	0.20	0.03
	Total	59.69	100.00

Source: Evaluation and Applied Research Department, Govt. of Tamil Nadu. (2007)

The socio economic status of Nilgiris people will be dramatically changed with the adoption of floriculture, because it is a viable, alternative option in crop diversification in Nilgiris region. Now many people coming forward to venture into growing flowers in the Green Houses and many traders from Bangalore, Hydrabad and Chennai come forward to market the cut flowers grown in the Nilgiris.

Infrastructure for hi-tech cut flower production

Production of hi-tech cut flowers need poly green house, drip irrigation and cold storage facilities. Small and medium farmers going for medium type of poly green house

construction and large farmers mainly going for construction of hi-tech poly green house. Government provides subsidies for construction of poly green house, drip irrigation system and cold storage.

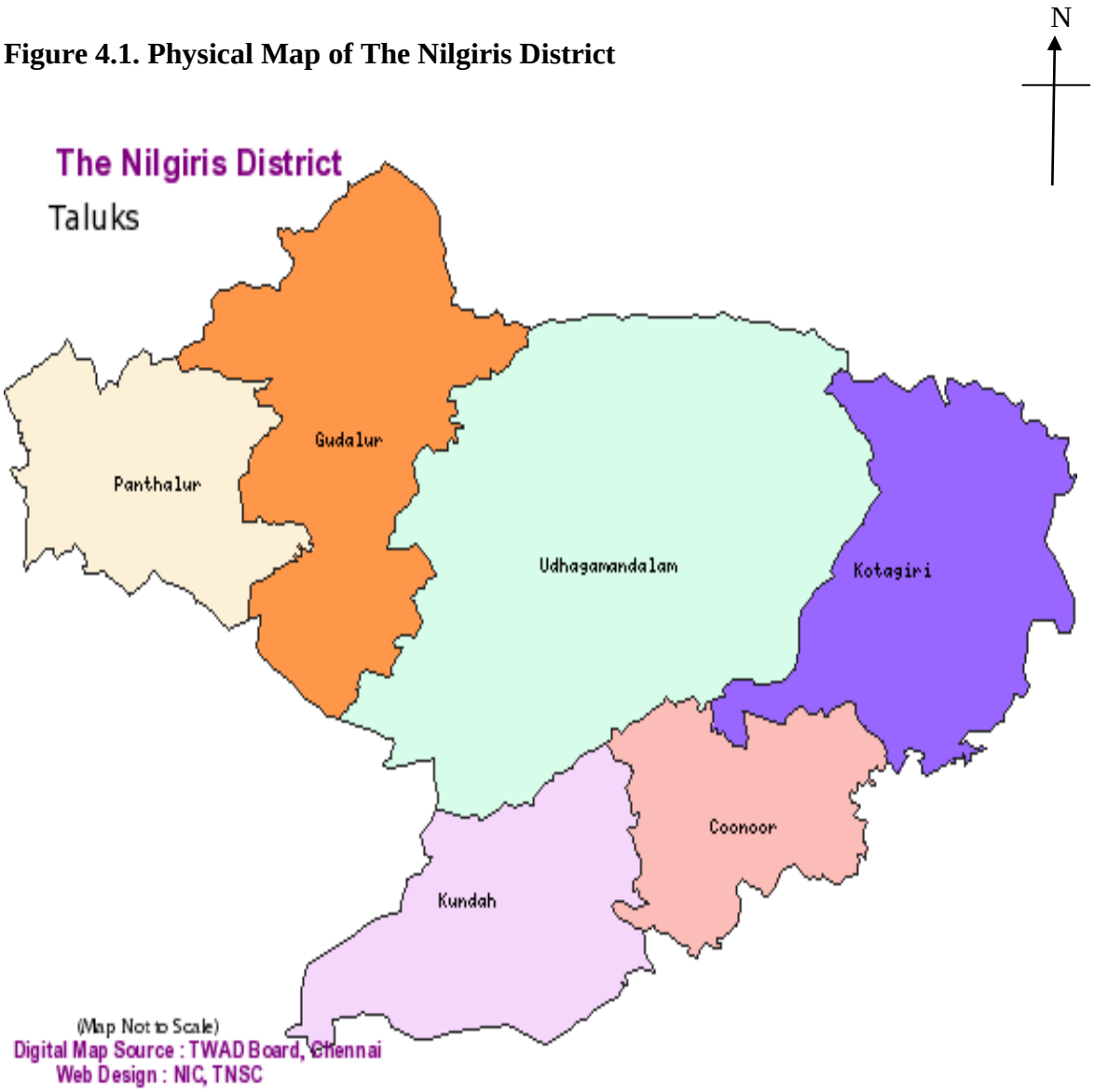
Mode of transportation

The major hubs for domestic marketing and exports, for Nilgiris floriculture products are Coimbatore and Bangalore, which are well connected from the Nilgiris. Transportation from field (hired vehicles/trucks) and from Ooty to Coimbatore / Bangalore is considered feasible and cost included.

Subsidies

Subsidies from various agencies like state department of Horticulture (for poly house, drip irrigation, shade net etc) National Horticulture Board (for planting material, cold store and other eligible heads of project costs etc.) Hill Area Development Programme (for polyhouse, planting material etc.,) Agriculture and Processed Food Products Export Development Authority (for air freight subsidy for export) etc., will be applied for, after sanction of term loan, but not taken into project cost.

Figure 4.1. Physical Map of The Nilgiris District



CHAPTER V

RESULTS AND DISCUSSION

The data gathered from the 30 sample farmers and 25 members involved in supply chain of Lilium cut flower were tabulated and analyzed. The findings are presented and discussed in this chapter.\

General Characteristics of the Sample Farmers

Analyzing the general characteristics of the sample farmers with respect to age, educational status, occupational status, farming experience, size of land holding, irrigation source, etc., will be helpful in understanding their decission making and practices followed by them.

Age of the respondents

Age is an important factor which influences many personality traits of the farmers. The details on the age of sample farmers are presented in Table 5.1

Table 5.1 Age Distribution of Sample Farmers

S.No	Age (years)	Number of Farmers	Percentage to Total
1.	< 30	5	16.67
2.	31-40	19	63.33
3.	41-50	6	20.00
4.	> 50	-	-
Total		30	100.0

It could be observed from the table, that majority of the farmers (63.33 per cent) were in the age group of 31-40 years, followed by 20.00 per cent of the sample farmers in the age group of 41-50 years. It could be concluded that major share of the sample farmers were middle aged. The farmers can be trained for adopting modern

cultivation practices for lilium, since they were fairly experienced and have many more years to go.

