

FLORICULTURE IN KARNATAKA: PERFORMANCE, PROBLEMS AND PROSPECTS

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FOREWORD

The cultivation and export of floricultural products have received considerable interest in recent years from the policy makers, researchers, agricultural and horticultural planners. It is often argued that horticulture and allied activities have to be given importance in view of the sector's potential in employment, income and export generation. On this ground, horticulture has been provided additional thrust in recent years. The plan outlays have been stepped up in successive plans for development of horticulture. However, some states are still lagging behind in this process. This may be due to lack of infrastructural facilities, lack of guidance to farmers by the department of horticulture as well as unsuitable agro-climatic conditions. Further, after attaining self-sufficiency in foodgrain production, the policy focus is being directed more towards remunerative crops and export potential crops. An important emerging activity in horticultural sector is floriculture. This sub-sector has been encouraged, because of its demand both in domestic as well as international markets. The increases in per capita income and urbanisation have led to a greater preference and increased demand for flowers. At present, flowers are being extensively used in various places. The testimony of this is mushrooming growth of florist centres in urban areas, its prosperity and demand. Still, this sector has a few bottlenecks. These have to be tackled and consequently the activity should become more remunerative to the farmers.

Present study was undertaken by Dr.P.Thippaiah for the Ministry of Agriculture, realizing the future growth potential of floriculture sector. It originated out of his keen interest in the subject. The analysis undertaken provides structure, growth and impediments faced by the sector based on secondary as well as micro-level data. I am sure, the results of this analysis would be useful to the practitioners and policy makers equally.

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PREFACE

The study on Floriculture in Karnataka: Performance, Problems and Prospects has been undertaken in the Agricultural Development and Rural Transformation (ADRT) Unit of the Institute for Social and Economic Change (ISEC), Bangalore, at the instance of the Ministry of Agriculture and Co-operation, New Delhi. Though the main focus of the study is on traditional floriculture in Karnataka, the performance of both modern and traditional floriculture in the entire county has been examined by using data from the secondary sources.

Various department officials and agencies have been of great help in collecting the secondary data and information. I will be failing in my duty if I do not acknowledge them. I wish to express my deep sense of gratitude to, in particular, the Director, Horticulture Department, and his colleagues in the planning wing and statistics divisions for providing necessary data.

I am highly grateful to the Dr. Gopal Kadekodi, Director, Institute for Social and Economic Change (ISEC), Bangalore, for the constant encouragement and support during the course of the study.

I had fruitful discussion with the Deputy Director of Horticulture, Bangalore Urban District, Assistant Director of Horticulture Department, Bangalore North and East Taluks. The insights provided by them on floriculture have greatly helped in drafting the report. I am highly grateful for them for providing necessary data and information for identifying the sample beneficiaries in selected villages for in-depth study.

I am especially thankful to Dr. K. Ramakrishna, Joint Director, Bio-Technology Division of Horticulture Department for providing valuable information on various infrastructural facilities available for floricultural development in the state.

My sincere thanks are due to Mr. Eswaraiah, senior Assistant Director, Floricultural Division, for providing necessary information on floricultural activity in the state.

I put on record my special appreciation to NHB, KAPPEC, KAIC, and APEDA, Horticulture Department, Bangalore, for providing secondary information on various aspects of floriculture.

I am also grateful to Mr. Gangadar, Mr T Raveendra Naika and Mr. Chandrasaha for their meticulous fieldwork for the project and in processing the data. My sincere thanks are due to Prof. R.S. Deshpande, Professor and Head, ADRT Unit and Dr M. J, Bhende in the ADRT Unit for guiding me at various stages of completion of the study report. I offer my sincere thanks to the sample farmers for having provided information required for the study. Finally, I thank Mr. Mohan Kumar for neatly typing the report.

P. Thippaiah

CHAPTER I

INTRODUCTION

1.1. Introduction

Karnataka ranks first in the country in the production of traditional and modern flowers. The area under the crop has increased from 0.04 lakh hectares in 1978-79 to 0.21 lakh hectares in 1999-2000. Out of this, 200 ha are under modern floriculture and 150 ha under green house floriculture. During the same period, the production has increased from 0.21 lakh tonnes to 1,32 lakh tonnes valued about Rs.250 crores. In terms of its share in the country, it accounted for 23.48 per cent of the area and 24.44 per cent in production during 1999-2000. The conducive climate prevailing in the 6 agro-climatic regions spread across 10 Zones in the state is responsible for this impressive growth. The growth of this crop in the state is also highest compared to other food crops as well as horticultural crops. On the export front, its performance is commendable. In 1999-2000, about 58 million stems were exported from the state. The realisations from these exports amounted to Rs.40.6 crores in 1999-2000, which accounted for the 44.80 per cent of the country's total flower exports and formed 1.94 per cent of the total agricultural exports of Karnataka. However, the growth within the state has not been uniform across the districts. Some districts/regions have been dominating in the coverage of area, production and productivity and some have lagged behind in the cultivation of flowers.

1.2. Rationale for the Study

Though floriculture is flourishing both in India as well as in the State, it has not made any remarkable breakthrough in the domestic and international floriculture markets due to various constraints. The country's share in the world trade of fresh flowers is 0.40 per cent to 0.50 per cent as compared to Netherlands 65 per cent, Columbia 12 per cent, Italy 6 per cent, Israel 4 per cent, Kenya 1 per cent and other countries 20 per cent. The area under floriculture although high compared to many countries, the area under protected cultivation is low compared to these countries. The proportion of area under protected to total area floricultural area is 99 per cent in Colombia, 70 per cent in Netherlands and 57.51 per cent Italy. Where as in India it is 0.56 per cent. The investments in this sector and per capita consumption of flowers are also considerably low when compared to other developed

countries like Western Europe, Japan and USA. In other words, the vast potential in the country does not seem to be fully tapped.

As far as domestic floriculture is concerned, it is constrained by lack of awareness about its potential, lack of quality planting material, weak infrastructural support, lack of post-harvest facilities, lack of good markets, exploitation by middlemen, weak database, and absence of information on income generation and employment generation from different flower cultivation and export barriers. It is also viewed that a majority of the flower growers belong to small and marginal farmers' category, facing many problems. No comprehensive study has been undertaken to cover all these aspects in the state. Therefore, an attempt has been made to highlight these issues in addition to providing database for identifying the magnitude of problems and prospects of this sector and also suggesting appropriate measures for tackling the problems of the growers and improving the floricultural industry.

1.3. Objectives

Keeping the above issues, the present study has examined the following broad objectives:

- to analyse the trends in area, production and yield of floricultural crops in Karnataka;
- to study the infrastructural facilities available for floriculture development in Karnataka;
- to study the trends in traditional (domestic) flower markets and modern markets (international markets);
- to study the socio-economic conditions of flower producers;
- to estimate the income and employment generated from floriculture activity;
- to identify the problems faced by the growers; and
- to suggest policy measures for the healthy growth of the sector.

1.4. Scope

Floriculture comprises both traditional and modern flower crops. The traditional flowers are grown in open-air conditions. These include chrysanthemum, jasmine, crossandra, rose, tuberose, aster, marigold, champaka etc. The modern flower crops are grown in controlled conditions (Green Houses). These include roses, gerbera, carnation, etc. Although, both are important, the traditional floriculture is more important as it is predominant in the state in terms of area and production and has been moving towards modern techniques. Hence, the proposed study has carried out a primary investigation mainly focusing on the traditional flower-growing farmers for knowing their socio-economic conditions and income and

employment generation. This is because of two reasons. First, a large number of small and marginal farmers and small traders (Unorganised Sector) are eking out a living in the sector compared to hi-tech floriculture. Secondly, the traditional flowers are grown in all districts of the state. Besides this, the secondary information on floriculture, which includes hi-tech floriculture have also been used to present the overall status of floriculture industry in the state.

1.5. Methodology and Data Sources

The study has utilised both the secondary and primary data. The secondary data is collected from various reports and documents of Horticulture Department, Government of Karnataka. This has enabled us to analyse the trends in area, production and yield of both traditional and modern floriculture, programmes and outlays for floriculture development in the state and infrastructural facilities across the districts of the state. Information has also been collected from National Horticulture Board (NHB), Agricultural and Processed Food Products Export Development Authority (APEDA) and Karnataka Agro Industries Corporation Flower Action Centre (KAIC) to know the provision for floriculture development as well as trade of flowers. The market information on the flowers traded in Bangalore wholesale markets have been collected from NHB to understand the marketing trends in various flowers. For assessing the export potentiality of this sector, information has been collected from APEDA and Visvesvaraya Industrial Trade Centre, Bangalore. The primary data is collected from the sample flower growers in the study area.

1.6. Study Area and Sample Size

The selection of the study area and the sample has been done based on the concentration of area under floriculture. In the first stage, Bangalore urban district was selected for the study as it has the largest floricultural area in the state. This district was found to be the first among floricultural districts in the state an account of favourable climate and proximity to Bangalore City market. Out of 5 taluks in the district, Bangalore east taluk, which had a larger area under floriculture and Bangalore North taluk had lesser area, were selected which formed the second stage. A list of farmers and villages growing traditional flowers in Bangalore North Taluk and Bangalore East Taluk were prepared with the help of officials of the horticulture department and farmers and finally required number of 28 sample farmers in each taluk were selected through random sampling method for the

in-depth study. These required samples were ultimately found in 6 clusters of villages in Bangalore North Taluk and 7 clusters of villages in Bangalore East Taluk. These sample respondents have been engaged in growing flowers under open conditions and catering to the domestic market. The flower crops grown in the sample farms were both seasonal and perennial crops. The seasonal crops such as chrysanthemum and marigold once shown to last 4 to 6 months after harvesting were removed from the field like other food crops. The perennial crops such as roses, jasmine, tuberose and crossandra etc. once planted, remained in the field for more than a year and generally, a life span of 10 to 15 years in the case of rose and jasmine. The yields from these crops would be higher and higher year after and year with least cost. A random sampling technique was used in selecting of flower growing farmers. In all, 1 district, 2 talulks, 13 villages and 56 flower-growing farmers were selected for the purpose of investigation. The information on socio-economic conditions, income, production of flowers, costs and returns, employment generation and the constraints faced by them in growing, marketing of flowers and access and awareness to government programmes for floriculture development and other variables were collected from them by canvassing well structured schedules. The data have been analysed by simple tabular method. The simple averages, percentages and growth rates have been worked out.

1.7. Reference Period of the Data Used

The study relates to the year 2001-2002 for the primary data, whereas the analysis of secondary data relating to area, production and exports mostly pertains to the period 1978-79 to 2001-2002.

1.8. Organization of the Report

The report has been presented in ten Chapters. Chapter I gives the introduction, which provides in brief the status of floriculture in the state and the country, details of the objective, coverage and methodology of the study. The II Chapter provides the floriculture development in India and the III Chapter deals with floriculture development in Karnataka. These two chapters cover area production, growth rates and export issues. This is followed by Chapter IV, which presents an overview of the infrastructure for floriculture in Karnataka, dwells on government support and institutional support to the sector. Chapter V analyses the marketing of flowers in Bangalore City under which market arrival, average price and total revenue have been covered. Chapter VI analyses the socio-economic

background of the flower growers. This highlights the characteristics of the selected household and their perceptions about modern floriculture. Chapter VII provides economics of production and marketing pattern of floricultural crops. The VIII Chapter presents the problems faced by floriculture and farmers. This brings out the bottlenecks faced by the farmers and the sector as a whole. Chapter IX highlights the prospects for floriculture and Chapter X provides conclusions and policy recommendations.