Educational Status of the Respondents

Education plays a major role by influencing farmers in their approach and attitude towards farming. The sample farmers were classified into four categories based on educational status such as illiterate, primary level, higher secondary level and college level. The details on the educational status of sample farmers are presented in Table 5.2.

Table 5.2 Educational Status of the Respondents

S.No	Education level	Number of Farmers	Percentage to Total
1.	Illiterate	-	-
2.	Primary	11	36.67
3.	Higher secondary	12	40.00
4.	College	7	23.33
Total		30	100.00

The results in table 5.2 revealed that 40.00 per cent of the sample farmers had higher secondary education followed by 36.67 per cent of the farmers with primary level education. About 23 per cent of the farmers were graduates. Certificate courses on hi-tech cut flower production under open and distance learning mode and training coupled with demonstration of good agricultural and post harvest management practices could be conducted to impart knowledge and skills for producing good quality produce.

Occupational Status

The farmers were classified into two groups based on their occupation i.e., agriculture alone and those with agriculture and other occupation. The results are presented in Table 5.3

Table 5.3 Occupational Status of the Respondents

S.No	Occupation	Number of Farmers	Percentage to Total
1.	Agriculture alone	18	60.00
2.	Agriculture + other occupation	12	40.00
Total		30	100.00

It could be seen from table 5.3, that most of the respondents (60.00 per cent) had agriculture as their only occupation. About 40 per cent of the farmers were also employed in other organisations.

Farming Experience

Years of farming by farmers provides opportunities for them to learn more about farming through practice. Hence details of farming experience were gathered, analysed and the results are presented in Table 5.4.

Table 5.4 Farming Experience of the Respondents

S.No	Experience (years)	Number of Farmers	Percentage to Total
1.	<5	4	13.33
2.	6-10	11	36.67
3.	11-15	9	30.00
5.	> 15	6	20.00
Total		30	100.00

It could be observed from table that, 36.67 per cent of the farmers had experience of 6 to 10 years of farming followed by farmers with 11 to 15 years of experience (30.00 per cent). The results indicate that the farmers were well experienced in the cultivation of crops.

Size of Land Holding

Size of land holding of farmers in general would influence their cropping pattern, cost of cultivation, buying behaviour of the farmers with respect to agricultural inputs etc., hence the details of size of holding of the farmers were analyzed and the results are presented in Table 5.5.

Table 5.5 Size of Land Holding of the Sample Respondents

S.No	Size of Land Holding (in ha)	Number of Farmers	Percentage to Total
1.	<1 (marginal)	2	6.67
2.	1-2 (small)	4	13.33
3.	2-5 (medium)	17	56.67
4.	>5 (large)	7	23.33
Total		30	100.00

It could be observed from the table 5.5 that among the sample farmers 56.67 per cent belonged to medium farmers group followed by 23.33 per cent of large farmers, and 13.33 per cent small farmers. Majority of the sample farmers were under the categories of medium and large and their marketable surples would be high. A group of medium and large farmers could be motivated to join together and sell all their marketable surpluses directly to the exporter, organized retail chain and consumers in the supply chain.

Source of Irrigation

Source of irrigation plays a critical role in the selection of the crop and also the number of crops cultivated in a year. Therefore source of irrigation in sample farms were analysed and the results are presented in Table 5.6**.**

Table 5.6 Source of Irrigation

S.No	Source of Irrigation	Number of Farmers	Percentage to Total
1.	River stream (perennial)	2	6.66
2.	Bore Well (or) open well	28	93.34
Total		30	100.00

It could be observed that 93.34 per cent of the sample farmers used bore well or open well as their main source of irrigation and only about seven per cent farmers used river stream as their source of irrigation. Water was available throughout the year for cultivation of lilium.

Livestock

Livestock has been an important source of income for farm families. Income from livestock has been continuous and less fluctuating. Adding livestock to cropping system significantly reduced the risks associated with farm income. The livestock products like meat, milk and milk products have had a prominent role in the dietary habits of the people. The number of sample farms with livestock is presented in Table 5.7.

The farm households showed higher preference towards rearing goat and cow. Farms with goat and cow constituted 43.47 and 34.78 per cent, respectively. Buffalo and bullock population had been on the decline in the region. High maintenance costs and increasing scarcity of fodder associated with mechanization of ploughing operations were the major reasons for the diminishing population of these two categories of livestock.

Livestock rearing in farms provided additional income particularly for agricultural labourers besides supplying farmyard manure and raw materials for biogas production. Further, it provided employment especially self-employment to a substantial number of farm households.

Table 5.7 Livestock Population

S.No	Category	Number of farms	Percentage to number of sample farms
1	Goat	20	43.47
2	Cow	16	34.78
3	Buffalo	8	17.39
4	Bullock	2	4.34

Sample farmers profile

Results showed that majority of the sample farmers belonged to the age group of 31 - 40 years. All the sample farmers were literates and agriculture was the primary occupation of all sample farmers. Small and large sized farms accounted for major share of the total sample. Majority of the farmers (87 per cent) had more than six years experience in cultivating of crops.

Supply chain of lilium

The supply chain represented the full range of activities from the selection of seed through processes along the chain, to delivery of the final product to the consumer. It included input suppliers, producers, processors, packers and movers, wholesalers, traders, retailers, and export/import distributors. An efficient supply chain management system would provide adequate incentives to farmers to produce more and convey changing needs of the consumers to the farmers to enable them to take up production based on market needs.

A supply chain typically consisted of

- Inbound distribution or logistics,
- Firm operations,

- Outbound distribution or logistics,
- Marketing and
- Channel value chain.

These activities would be supported by

- Purchasing or procurement,
- Research and Development,
- Human Resource Management and
- Infrastructure

Following six supply chains for lilium were identified in the study area.