CHAPTER II

FLORICULTURE DEVELOPMENT IN INDIA

2.1. Introduction

Floriculture is becoming a booming industry in the World today. This sector, according to international trade classification, encompasses (a) bulbs, tubers and tuberous roots, (b) other live plants (including trees, shrubs, bushes, roots, cutting and slips), (c) cut- flowers and flower buds, fresh dried, dyed, bleached, impregnated or otherwise prepared, and (d) foliage, branches and other parts (other than flowers and buds) of trees shrubs, bushes and other plants and mosses, lichens and grasses, being goods of a kind suitable for bouquets or ornamental purposes, fresh, dried, dyed, bleached, impregnated or otherwise prepared. The Government of India has adopted a new Indian trade classification, which is based on Harmonized System (HS) of commodity Description and Coding Systems. HS Codes of government of India follow the Brussels Tariff Nomenclature (BTN). The description of according to this comprise of the following:

- a). Bulbs, tubers and Tuberose roots: These are products that may be planted in pots, boxes or similar containers.
- b). Live plants: These are plants that are used for permanent or semi permanent decoration in offices, homes and buildings. These are whole plants, which are suitable for planting or for ornamental purposes.
- c). Cut-flowers: These are flowers and flower buds with a suitable stem of varying length, which makes them suitable for bouquets or for ornamental purposes. Examples of cut-flowers are roses, carnations, chrysanthemums, orchids, gladiolus etc.
- d). Cut foliage: These are leaves, twinges grasses, shoots etc. The economic value of these lies not in the decorative effect of the blossoms but in its colour and shape.
- d) Others: These include dried flowers and foliage, propagation materials, tissue culture plants and starter and adult ornamental plants including houseplants. (For details, see, Dattatreyulu 1997:1-2). In other words, floriculture covers a wide variety of flowers such as bulbs, tubers, live plants, shrubs, bushes, roots, cut flowers, flower bulbs, dried, bleached flowers and foliage etc.

In India, floriculture is emerging as an important commercial crop. A lot of importance has been given to this sector due to its multiple uses, satisfying the aesthetic needs of the people, This is apart from creating more employment, ensuring higher rate of returns to rural people and facilitating earning more foreign exchange. More specifically, they are being used as raw materials in the manufacture of essence, perfumes, medicines and confectioneries for direct consumption by the society.

The production of flowers is an age-old occupation. This does not find a place in the literature on horticultural crops. Until last decade, the growing and selling of flowers was confined to a few families. They grew a variety of flowers on the same land which were sold close to the house, as they could not survive a long journey. The situation in the last decade has however, changed. Now, different farmers are growing different flowers both for domestic market and export purposes. The flowers were, until 1960s, confined to domestic markets. These flowers are now moving long distances due to the availability of airfreight and hi-tech cooling systems. The economic reforms and liberalisation policies introduced from 1991 and modified EXIM policies of 1995-96 and 1999-2002 have given fillip to this sector. After liberalization, the Government of India identified this activity as a sunrise industry and accorded it 100 per cent export-oriented status. Later, many writers have termed this industry as "Rosy Business sector", a Global Concern, Blossoming Industry, Thrust Area, Money Spinning, Lucrative export-oriented sector etc. Growing demand and much higher return per unit of land than any other agricultural activity has prodded farmers to take to this sector. The growing demand for this product has also increased on account of rapid urbanization, increase in individual purchasing power among middle-income groups, increase in the number of IT Units, Hotels, Tourists, Temples, increase in GDP, Per capita Incomes, change in life-styles/ social values of the people, greater awareness among the people to improve the deteriorating environment and economic up-liftment of the people's conditions.

The Five-Year Plans which had not given due attention to this crop in the past have started giving more attention to it on account of its multiple use. In the Ninth Five Year Plan, about 40 crores were allocated to this sector (GOI 1996: 55) as against 17 crores in the Eighth Five Year Plan (GOI 1996:49). This speaks of the importance given to the sector. This positive attitude enabled the country to achieve a breakthrough both in area expansion and production in the last 8 to 10 years.

2.2. Area under Floriculture

There are no reliable data on area under floricultural crops. However, the available literature on floriculture reveals various estimates on area at different points of time. It was estimated that the area under floriculture in India was 4,000 hectares in 1962 and 7,500 hectares in 1976 (National Commission on Agriculture (NCA) 1976). Later estimate by APEDA shows that the area was 34,000 hectares in 1995 accounting for 15 per cent of the world's floricultural area (Cebeco India Pvt.Ltd. 1999: 14). This was low compared to China with 60,000 hectares but higher than Netherlands with 8,017 hectares (Raghavan 2000:151 and Cebeco India Private LTD 1999:13). The other major countries, which have larger area under floriculture are Japan (21,218 hectares), Italy (7,654 hectares), USA (16,400 hectares), Columbia (4,757 hectares) Brazil (10,285 hectares), UK (6,804 hectares) and Israel (1,950 hectares). Recently, the National Horticulture Board (NHB) provided more reliable data on floriculture. According to this, the area under floriculture at all India level had increased from 53,000 hectares in 1993-94 to 88,609 hectares in 1999-2000 with an increase of 35,607 hectares. The proportion of area under traditional floriculture was accounted for 0.72 per cent of the total horticultural crops and 0.05 per cent of the gross cropped area in 1999-2000. This is well ahead of the projected area of 0.5 million hectares by the National Commission on Agriculture for 2000 A.D (NCA 1976: 355). Based on the present trends, it was projected that it might reach around 1 lakh hectares by the end of Ninth Plan and production would also be around 3.4 lakh MT of loose flowers and around 85 crores of cut-flowers with stem (GOI 1996: 50). This has been achieved. However, the area under protected (Modern) conditions is very less compared to other countries (The difference between modern and traditional floriculture is presented in Appendix-I). In Netherlands, the proportion of area under protected area was 70 per cent, Colombia (90 per cent), whereas in India it was 500 hectares accounting for 0.56 per cent of the total area under floriculture and the rest was under traditional flowers. Efforts are needed to increase the area under hi-tech at least to 2000 hectares in view of its growing demand.

The production of loose flowers increased from 233,000 tonnes to 509,193 tonnes and that of cut-flowers increased from 5,555 lakh numbers to 6,806 lakh numbers during the above period. The major traditional flowers grown are Marigold, Jasmine, Rose, Aster Crossanda and the cut-flowers with stem include Rose, Gladiolus, Tuberose and Carnation, hibiscus, China Aster, several annuals as Gonphera, Cocks, Comb, Golden Rod, Dahlia, Zinnia and Sunflowers. The favourable factors such as warm temperature, soil conditions, relatively

cheap labour, different agro-climatical zones have helped the growth in area and production in the country.

When we compare the growth rates of area under flower as well as production to that of horticultural crops (Table 2.2), it is found that the growth rates were much higher in case of flowers than horticultural crops (Table 2.1).

Table 2.1: All India Area and Production of Flowers

Year	Area (in 000' Ha.)	Production (in 000' MT) Loose	Production (in lakh Nos) Cut
1993-94	53	233	5,555
1994-95	60	261	5,190
1995-96	82	334	5,370
1996-97	71	367	6,152
1997-98	74	366	6,222
1998-99	74	419	6,428
1999-2000	89	509	6,806
2000-01	100	560	7,400
2001-02	110	570	8,600
Compound Growth Rate	6.91	12.84	4.32

Source: 1. National Horticulture Board: Horticulture Data Base-2001.
2. Economic Survey-2001-2002, Government of India.

Table 2.2: All India Area and Production of Horticultural Crops

Year	Area (in Million Ha.)	Production (in Million MT)	Productivity (in MT/Ha.)
1991-92	12.8	96.6	7.5
1992-93	12.9	107.4	8.3
1993-94	13.1	114.6	8.7
1994-95	13.1	118.4	9.0
1995-96	13.7	125.5	9.2
1996-97	14.4	128.5	8.9
1997-98	14.8	128.6	8.7
1998-99	15.1	146.0	9.7
1999-2000	15.3	149.2	9.8
2000-01	15.70	152.50	9.71
2001-02	16.54	156.55	9.47
Compound Growth Rate	2.57	5.08	2.58

Note: Horticultural Crops - Fruits, Vegetables, Potato & Tuber Crops, Mushrooms, Flowers, Plantation crops (Excluding Tea, Coffee & Rubber), Spices and Honey.

Source: 1. National Horticulture Board: Horticulture Data Base-2001.
2. Economic Survey-2001-2002, Government of India.

2.3. Contribution of Floriculture to Gross Domestic Product (GDP) of Agricultural Sector

The contribution of horticultural crops to the agricultural sector GDP was estimated at 26.69 per cent during 1999-2000. as against 18.24 per cent during 1990-91. Of this, the contribution by floriculture was about 0.40 per cent during 1990-91 and its share increased substantially during 1999-2000 with 2.45 per cent.

2.4. State wise Area under Floriculture

In the country, the highest area under floriculture was found in Karnataka with 20,801 hectares, followed by Tamil Nadu 18,120 hectares, Andhra Pradesh 18,087 hectares, West Bengal 13,227 hectares, Maharashtra 6,606 hectares, Delhi 3,450 hectares and, Haryana 2,250 hectares in 1999-2000. These states together accounted for 98.64 per cent of the total area in the country. The southern states, viz., Karnataka, Tamil Nadu and Andhra Pradesh accounted for 64 per cent of the area in the country (NHB 2002: 17). A larger proportion of the area of the floriculture in many states was concentrated around the suburban areas of urban areas as there was growing demand from urbanites.

2.5. Employment in Floricultural Crops Cultivation

Floricultural crops are highly labour intensive and have the capacity to generate more direct and indirect employment both in rural areas as well as in urban areas. Estimates across different states in India indicate that the employment generation of flower crops cultivation was higher than other horticulture crops, food crops and commercial crops. According to estimates, the employment generation of floricultural crops cultivation was 913 man-days per hectare in Crossandra and 1,210 man-days in Jasmine (Rao 1997). A Study by UAS Bangalore, in Chitradurga district showed that the employment generation of one hectare of Crossandra was 1,461 man-days per year. Of this, 65 accounted for female workforce. It was estimated that conventional (traditional) floriculture provide a decent standard of living for nearly 10,000 farm households and employment to 80,000 farm labourers and 2.5 lakh small retailers and flower vendors in the state of Karnataka (Prakash 2002:240). In contrast to the traditional floriculture, the modern floriculture generated more employment. The range of employment per hectare in this activity was 7,121 man-days (Thippaiah 20001:120) to 7,468 man-days /hectare including technical labour (Prakash 2002:247), whereas the food crops, generated 860 man-days per hectare per annum as against 143 man-days for cereal crops

(GOI 1996:1), Paddy 175 man-days, and Sugarcane 285 days (Rao 1997: 586), to 305 man-days (Algamani 1997:620), Groundnut 105 (Rao 1997:585) to 225 (Alagamani 1997:670) per hectare of land.

The high-tech floriculture employs more labour. However, the cost of generating a human Labour Day is Rs. 1886 in high-tech compared to Rs.87 in conventional floriculture and Rs.217 in commercial floriculture (Chengappa and Reddy 2000:20 and Prakash 2000:247). This means that cost incurred by high-tech floriculture to generate one human day is capable of generating employment to nine labourers in the cultivation of field roses and 22 labourers in conventional floriculture. There are no estimates on total labour required in modern floriculture. But some case studies indicate that the total labour in 10 sample units in Bangalore were 981 which worked out to 98 persons per unit, the proportion of permanent labourers was 43.73 per cent (Thippaiah 2001:119). But the study of Prakash (2002:248) shows the proportion of permanent labour at 8 per cent and they were given industrial type of benefits. Prakash's study also shows that nearly 72 per cent of the labourers working in hi-tech floricultural units were in the age group of less than 25 years, 50 per cent of the total workers belonged to dalits and 24 per cent of them were the previous owners of the land which was in the hands of the corporate floriculturists.

2.6. Income Generation of Floricultural Crops

Like more employment generation, the flower crops have the inherent advantage of providing higher productivity per unit of land resulting in higher income. The study of Alagamani *et. al* (1997) in Madurai district of Tamil Nadu shows that the income obtained from flower was Rs. 9.47 lakhs in the case of Kanakambara (Crossandra) followed by Rose Rs. 8.40 lakhs. These incomes were higher compared to other crops such as sugarcane Rs. 24,298/ha. The income generation of fruit crops was Rs.20, 000, Rs. 15,000 for vegetable crops, and Paddy Rs. 10,000 and Ragi hardly Rs. 4,000 per hectare (GOK 1993:9).