Supply Chain I

Producer → Commission Agent → Wholesaler → Consumer
(Nilgiris) (Nilgiris) (Bangalore) (Bangalore)

Supply Chain II

Producer → Wholesaler → Consumer
(Nilgiris) (Bangalore) (Bangalore)

Supply Chain III

Producer → Wholesaler → Exporter → Consumer
(Nilgiris) (Nilgiris) (Bangalore) (Holland)

Supply Chain IV

Producer → Auction center → Exporter → Consumer
(Nilgiris) (Nilgiris) (Bangalore) (Holland)

Supply Chain V

Producer → Auction center → Wholesaler → Retailer → Consumer
(Nilgiris) (Nilgiris) (Bangalore) (Bangalore) (Bangalore)

Supply Chain VI

Producer → local trader → wholesaler → Consumer
(Nilgiris) (Nilgiris) (Bangalore) (Bangalore)

Eighty five per cent of lilium moved from Nilgiris to Bangalore mainly through value chain I, II, V and VI**.** Channel III and IV were for export market. Since the focus of the study was on domestic market, these two channels were not analysed. Channel II was used by large farmers alone for sending their produce to Bangalore. Channel I, V and VI were predominently used by marginal and small farmers to sell their produce. Detailed analysis of channel I, II, V and VI are presented in the following sections.

In all the supply chains, farm was considered as the starting point. Farmer purchased inputs from various suppliers. The farmer did not supply to lilium exclusively any of the particular intermediary but used a combination of intermediaries based on the demand, price and other conditions. Hence the analysis of the farm operation has been presented in composite manner.

Farm operations for lilium cultivation

Lilium was cultivated under poly green house condition. The size of the poly green house varied with the size of holding, because of higher capital investment. Marginal farmers constructed poly green house 1600 sq.m whereas small and large

farmers constructed 3200 sq.m and 6400 sq.m poly green house, respectively. Subsidies were given by various agencies such as State Department of Horticulture (poly house, drip irrigation, shade net etc), National Horticulture Board (planting material, cold store etc.), Hill Area Development Program (for poly house, planting material etc.,), Agriculture and Processed Food Products Export Development Authority (for air freight and shade net subsidy for export) etc., for establishment of poly green house. Materials for poly green house were available with local suppliers and it was erected by local labors. With the aid of mist chamber and blowers, microclimate in the poly green house was maintained. Fertigation and irrigation was done through drip irrigation system. The capital required for erecting poly green house for marginal farm was Rs. 16.06 lakhs whereas for small and large farms it was Rs. 18.60 and 24.06 lakhs, respectively (details in Annexure I)

Lilium *(Lilium asiaticum.L*), a member of the **Liliaceae** family, has been valued for its wide array of colours of flowers, excellent keeping quality and ability to re-hydrate after continuous transportation. Lilium bulbs were imported from Holland (stored at -1.5ºC in dark) and bulb was be grown for cut flowers once in its life time. The cultivated area was deep ploughed and organic manure was thoroughly mixed. After manuring, the soil was fumigated. Beds at the size of 1m x 10 m were formed. Plant population was taken at an ideal level of 35 plants / sq.m. at a spacing of 10 cm x 15 cm. Irrigation was given regularly, about three times in a week through drip irrigation system. Fertilizers and pesticides were applied on a regular prophylactic (in advance) schedule. Fertilizers were applied through drip system (fertigation). The flowers were harvested from 90 days after planting for about ten days continuously and the flowers were graded, bunched and packed.

The fixed cost, input usage, variable cost of lilium cultivation and returns from lilium are discussed in this section. Details of fixed cost per season for cultivation of lilium for marginal, small and large farmers are presented in the table 5.8.

Table 5.8. Fixed cost per season of lilium

(Rs.in lakhs)

Particulars	Rate per year* (%)	Marginal farmers	Small farmers	Large farmers
Depreciation				
Poly greenhouse	10	0.43	0.48	0.53
Drip system	15	0.13	0.16	1.92
Tools and Equipments	15	0.01	0.01	0.02
Packing cum store house	10	0.02	0.02	0.04
Subtotal		**0.59**	**0.67**	**2.51**
Interest on fixed capital (Nationalized Bank Rate)	12.50	0.67	0.78	0.89
Total		**1.26**	**1.45**	**3.40**

(* National Horticulture Board norms)

The fixed cost / season for marginal farm was Rs.1.26 lakhs whereas for small and large farms it was Rs.1.45 and Rs 3.40 lakhs, respectively. The fixed cost varied significantly across farm sizes due to variations in technology used for cold storage and poly green house.

Details of quantities of inputs used by the Lilium cultivators are furnished in the Table 5.9.

Table 5.9 Quantity of inputs used in Lillium cultivation

S.No	Inputs	Marginal farmers	Small farmers	Large farmers	Recommended practice
1.	Planting material (bulbs/ac)	1.0 lakh	1.10 lakh	1.25 lakh	1.25 lakh
2.	Organic manure (tonnes/ac)	5	10	10	10
3.	Inorganic fertilizer (kg/ac)				
i	Calcium Nitrate	30	35	30	25
ii	Potassium Nitrate	40	50	40	40
iii	All 19 (19:19:19)	45	50	40	30
iv	Mono Ammonium Phosphate	20	25	20	25
v	DAP	15	20	15	15
vi	Urea	20	25	20	20
4.	Machine power (hrs/ac)	10	8	8	8
5.	Plant protection chemical /ac				
i	Bavistin (kg/ac)	15	12	8	10
ii	Azadiractin (0.03%) (lit/ac)	2	2	1	2
iii	Pseudomonas (lit/ac)	4	3	5	5
iv	Trichoderma (kg/ac)	10	12	12	10
6.	Average number of irrigations (per week/ac)	4	3	3	3

Lilium bulbs were imported from Holland and the bulb was grown for cut flowers for one season and other inputs were available locally. The quantity of planting material used increased with increase in farm size, reflecting high density planting in large farms.

Quantity of manure applied by marginal farmers (5 tonnes) was much lesser than that applied by small and large farmers.

Variable Cost

Details of variable cost per season for cultivation of lilium for marginal, small and medium are presented in the table 5.10. Total variable cost per season was Rs. 20.61 lakhs for marginl farmers and the variable cost per stem was Rs. 20.61. Planting material cost was high for marginal farmer because of less plant density. The total variable cost per season for small and large farmers was Rs. 20.96 lakhs and 20.81 lakhs, respectively. The variable cost per stem for small farmer was Rs. 19.05 and it was much lesser for large farmers (Rs. 16.65). The cost per stem decreased with increasing farm size and it was primarily due to increase in plant density with the increased farm size. Harvesting was done from 90 days after planting for about 10 days. Harvesting was done manually using sickature at 7-10 am and 4-6pm daily.

Output and returns

The summary of output and returns are furnished in the Table 5.11.

Table 5.11. Output and returns

(Rs in lakhs/ac)

S. No	Output and Returns/season	Marginal	Small	Large
1.	No. of bulbs / m²	25.00	27.50	31.25
2.	No. of cycles in a year	3	3	3
3.	No. of flowers / bulb	1	1	1
4.	'A' Grade flowers	80000	99000	118750
5.	'B' Grade flowers	17000	8800	5000
6.	Average Sale price	25.50	26.50	28.00
	Income (lakhs)	24.74	28.56	34.65
7	Total cost	21.86	22.41	24.21
8	Average marketing cost @ Rs 2.50/stem (lakhs)	2.40	2.69	3.09
	Net income	0.48	3.44	7.35

From the Table 5.11 it could be observed that the total income varied considerably and it was lower for marginal farmers. Cost of production per stem also showed a decreasing trend as the size of the farms increased. This is probably due to increase in the efficiency in use of resources in large farms together with economies of scale in production. Average sale price per stem was the highest for large farmers (Rs. 28.00) when compared with small (Rs. 26.50) and marginal farmers (Rs. 25.50), because of better quality of stems produced by large farmers.

Outbound logistics

The farmer is the first leg of the chain and his value addition is the production of the crop. He, thus, bears product risks in terms of the crop loss, possible wastage prior to sale and financial risks in terms of the investment in the crop. Details of value addition by the marginal, small and large farmers are given in the Table 5.12

There was marginal difference in the price for farmer from different channels. Net price received by the farmer was maximum in channel II, primarilly because the number of intermediaries was least. Farmers marketing expenditure was maximum (Rs. 3.45) in channel I and VI, largely due to higher packing and commission charges. In supply chain I and VI the farmer himself made small packs which was more costlier, while in channel II the farmers packed stems in large boxes while selling directly to wholesaler.

Grading and standardization

In absence of scientific grading/sorting and other quality checking mechanism, the quality of the produce was determined manually and visually. The quality of the produce was determined manually as grade A (good quality), if it had four and more buds and B (normal quality), if it had less than four buds.

Packaging and Handling

Lilium was packed in single use card board boxes (with small holes for aeration) by the labour or farmer immediately after harvesting. The boxes full of lilium were stacked on above the other inside the transport vehicle during loading. Poor packaging material, overstuffing of the packs and over loading of the truck at times and unloading resulted to loss/damages. The packaging and handling methods increased the farmers' cost. Farmers brought their produce in boxes for selling in local markets/ auction center without knowledge of market price on the particular day. He sold all his produce even at a lower rate to skip the same hardships for the next day.

Transportation

Farmer brought flowers from farm to the local trader/auction center/wholesaler. Trade and transport go side by side: one reinforces and strengthens the other. Normal trucks were used to transport the produce to market. Farmers did not use refrigerated truck for transporting the cut flowers. Due to lack of better transport facility, cost of transportation increased and ultimately the marketing cost. The details of transportation of lilium is presented in table 5.13.

Table 5.13. Tranportation of lilium

S.No	Particulars	Lilium
1	Nilgiris-Mettupalayam-Coimbatore	5-6 hours
	Distance covered (trucks)	98-100 km
	Coimbatore- Bengalore	8-10 hours
	Distance covered (trucks)	450 km
2	Bengalore – Other countries (air)	Maximum 3-4 days

The farmer's profitability hinges on his price discovery, which is largely determined by his networking ability. By default he sends his produce to the local market where prices would be lower than metro markets but his transportation cost is also lower.

Problems faced in Lilium cultivation by sample farmers

The problems faced by the sample farmers in Lilium cultivation were analyzed using Garrett's Ranking Technique and the results are presented in Table.5.15

Table 5.15 Problems faced in Lilium cultivation by sample farmers

(n=30)

S.No	Problems	Score	Rank
1	High cost of Imported Planting Material	61.53	I
2	Pest and Disease attack	55.23	II
3	Lack of Skilled man power	52.19	III
4	high labour cost	48.24	IV
5	Cost of fertilizers and plant protection chemicals	43.72	V

The producers expressed that the high cost of imported planting material was the most important problem (61.53) followed by pest and disease attack (55.23). Other important problems were lack of skilled man power (52.19) followed by high labour cost (48.24) and cost of fertilizers and plant protection chemicals (43.72). Farmers must be trained on effective modern pest and disease management technologies. Education instititutions can train youth on technology and skills required for scientific management of hi-tech cut flower cultivation under poly green house. Since this is a growing market it can absorbe large amount of skilled labour.

Problems faced in Lilium marketing by sample farmers

The farmers were asked to rank the problems faced by them in marketing of lilium and the results are presented in Table.5.16

Table 5.16 Problems faced in Lilium marketing by sample farmers

(n=30)

S.No	Problems	Score	Rank
1	Price fluctuation	56.82	I
2	Storage cost	51.35	II
3	Late payment	44.28	III

The farmers ranked price fluctuation as the most important problem followed by storage cost and late payment. The results indicate the need for development and promotion of storage facilities which would indirectly help to stabilize prices. Market information based planning and production to meet the market needs enables efficient use of resources. Group effort of farmers or private investment is essential for establishing cold storage facility. Market information and efficient supply chain management would reduce the problems in marketing.

Supply Chain I

In supply chain I the farmers sold the produce through commission agents to wholesalers cum processor cum retailer (WPR), who in turn sold it to consumers at Bangalore. Expenses like packaging, loading/unloading and transportation etc was borne by the buyers and producers, at their end.

Inbound logistics

The commission agent is ideally charged with the task of transfering the ownership of the flowers from the farmer to buyers at near or distant market. His reward was the commission

on the sale. His risk was primarily financial since he offered credit to his customers (wholesalers) and only sometimes on credit purchase, especially from small farmers.