A study in Farukahabad in Uttar Pradesh shows that the Rose yielded a net income of Rs.1.3 lakhs per hectare, on an average investment of Rs. 11,000 per hectare, and the input – out put ratio worked out to 1: 1.76. In the case of Jasmine, the average net returns came to Rs. 1.04 lakhs, on an average investment of Rs. 97,430 per hectare, and input-output ratio worked out to 1:1.73 (Singh *et.al.* 1997: 621). The study of Marigold flower in Nagpur in

Maharashtra reveals that income from floriculture crops was more than the food crops and cotton.

2.7. Domestic Trade of Flowers

The cultivation of flowers in the past was undertaken just to meet the family requirement and also meet the local religious and festival needs. Over a time, some farmers started growing flowers to market in the local markets in small quantities. As civilization advanced, the demand for these flowers increased from the important cities. The flowers were mainly transported to urban areas either by buses, trucks or rail. Today, Several states in India are producing flowers and marketing these in domestic markets. There is hardly any study to quantify the total marketable surplus and the value of these flowers. To some extent, the National Horticulture Board has filled this gap. However, this information does not provide us with a complete picture and it only shows the total quantity traded and its value in major markets. Besides this, some studies have provided partial information about the marketing of flowers. This enables us to understand at least the growth trends in these markets and its increasing importance.

There are varying estimates on domestic flower trade in the country. It is estimated that the value of trade was around Rs. 200 crores and increased to Rs. 500 crores in 2002 (Prakash 2002:234), which is an indicative of the growing significance of the floriculture cultivation in India. Nearly 50 per cent of this trade accounted for traditional flowers. Much of this trade was confined to cities in the countries. One estimate shows that the total trade in Delhi was about Rs.50 crores (Raghava and Dadlani 1999:147) and Rs. 9.26 crores annually, in Mumbai, Calcutta, Madras, Delhi and Bangalore in 1996 (Rai *et. al.*, 1988) (GOI 1976: 355) and the daily flowers trade of direct selling and wholesale at one market, namely, Krishna Rajendra Market of Bangalore alone was accounted for Rs. 2 lakhs per day (Sachin 1997). The instability in the international market and attractive prices in the domestic prices have been cited as important factors for this growth.

2.8. Who Benefits from Marketing of Flowers?

One of the serious problems that one can notice in the rural unorganized markets is dominance of middlemen and other market functionaries. They are exploiting the producers of flowers on account of the inherent nature of horticultural produce, which is

highly perishable in nature, bulkiness, seasonal and high moisture content and fast deterioration. As a result of these, the farmers are not benefiting. Studies show that the producers have received less share in the consumer price. A study in Jaipur district shows that the producer received only Rs. 6.63 per kg, which accounted for 31.27 per cent of the consumer price in Marigold crop than the florist (Sharma 2001:168). Similarly, in Karnataka, the producer got about 56 per cent in the consumer price of Jasmine, 45.2 per cent in Crossandra and 36 per cent in Chrysanthemum (GOK 2000:8). Another study by Chengappa and Reddy (2000:24) in Karnataka show that the price spread across different agents involved in trade. According to this, the producers' share in the consumers' price varied from 41.33 per cent to 51.68 per cent in Crossandra and to 64.35 per cent in Chrysanthemum. The Study of Jadhav *et. al.*, (2000:132) shows that the producer's share in the consumer's price was 25 per cent to 37 per cent in Rose, 28 per cent to 40 per cent in Gladiolus, 40 per cent in Gerbera, and 25 per cent to 37 per cent in the case of Aster.

2.9. Export Units in India (Modern Flowers)

The liberalization of seed policy in the late 1980s and globalization of the Indian economy and the economic reforms initiated in the early 1990s and the signing of WTO in 1995 paved the way for investment in hi-tech floriculture. In between 1991 and 1996, about 170 export-oriented floriculture units with 1,545 million stems capacity (small and big) were started in various parts of the country involving more than 1,500 crores for growing 40 varieties of roses in an area of 500 hectares (GOI: 1996:47), of which 70 units are operational. Many of them operate less than 50 per cent of their capacity. About 35 units of these are concentrated in and around Bangalore in Karnataka covering 150 hectares with an investment of over Rs. 500 crores (GOK 2000 :10), whereas Maharashtra has 39 units covering 150 hectares, Tamil Nadu has 17 units covering 152 hectares and Delhi has 12 units covering 50 hectares. These units came up in these areas as they were in the proximity of international airports, which were essential for quick exports. Many of these units have been started with technical collaboration with Netherlands, Israel and France. Large proportions of these industries were operating lower than the assumed capacity utilization (Thippaiah 2001: Malik 1998:60). Many organized sector firms such as ISSAR, TATAS, BIRLAS, THAPARS, R.P. GOENKA GROUP and MRF GROUP started these units. About 90 per cent of the units are growing roses because of their high demand and returns in comparison with other flowers. Though Chrysanthemum, Gladiolus, and Tube-rose offer good returns they were mostly not preferred for export, as they were bulky resulting in higher freight costs.

2.10. Unit Costs

There are wide variations in the cost of establishing the export-oriented floriculture units in the country. The workout of the investment per unit is between Rs.2.25 crores (Sudha 2001:3) and Rs.2.51 crores (Thippaiah 2001:117). The average annual cost of production for export of one hectare of cut roses was worked out to be in the range of Rs. 33.95 lakhs (Thippaiah 2001:122) to Rs. 67.21 lakhs (Sudha 2001:3).

In contrast to this, the estimate of Industrial Bank of India reveals that an investment in the range of 2.03 crores to 2.25 crores is required per hectare of flower cultivation. Those who are in the industry also say that at least 1 crore is required to cultivate the flower on one acre of land which includes importing planting materials, construction of green houses and creation of pre-cooling, grading and packing facilities. (Deccan Herald, June 24,1996: GOK 2001)). According to another estimate, to grow over 2.1 million flowers per annum on 3.5 hectares of land the project can cost between Rs.10.15 crores. Whatever may be the differences in cost estimates, it is found that modern floriculture is highly capital intensive than traditional floriculture.