Commission agents typically got the demand one day in advance from their wholesalers from respective locations and scheduled their purchase next day accordingly. But more often they realized a lesser price than what they expected. Sometimes it was due to certain sudden ripples in market but most of the time the traders at distant market tried to capture more value than what they should actually. As a whiplash effect, commission agents attempted to recover this loss in their subsequent purchases by trying to bring down the rates in sourcing markets.

Operations

For the commission agent the significant cost was interest, which indicates that his risk was mostly financial. The Commission agent's revenue was only a fraction of the sale amount. All Commission agents extended credit between 7-14 days to buyer (wholesaler). For an average commission agent, 70-80 per cent of the customers purchased on credit. Unlike other businesses, credit does not ensure a higher price. It was not an additional service but a necessary factor for doing business.

The commission agents charged Rs.1-1.50 per stem as their commission and all related expenses were borne by the buyer. There was no physical value addition in this stage.

Outbound logistics

Large Commission agents who were able to source and sell good volumes were able to make profits since their fixed costs (shed) got spread over a larger volume. Commission agents usually targeted buyers from long distance such as Bangalore for higher profitability due to better price discovery. Ninety per cent of the produce was sold to the wholesalers and only two to three per cent for local retailers incase of marriages and functions.

Wholesalers cum Processor cum Retailer

Inbound logistics

The wholesaler was an aggregator cum bulk-buyer who purchased large volumes and sold piecemeal to semi-wholesalers, retailers and exporter. He sold the produce on a mark-up basis. However, his prices were generally limited by supply in market in which he operated. The wholesaler had to bear considerable product risk due to various reasons and also a small amount of financial risk.

Operations

The wholesalers had to bear product risk in terms of wastage, transport and some credit risk and these were his major cost components. Wastage with the wholesaler was high on account of holding time, stage of produce life cycle and handling. Interest formed a small component since his customers were frequent buyers and generally cleared outstanding on a rolling basis. Details of value addition by the WPR are given in the Table 5.16.

Table 5.17. Value Addition at Wholesalers cum Processor cum Retailer

S.No	Particulars/stem	Amount (in Rs)	Percentage to sale price
a	Purchase price	30.70	92.33
i	Transport cost	0.10	0.30
ii	Grading/ sorting	0.50	1.50
iii	Spoilage loss	0.20	0.60
iv	Marketing cost	0.80	2.40
v	Profit Margin	1.75	5.26
vi	Marketing Margin	2.55	7.68
b	Sale price	33.25	100.00

Grading

The trader or his agent opened the boxes dipped his hand inside the boxes in which the farmer brought his produce and took out sample stems. Based on the quality of the produce in his hand, the quality of the entire box was determined, which was often detrimental to the farmer's interest. Visual checks were also used for determining the size and colour of the produce and the farmers were often at the receiving end.

Transportation

The produce was transported to various places like Bangalore and Coimbatore. The farthest distance traveled was 450 km and time taken to reach was eight to ten hours. The nearest distance was 40 km and time taken to reach was two to three hour hours. The cost of transportation to Bangalore was Rs. 0.50 – 1.00 per stem and to Coimbatore it Rs. 0.25-0.50 per stem.

Outbound logistics

The wholesalers profitability depends on two variables – quality and quantity. The wastage level at the wholesaler's doorstep was fairly high and had to be factored into his price. However market compulsions put a cap on this factoring and hence wholesalers depend on finding means of reducing wastage. The wholesalers net margin across products and across markets was approximately 5-6 per cent.

Supply Chain II

In supply chain II the farmer sold the produce to wholesalers cum processor cum retailer (WPR). The operations of farmers and WPR have been discussed in supply chain I. In supply chain II, the farmers got maximum producer's share in consumer's rupee mainly because of less number of intermediaries and economies of scale in the supply chain. Supply chain II provided more net price to producer and high quality produce to consumer with minimum manual handling.

Supply Chain V

In supply chain V the farmers sold the produce through auction center to wholesaler. The auction center charged Rs.1.00 per stem as their service charge. Generally collusion of trading agents was observed in the auction centre and they attempted to purchase at less price from the farmers. Expenses like packaging, loading/unloading and transportation etc., at their segment was borne by the buyers and producers. There was no physical value addition in this stage. Wholesaler sold the

produce to retailer. The operations of farmer and wholesaler were discussed in supply chain I. The operations of retailer in supply chain V discussed in this section.

Retailers

Inbound logistics

Retailers were more conscious of quality and they procured only the first grade produce in limited quantities to meet their front-end demands and dealt with few wholesalers who could fulfill their limited requirements.

Operations

Expenses like packaging, loading/unloading and transportation etc was borne by the retailer. Details of value addition by the retailers are given in the Table 5.18.

Table 5.18. Value Addition at Retailer cum Processor of Lillium in SC V

S.No	Particulars/stem	Amount (in Rs)	Percentage to total share
a	Purchase price	32.00	85.33
i	Sorting/Grading	1.00	2.67
ii	Transport cost	0.60	1.60
iii	Spoilage loss	1.00	2.67
iv	Marketing cost	2.60	6.93
v	Profit Margin	2.90	7.73
vi	Marketing Margin	5.50	14.67
b	Sale price	37.50	100.00

The retailer had to bear product risk in terms of wastage, transport and low sales. Wastage with the retailer was high on account of holding time, stage of produce life cycle and handling. Value addition at the retailer was in the form of bouquets and other floral arrangements using lilium.

Out bound logistics

The retailer was the last leg in the chain that supplied the produce to the consumer. He generally sold on a mark-up basis and had to bear a small amount of product risk.

Supply chain VI

In supply chain VI the farmers sold the produce to local traders who in turn sold it to wholesaler cum processor cum retailer. The local traders charged Rs.1.50 per stem as their service charge. Expenses like packaging, loading/unloading and transportation etc., were borne by the buyers and producers, at their end. There was no physical value addition in this stage. Wholesaler cum processor cum retailer sold the produce to consumer. The major differece between commission agent and local trader was that the local trader transacted only small quantity. The operations of farmer and WPR were discussed in supply chain I.

Marketing Efficiency

Marketing is said to be efficient if the total marketing margins were higher per unit of marketing cost. The markeng efficiency of different supply chain for Lilium was estimated using the following three methods. More than one method was used to check the accuracy of the efficiency.

Details of marketing efficiency of lilium presented in Table 5.19 to 5.21.