2.11. Per Capita Consumption of Flowers

There are no empirical evidences to show that the level of per capita consumption flowers in India. However, based on the area increase, production and mushroom growth of florist centres and flower stalls one can confidently say that flower consumption has increased over a period of time in India. The per capita availability of flowers in India in 1981 was 0.18 grams per annum and it increased to 0.49 grams in 2001. This is really low compared to other developed countries' real consumption of flowers in terms of money. Evidences show that the consumption of flowers in the world has increased almost four-fold in terms of value in the past two decades, i.e., 12.5 billion US\$ in 1980 to 50 billion US\$ in 1999 (Cebeco India: 1999:9). America alone spends nearly 15 billion dollars a year on flowers and plants which is about 4 times more than one generation ago (Vivienne 2001:106). The increased consumption of flowers has mainly concentrated in North America, Japan, and Western Europe. As far as per capita consumption of cut flowers and plants is concerned, Norway has been found to be the highest in the world with 153 US \$ followed by Switzerland 120 US \$, Denmark 119 US \$, and Sweden 104 US \$ (Raghava 1996).

2.12. Ecological Impact

There has been adequate literature on the positive side of modern floriculture. But, very little attention has been paid to deal with the negative side of it. A few studies, however, provided some evidences on this issue. It is found that the practice of modern floriculture affected soil fertility, groundwater, human health and land quality.

It is estimated that the fertilizer use in hi-tech Rose was 15,000 kgs per hectare, which was almost 100 times more than normal requirement of a food crop. On the other hand, the traditional floriculture is highly sustainable with the use of traditional inputs such as Farm Yard Manure (FYM) and less of purchased inputs. It is stated that these crops prone to several diseases such as red mite, black spot, and powdery mildew. To control these, each green house in a week spray about six litres of strong pesticides and fungicides like Novan and Novotron. They also mix five kgs of ammonium phosphate with water per acre. Again, several kinds of prophylactic as well as curative spraying of pesticides are being applied. These gradually seep into the ground and contaminate the underground water. It is estimated that the use of pesticide in hi-tech floriculture is 16 times higher compared to conventional flowers. The quantity of plant protection used in Rose is around 160 kgs per hectare. On an average, one spraying per week against fungal diseases and another spraying to prevent red spider is applied for flower crops around Bangalore (Prakash: 2002:249; Chengappa & Reddy 2002:21). Similarly, the use of plant protection chemicals is almost 1,500 times more than that in the cultivation of a field crop like red gram. Many of these chemicals are ultimately percolating into the ground, thereby contaminating the groundwater.

The workers engaged in the application of these chemicals are suffering from headache, impaired vision/eye irritation, asthma, skin diseases etc. (Prakash: 2002:249 and Veena: 1998). Though the workers are given masks and gloves, most of them are ineffective. It is also stated that the units pollute land and 10 years of the cultivation of flowers on the same land require an average of 30 years for land becoming fit for agriculture again (Veena 1998).

Another serious problem that has been noticed is the depletion of groundwater on account of over-exploitation. It is found that the units with 10 acres of floriculture have dug up an average of 4 bore wells and each well goes to about 600 feet. According to one estimate, the groundwater use is 212-acre inches per hectare, which is almost 40 times higher

than the amount of water used by normal food crops like ragi. This has caused groundwater levels to go low (Veena 1998; Prakash 2000:249; Chengappa & Reddy 2002:21).

Another study has estimated the ecological costs of hi-tech floriculture at around Rs. 10 lakh per hectare, out of which 70 per cent is in the form of soil fertility, 2.5 per cent in the form of pests and disease resistance and resurgence of new pest and 5 per cent is due to negative externality resulting from groundwater over-exploitation (Prakash: 2002). Because of all these some apprehensions had been expressed about the area expansion of modern flowers, which is likely to affect food security, loss of man-days, ecology, health hazards and groundwater. Because of these apprehensions, some of the studies advocate growing of food crops than roses. Because, growing food crops with additional investments can generate more employment and employment without any ecological imbalances. (See, Prakash 2002:252). However, such apprehensions are likely to emerge when new crops are experimented. As we have achieved self-sufficiency in food production, there is nothing wrong in expanding area under remunerative crops like modern flowers. However, some technological advances have to be made to reduce the ecological damages as a result of the modern roses cultivation.

2.13. Post Harvest Losses of Flowers

One of the serious problems that one notices is the perishability of flowers at different stages. It is estimated that about 20 per cent (Negi 2000:12) to 35 per cent of the flowers are being lost during harvest, handling, storage, transport and marketing (**Table 2.3**). However, the post-harvest losses are less in case of hi-tech flowers as they have a chain of cold storages right from harvesting to marketing. The loss estimated in this sector was hardly about 6.00 to 6.64 per cent in 1997-98 (Thippaiah 2001:123), whereas in traditional flowers it was estimated to be 7 to 13 per cent (Thippaiah 2001:158). Much of this occurred at the time of plucking/packing and grading.

Table 2.3: Pre and Post Harvest Losses of Different Flowers

(Percentages)

Flowers	Pre and post harvest losses			Transportation	Total
	Plant mortality loss at growers level	Packing loss at growers level	Non availability of cold storage at growers level		
Rose	9.00	4.00	4.20	15.00	32.20
Gladiolus	9.00	9.10	4.60	9.70	32.40
Carnation	9.70	4.90	7.80	10.00	32.40
Chrysanthemum	7.30	6.50	11.00	10.50	35.30
Orchid	15.00	8.00	5.00	0.00	28.00
Tuberose	3.20	5.00	6.60	12.70	27.50
Flowers					8.61 to 12.50*

Source: Swarup 1995; Shah and Kshirasagar 2001.