Table 5.19 Marketing Efficiency of Lilium through Shepherd method

S.No	Market Channel	Value of goods sold	Total marketing cost	Marketing Efficiency
1	Supply Chain I	33.25	4.95	5.72
2	Supply Chain II	33.75	2.90	10.64
3	Supply Chain V	37.50	6.00	5.25

4	Supply Chain VI	33.75	5.00	5.75

Table 5.20. Marketing Efficiency of Lilium through Acharya's approach

S.No	Market Channel	Net price received by the farmer	Marketing cost + Marketing margin	Marketing Efficiency
1	Supply Chain I	24.55	10.20	2.41
2	Supply Chain II	28.40	6.15	4.61
5	Supply Chain V	26.80	14.00	1.91
6	Supply Chain VI	24.55	10.75	2.28

Table 5.21. Marketing Efficiency of Lilium by using Calkin's index

S.No	Market Channel	Sum of profit or margin	Sum of marketing cost	Marketing Efficiency
1	Supply Chain I	3.45	4.95	1.69
2	Supply Chain II	2.45	2.90	1.84
5	Supply Chain V	4.60	6.00	1.77
6	Supply Chain VI	4.20	5.00	1.84

The results of marketing efficiency analysis presented in Tables 5.19-5.21 revealed that the marketing efficiency was relatively high for the supply chain II. In supply chain II number of intermediaries were less, hence WPR could directly place demand order to farmer and farmers supplied the same (demand based supply).

This channel was used by large farmers only (who produced better quality flowers than marginal and small farmers). Hence supply chain II was found to be the most efficient.

Problems faced by Intermediaries

The intermediaries were asked to rank the problems faced by them in Lillium marketing and the results are presented in Table 5.22.

Table 5.22. Problems Faced by Intermediaries

(n=25)

S.No	Problems	Score	Rank
1	Lack of quality	58.79	I
2	Lack of consistency in supply	55.91	II
3	High handling cost	52.23	III
4	Poor storage facility	49.17	IV
5	High transport cost	46.71	V

The intermediaries expressed lack of quality as the most important problem (58.79) followed by lack of consistency in supply (55.91). The other problems were high handling cost (52.23), poor storage facility (49.17) and high transport cost (46.71). Training on good management practices along with economies of scale is required to overcome the problems. High handling cost was mainly because of repacking, grading and sorting. Poor storage facility at farm level led to deterioration in quality at farm level, which accentuated the problem in maintaining freshness for distant markets.

The data collected and the observations made during the survey were used to analyze the traditional cut flower marketing practices followed five years ago and the present marketing system with respect to various attributes of the supply chain. This

analysis led to the identification of efforts required for developing a modern scientific supply chain. The results are presented in the table 5.23**.**

Table 5.23. Integrated approach for efficient supply chain of Lilium cut flower

S.No	Attributes	Traditional (past)	Present marketing	Modern supply chain (future)
1	Sourcing emphasis	Short term and multiple sourcing	Relationship with vendor and purchase from two to three sources	Long term relationship with vendor and single sourcing
3	Information sharing	No information sharing	Less information sharing and planning for volumes	Greater information sharing and planning for meeting, market needs and market development
4	Management and technical assistance	No	Less	High and need based
5	Cost reduction	No	Yes (less commission and Less spoilage) and left to individual efforts.	Yes (reduction of intermediaries) and marketing information flow for all supply chain partners
6	Spoilage	20 % at wholesaler level, 15 % at retailer level and 20% at exporter level	Only 10-15% at each level	Less than 2% across the supply chain
7	Order receiving	Irregular and Large batch size	Medium batch size and frequent deliveries	Market oriented batch size and frequent deliveries

Table 5.23. (Cont'd)

S.No	Attributes	Traditional (past)	Present marketing	Modern supply chain (future)
8	Information Technology	No	Less and IT enabled	IT enabled and Easy access by all supply chain partners
9	Value added activities	No	Grading, quality checking and packaging based on size, colour and freshness	Standardized uniform market oriented grading practices
10	Transparency	No	Less transparency in demand, availability, price, consumer preference	High transparency in market information for all supply chain partners
11	Customer price	Very high	Medium	Low
12	Net price received by producer	Very low	Medium	High
13	Time to reach consumer	Maximum 2-3 days	Maximum 1-2 days	within one day

The players in the market were disaggregated, acted more on self interest in the absence of any credible marketing information, resulting in more wastage in the system and less benefits to the farmers. Over the years the practices had improved and there was more market information flow because of developments in information and communication techchnology, access to better quality inputs and cut flower production technology and marketing logistics. This has reduced the wastage to some extent, increased the market reach and returns to farmers. However gaps still exit in the present marketing system which have to be rectified by designing, developing and successfully operateing a modern supply chain system**.**

CHAPTER VI

SUMMARY AND CONCLUSION

In this chapter, a brief summary of the research work done along with the findings and conclusion are presented. The study was undertaken to analyze the supply chain of lilium cut flower in Nilgiris district of Tamil Nadu with the following specific objectives;

- to examine the current practices in supply chain of Lilium cut flowers in Nilgiris district,
- to conduct value chain analysis for Lilium cut flowers,
- to identify the major constraints in supply chain of Lilium and
- to suggest suitable strategies for efficient supply chain management of Lilium in Nilgiris district.

There are four Panchayat Unions in Nilgiris district. Among the four Panchayat Unions, based on the maximum area under cut flower production three Panchayat Unions viz., Kotagiri, Ooty and Coonoor were selected. The list of Lilium cultivators in each Panchayat Union was collected and from this ten farmers were selected by simple random selection method. Thus the total sample size of farmers was 30. The members involved in supply chain of cut flower such as local traders, commission agent, wholesaler, retailer and exporter were identified and in each category five members were selected by simple random selection method. Thus the total sample included 30 farmers and 25 members in the supply chain.

Primary data was collected from the sample farmers and the members in supply chain by personal interview using well structured questionnaire. Information from secondary sources like government institutes, government publications; other publications and annual reports were also used.

General characteristics of sample farmers

Results showed that majority of the sample farmers belonged to the age group of 31 - 40 years. All the sample farmers were literates and majority of them had higher secondary level education (40.00 per cent). Agriculture was the primary occupation of all sample farmers. Small and large sized farms accounted for major share of the total sample. Majority of the farmers (87 per cent) more than six years experience in cultivating of crops.