2.14. Infrastructural Facilities for Floricultural Development

Well-developed infrastructure for survival of horticulture sector is very essential as most of the products are perish quickly. Unfortunately, in India, more than 40 per cent of our horticultural products including flowers, perish soon after harvesting. This does not include destroying matured crops due to price crash and pre-harvesting losses. This enormous loss is neither benefiting the producer nor consumer. Efforts are required to minimise these losses for the benefit of the society and the country. In this direction, the government has set up specialized agencies such as APEDA, NHB etc, to provide infrastructure facilities for preventing post-harvest losses of flowers and other horticultural produce.

2.15. National Bank for Agriculture and Rural Development- 1982 (NABARD)

The NABARD is playing a vital role since its inception in 1982 in providing credit support to agriculture including horticultural crops production and marketing. After the 1990 it is focussing more on horticulture, in general and floriculture, in particular. The disbursements for plantation and horticulture in India increased from Rs.10,493 lakhs in 1992-93 to Rs. 24,603 lakhs in 2000-01. It is giving refinance up to Rs. 2 lakhs with 14 per cent interest to the 100 per cent export-oriented flower units. During the same period disbursements for floriculture increased from Rs. 93.52 lakhs to Rs. 1,555 lakhs accounting for 0.86 per cent and

6.32 per cent of the total disbursement to plantations and horticulture. If we work out the share of floriculture in the total disbursement of horticulture, excluding plantations and sericulture, it accounts for 3.96 per cent and 11.59 per cent respectively in 1992-93 and 2000-2001. (Table 2.4). This shows the growing importance of floriculture. A major share of these funds has been given to floriculture in Karnataka where a large number of the units of the country are concentrated.

Table 2.4: Year-wise Disbursements for Floriculture by NABARD

Year	Disbursements (Rs. Lakhs)
1992-93	93.520
1993-94	253.780
1994-95	978.060
1995-96	1213.670
1996-97	1039.640
1997-98	1458.000
198-99	1351.112
1999-2000	1613.600
2000-2001	1555.000
Total	9556.382

Source: M.R. Sharma (2002).

2.16. Agricultural and Processed Food Products Export Development Authority-1986 (APEDA)

This agency was established to maximize the country's foreign exchange earning through increase in agricultural exports and to provide better incomes to the farmers. In order to fulfill this task, it drew up several schemes for assistance to the exporters and their associations, farmers and cooperative etc. A few of these schemes have been extended to floriculture sector too. The specific schemes for the sector are: (a). Scheme for Feasibility Studies, Surveys, Consultancy and Database Upgradation, (b). Scheme for Infrastructure Development, and (c) Scheme for Export Promotion and Market Development.

2.16.1. Scheme for Feasibility Studies, Surveys, Consultancy and Database Upgradation

Under this scheme, financial assistance is provided to flower exporters, grower's organizations and trade associations for conducting feasibility studies etc. The assistance is limited to 50 per cent of the total cost of the study, subject to a ceiling of Rs. 2 lakhs per

beneficiaries. Prior approval of the APEDA is required to carry out these studies. These assistances will be paid after completing the studies.

2.16.2. Scheme for Infrastructure Development

Under the scheme, financial assistance is provided to the floricultural units for the purchase of refrigerated trucks for transport of cut-flowers from farm or cold storage to the airports. The scale of assistance is 25 per cent of the cost subject to a ceiling of Rs. 2.50 lakhs per beneficiary. In addition to this, there is also a provision for assistance for setting up post-harvest handling facilities such as air conditioned packing and grading house, cold storage at the floriculture farm. The scale of assistance for this activity is restricted to 50 per cent of the capital cost subject to a limit of Rs. 5 lakhs per beneficiary.

2.16.3. Scheme for Export Promotion and Market Development

Financial assistance is available under this scheme for the supply of flower product samples for the purpose of test marketing, product information and market promotion. The assistance under the scheme is limited to Rs.50, 000 per beneficiary covering the cost of samples or freight or both. They have to be decided on case-to-case basis. Assistance is also available under the scheme for publicity and promotion in preparation of the product literature and publicity material for the distribution among importers and consumers for export publicity. The scale of the assistance is 40 per cent of the cost, subject to a ceiling of Rs. 2 lakhs per beneficiary. This assistance is made available to those whose projects, have been approved earlier, and the costs will be reimbursed after completion of the work.

2.17. National Horticulture Board (NHB)- 1984

In order to prevent post-harvest losses of horticultural crops and development of horticultural crops, the Government of India established the National Horticulture Board (NHB) in April 1984 with its headquarters at Gurgaon, Haryana. The basic aim of the scheme was not only to encourage private investment in the sector but also to reduce post-harvest losses of flower produce and promote its export. Under this scheme, financial assistance is extended up to 40 per cent of the loan for the project subject to a limit of Rs.1 crore at the rate of 4 per cent service charges per annum. Till 1966-97, it had extended a financial assistance of Rs. 5,306.33 lakhs for 69 floricultural units in different states. Karnataka had received about

Rs.816.60 lakhs for 9 units up to 1996-97. The latest information shows that up to 1998-99, Karnataka received a cumulative assistance of Rs. 1,747.60 lakhs for 24 units. However, the repayment of these loans was very poor. The extent of overdue in the state has been about 70 per cent of the demand. On account of mounting overdues, the scheme was modified and now, the floricultural units are being given 20 per cent of the project cost with a maximum limit of Rs. 25 lakhs in the country and Rs. 30 lakhs in North eastern/ tribal/ hilly areas.

2.18 . Indian Institute of Horticultural Research - Bangalore

The scientists of the ornamental crops division of the organization have done a tremendous job in evolving varieties, hybrids and cultivars of various flowers from time to time. Since 1972, 6 Bougainvillea, 4 China Aster, 11 Chrysanthemum, 14 gladiolus, 25 Hibiscus, 3 Roses and 2 Tuberose varieties have been developed. These varieties are not only high yielding, but also have highly improved quality attributes, disease resistance and are suitable for different agro-climatic Zones. They are being made popular with the extension agencies of UAS and the state Horticulture Department (IIHR 1999).