Supply chain of lilium

There were six supply chains for lilium cut flower. More then eighty five per cent of lilium moved from Nilgiris to Bangalore through channel I, II, V and VI. For export market, channel III and channel IV were predominant.

Channel I: Farmer - Commission agent - Wholesaler - Consumer

Channel II: Farmer - Wholesaler - Consumer.

Channel III: Farmer - wholesalers - exporter - Consumer.

Channel IV: Farmer - Auction center - Exporter - Consumer.

Channel V: Farmer - Wholesaler - Retailer - Consumer.

Channel VI: Farmer- local trader - wholesaler - consumer.

Farm operations

Marginal farmers constructed poly green house in 1600 sq mt. at a capital investment of Rs. 16.06 lakhs. The fixed cost and variable cost per season were Rs. 1.26 lakhs and Rs. 20.61 lakhs. The cost of production per stem was Rs. 22.54. The average price realized by a marginal farmer was Rs. 25.50 per stem. The net return per season was Rs. 0.48 lakhs.

Small farmers constructed poly green house in 3200 sq mt. at a capital investment of Rs. 18.60 lakhs. The fixed cost and variable cost per season were Rs.1.45 lakhs and Rs.20.96 lakhs. The cost of production per stem was Rs. 20.79. The average price realized by a small farmer was Rs. 26.50 per stem. The net return per season was Rs. 3.44 lakhs.

Large farmers constructed poly green house in 3200 sq mt. at a capital investment of Rs. 24.06 lakhs. The fixed cost and variable cost per season were Rs. 3.40 lakhs and Rs. 20.81 lakhs. The cost of production per stem was Rs.19.52 The average price realized by a large farmer was Rs. 25.50 per stem. The net return per season was Rs. 7.35 lakhs.

Supply chains

Channel II was used by large farmers alone for sending their produce to Bangalore. Channel I, V and VI were predominantly used by marginal and small farmers to sell their produce.

In Supply Chain I, the net price received by the farmer was Rs 24.55/stem, which constituted about 73.83 per cent of the consumer price. The marketing cost incurred by the commission agent accounted for about 2.10 per cent of final price and by the wholesaler was about 2.40 per cent of final price. Marketing efficiency of this supply chain was 2.41.

In Supply Chain II, the net price received by the farmers was Rs. 28.40/stem, which accounted for about 84.15 per cent of the consumer price. The marketing cost

incurred by the wholesaler constituted 2.37 per cent. Marketing efficiency of this supply chain was 4.61.

In the Supply Chain V, the net price received by the farmer was Rs 26.80/stem, which constituted about 71.47 per cent of the consumer price. The marketing cost incurred by the wholesaler accounted for about 2.13 per cent of final price and by the retailer was about 6.93 per cent of final price. Marketing efficiency of this supply chain was 1.91.

In the Supply Chain VI, the price received by the farmer was Rs 24.55/stem, which constituted about 72.74 per cent of the consumer price. The marketing cost incurred by the local trader accounted for about 2.22 per cent of final price and by the wholesaler was about 2.37 per cent of final price. Marketing efficiency of this supply chain was 2.28.

There was marginal difference in the price of stem received by farmer from different channels. Net price received by the farmer was maximum in channel II, primarily because the number of intermediaries was least. Farmers marketing expenditure was maximum (3.45) in channel I and VI, largely due to higher packing and commission charge. In supply chain I and VI the farmer himself made small packs which were more costly, while in channel II the farmers packed stems in large boxes while selling directly to wholesaler.

Suggestions

Supply chain management

- Leadership must emerge from the supply chain for building and maintaining the supply chain. The leadership may emerge from the farmers (as a group), wholesaler cum processor, organized retailer and exporter.

- Some of the institutional arrangements such as contract farming, co-operative society, group marketing and relationship with some corporate are suggested to farmers to facilitate direct sales to consumers / export markets.

- Dedicated networks of farmers and intermediaries in the market could be developed with the State Agriculture University and Development Departments playing a catalytic role.

Improve farm operations for better quality produce

- Imported planting materials were very costly. Research and development must be strengthened developing suitable varieties and for producing good quality planting material.

- Farmers stated that the expenses towards labour, manuring and plant protection were high. Farmers must be trained in good agricultural practices must be reduce the cost and improve quality of produce harvested.

- The public sector extension needs to pro-actively engage with the institutions and design extension programmes that can enhance the capacity of producers and producer groups in producing better quality cut flowers.

- Since all the farmers are literates, continuous updating of knowledge and skills on production and marketing techniques could be attempted through certificate courses on open and distance learning mode coupled with training and demonstration.

- Farmers must be taken to the destination market to understand the buyer needs.

Strengthen marketing infrastructure

- Standardized grading system based on the market needs has to be followed across the supply chain.
- Uniform packing size based on the transport facility must be designed. Packing and labeling should also be done to facilitate traceability.
- Small cold storage facilities must be created in marginal and small farm holdings.
- Cold chains should also be created to reduce loss in transit and maintain the freshness of the flowers.
- Access to market information was incomplete and inadequate. Government must take necessary steps to collect and disseminate information so that the farmers and others could be benefited.

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Table 5.12.Value Chain of producer in SC I, II, V and SC VI

S.No	Particulars/stem	SC I		SC II		SC V		SC VI	
		Amount (in Rs)	Percentage to total share	Amount (in Rs)	Percentage to total share	Amount (in Rs)	Percentage to total share	Amount (in Rs)	Percentage to total share
1	**Producer**								
a	Gross price received	28.00	84.21	30.50	90.37	29.50	78.67	28.00	82.96
ii	Packing	0.75	2.25	0.20	0.60	0.40	1.07	0.75	2.22
iii	Loading/ unloading	0.40	1.20	0.30	0.91	0.40	1.07	0.40	1.18
iv	Transport cost	0.60	1.80	0.40	1.26	0.50	1.33	0.60	1.78
v	Commission Charges	1.50	4.51	1.00	2.96	1.00	2.67	1.50	4.44
vi	Sorting/Grading	0.10	0.30	0.10	0.30	0.20	0.53	0.10	0.30
vii	Spoilage loss	0.10	0.30	0.10	0.30	0.10	0.27	0.10	0.30
b	Marketing cost	3.45	10.37	2.10	6.22	2.60	6.93	3.45	10.22
c	Net price received	24.55	73.83	28.40	84.15	26.80	71.47	24.55	72.74
Price paid by the end Consumer		33.25	100.00	33.75	100.00	37.50	100.00	33.75	100.00

Table 5.10. Variable cost per season

Particulars	Marginal farmer			Small farmer			Large farmer		
	Unit cost (Rs.)	**Quantity**	**Total Cost (Rs.in lakhs)**	**Unit cost (Rs.)**	**Quantity**	**Total Cost (Rs.in lakhs)**	**Unit cost (Rs.)**	**Quantity**	**Total Cost (Rs.in lakhs)**
Planting material	16/bulb	1 lakh	16.00	15.25/bulb	1.10 lakh	16.78	14.00/bulb	1.25 lakh	17.50
Manure and Fertilizer	1.10/stem	1 lakh	1.10	0.90/stem	1.10 lakh	0.99	0.60stem	1.25 lakh	0.75
Plant protection	0.80/stem	1 lakh	0.80	0.60/stem	1.10 lakh	0.66	0.40/stem	1.25 lakh	0.50
Labour	Rs.100/day	540 man days	0.54	Rs.100/day	540 man days	0.54	Rs.100/day	540 man days	0.36
Harvesting	0.25/stem	1 lakh	0.25	0.25/stem	1.10 lakh	0.28	0.25/stem	1.25 lakh	0.31
Miscellaneous including electricity charges etc.	0.60/stem	1 lakh	0.60	0.50/stem	1.10 lakh	0.55	0.30/stem	1.25 lakh	0.38
Average loss of planting material	16/bulb	3000(3%)	0.48	15.25/bulb	2200(2%)	0.31	14/bulb	1250(1%)	0.18
Interest on working capital @ 12.50 per cent	-	-	0.84	-	-	0.85	-	-	0.83
Total			**20.61**			**20.96**			**20.81**

Annexure I. Fixed capital investment

S.No	Particulars	Marginal farmer			Small farmer			Large farmer		
		Unit cost (Rs./Sq.m)	Quantity (Sq.m)	Total Cost (Rs.in lakhs)	Unit cost (Rs./Sq.m)	Quantity (Sq.m)	Total Cost (Rs.in lakhs)	Unit cost (Rs./Sq.m)	Quantity (Sq.m)	Total Cost (Rs.in lakhs)
1	Poly greenhouse	400	3200	12.80	450	3200	14.40	500	3200	16.00
2	Drip irrigation and Mist cooling system	80	3200	2.56	100	3200	3.20	120	3200	3.84
3	Tools and Equipments	-	-	0.20	-	-	0.30	-	-	0.30
4	Packing cum store house	-	-	0.50	-	-	0.70	-	-	1.25
	Total			**16.06**			**18.60**			**21.39**

Annexure III. Value Chain of wholesaler in SC I, II, V and SC VI

S.No	Particulars/stem	SC I		SC II		SC V		SC VI	
		Amount (in Rs)	**Percentage to total share**	**Amount (in Rs)**	**Percentage to total share**	**Amount (in Rs)**	**Percentage to total share**	**Amount (in Rs)**	**Percentage to total share**
1	**Producer**								
a	Purchase price	30.70	92.33	30.50	90.37	29.50	78.67	30.50	90.37
ii	Packing & Grading	0.10	0.30	0.50	1.48	0.50	1.33	0.10	0.30
iii	Transport cost	0.50	1.50	0.10	0.30	0.10	0.27	0.50	1.48
iv	Spoilage loss	0.20	0.60	0.20	0.60	0.20	0.53	0.20	0.60
v	Marketing cost	0.80	2.40	0.80	2.37	0.80	2.13	0.80	2.37
vi	Profit Margin	1.75	5.26	2.45	7.26	1.70	4.53	2.45	7.26
vii	Marketing Margin	2.55	7.68	3.25	9.62	2.50	6.67	3.25	9.63
b	Sale price	33.25	100.00	33.75	100.00	32.00	85.33	33.75	100
Price paid by the end Consumer		33.25	100.00	33.75	100.00	32.00	100.00	33.75	100.00

Annexure II. Supply chain I, II, V and VI

S.No	Particulars	SC I	SC II	SC V	SC VI
		Amount (in Rs)	Amount (in Rs)	Amount (in Rs)	Amount (in Rs)
	Supply chain	**Producer**	**Producer**	**Producer**	**Producer**
1	Gross price received	28.00	30.50	29.50	28.00
2	Packing	0.75	0.20	0.40	0.75
3	Loading/ unloading	0.40	0.30	0.40	0.40
4	Transport cost	0.60	0.40	0.50	0.60
5	Commission Charges	1.50	1.00	1.00	1.50
6	Sorting/Grading	0.10	0.10	0.20	0.10
7	Spoilage loss	0.10	0.10	0.10	0.10
8	Marketing cost	3.45	2.10	2.60	3.45
9	Net price received	24.55	28.40	26.80	24.55
	Intermediaries	**C A***	-	**W***	**L T***
10	Purchase price	28.00	-	29.50	28.00
11	Transport cost	0.50	-	0.50	0.40
12	Sorting/Grading	0.10	-	0.10	0.20
13	Spoilage loss	0.10	-	0.20	0.15
14	Marketing cost	0.70	-	0.80	0.75
15	Profit Margin	1.70	-	1.70	1.75
16	Marketing Margin	2.70	-	2.50	2.50
17	Sale price	30.70	-	32.00	30.50
	Intermediaries	**WPR***	**WPR***	**Retailer**	**WPR***
18	Purchase price	30.70	30.50	32.00	30.50
19	Sorting/Grading	0.10	0.50	1.00	0.10
20	Transport cost	0.50	0.10	0.60	0.50
21	Spoilage loss	0.20	0.20	1.00	0.20
22	Marketing cost	0.80	0.80	2.60	0.80
23	Profit Margin	1.75	2.45	2.90	2.45
24	Marketing Margin	2.55	3.25	5.50	3.25
25	Sale price	33.25	33.75	37.50	33.75
	Price paid by the Consumer	33.25	33.75	37.50	33.75

CA*=Commission Agent **W*=Wholesaler**
LT*=Local Trader **WPR*= Wholesaler cum Processor cum Retailer**