2.19. India's Exports

Indian floricultural trade statistics is mainly available in two sources, namely, ADEDA and DGCI & S. Across these sources, the value of trade was almost the same up to 1996-97. Thereafter, one could notice some differences. One is not clear about the reasons for these differences. However, one thing is clear that there has been increasing trend right from 1991-92 to 2000-2001. Karnataka, Maharashtra, Dehhi, Andhra Pradesh and Rajasthan states have contributed a bulk of these exports. According to DGCI & S data, the total trade was just Rs. 14.80 crores in 1991-92, which increased to Rs.132.62 crores in 2000-2001 with an increase of 790.94 per cent during this period and a net gain of 130.77 crores over 1.88 crores imports (NHB: 2002). The annual compound growth rates indicate that flower crops recorded the highest growth rate with 32 per cent between 1991-92 and 2000-2001. This is high compared to all horticultural crops (**Table 2.5**). Despite these achievements still they lagged behind the targeted exports of Rs.100 crores by the end of 8th plan and Rs. 200 crores by 9th plan (GOI: 1996:51).

In spite of this increase, our exports accounted for just 0.5 per cent of the world's trade of flowers compared to Netherlands 65 per cent, Colombia 12 per cent and Israel 6 per

cent (Negi: 2000:12). Lack of technical know-how, standard methods of growing and harvesting flowers of an internationally acceptable quality as well as problem of packing, speedy and cheap transport have been attributed as major reasons for low exports.

**Table 2.5: Exports of Floriculture Products from India
April to March**

Year	As per DGSI & S flower exports (Rs. Crores)	As per DGSI & S Total Horticulture (Rs. Crores)	As per APEDA flower exports (Rs. Crores)	As per APEDA All horticulture crops (Qty.MTs)	As per APEDA All horticulture crops (Rs. Crores)
1991-92	14.80	1,407.42	NA	NA	NA
1992-93	14.91	1,465.60	14.91	NA	NA
1993-94	18.84	2,047.40	18.83	604,993	697
1994-95	30.84	2,347.45	30.83	705,156	837
1995-96	60.14	2,658.11	60.14	747,061	1,126
1996-97	63.40	3,171.88	63.39	897,090	1,164
1997-98	86.74	3,539.57	81.2	871,678	1,484
1998-99	103.45	3,920.87	96.6	632,135	1,405
1999-2000	116.72	NA	105.15	884,870	1,830
2000-2001	132.65	NA	123.12	1,092,044	2,380
Compound Growth Rate	32.00	16.76	30.97	5.80	17.31

Note: Horticultural exports refer to floriculture and seeds, total fruits and vegetables and processed fruits and vegetables.

Source: 1 Foreign Trade Statistics, Directorate General of commercial Intelligence and Statistics (DGCI & S) (Different Issues).

2. Export Statistics for Agro and Food products: India 1996, Agricultural and Processed Food products Export Development Authority (APEDA), New Delhi,

A larger proportion of these exports are sent to Netherlands (24.36 per cent), USA (19.93 per cent), Japan (8.68 per cent), U K (8.56 per cent) and Germany (6.29 per cent) (**Table 2.6**). From the Table, it also clear that right from 1991-92, more are less the same countries have been importing flowers with different proportions.

Table 2.6: Top 10 Countries Importing Indian Floricultural Products

Countries	(Percentage Share)	
	1991-92	2000-2001
Total Rs. crores	14.80	132.65
Japan	4.13	8.68
UAE	3.4	-
USA	18.34	19.93
Netherland	8.69	24.36
France	7.25	2.39
Germany	16.84	6.29
Italy	15.73	4.70
UK	10.63	8.56
Spain	2.62	4.07
Switzerland	3.13	2.59
Belgium	-	2.96
% Share of ten Countries	90.76	84.54
Total of Ten Countries (Rs. Crores)	13.42	125.13

Note: 1. First row total represents to total exports of flowers.
 2. Last row represents total exports of ten countries.
 3. The remaining figures are % share of each country in total flower exports.

Source: DGCI & S Reports.

In the last two years, Japan is one of the countries importing 85 per cent of its requirements from India and India also prefers to export to this country on account of the imposition of import duties by European countries. A small proportion of traditional flowers is also exported to Singapore, and Malaysia. This is due to diversion of trade towards Japan (import duty free country). Sri Lanka is another country which is importing 50 per cent of their flower requirement.

Table 2.7: Variety-wise Exports of India's Floricultural Products

SL.No	Variety	(Rs Lakhs)	
		1991-92	1997-98
1	Cut Flowers	39.90 (2.76)	1,894.12 (21.84)
2	Dried Flowers	643.51 (44.52)	5,327.30 (61.42)
3	Live Plants	401.53 (27.78)	671.20 (7.74)
4	Dried Plants	239.87 (16.60)	483.54 (5.57)
5	Bulbs	120.58 (8.34)	298.08 (3.44)
Total		1,445.39 (100.00)	8,674.24 (100.00)

Note: Figures in parentheses are percentage to total.

Source: 1. The Hindu, Survey of Indian Agriculture, 1994
 2. Jadhav *et. al.*, 2000

From **Table 2.7**, it is clear that dry flowers exports have been increasing significantly. They are increasing as they resemble freshness and they can be preserved for longer period. Today, dried flowers contribute a major share to the floricultural trade. These are preferred due to their non-perishable nature, things of beauty and lasting value. India has been exporting dry flowers for the last 30 years. They are mainly exported to USA, Israel, Hong Kong, Japan, Singapore, Germany, New Zealand, Italy and western Countries. U K is the other country which is the largest importer of our dried flowers like dahlia, bell cups, marigold, jute flowers, wood roses, wild lilies, helichrysum and lotus pods (Chadha: 2001: 63). Most of the dry flower units are concentrated in Tamil Nadu, Kolkatta and Rajasthan (Ramkumar *et. al.*: 2000). The state of Rajasthan is exporting 75 per cent of the rose products in dry form to west Asian countries (see, Irulappan 2000:209).

2.20. Central Government Initiatives for Floriculture Development

Considering the favourable agro-climatic conditions to floriculture and its immense potentialities in earning high profit, creating more employment and earning more foreign exchange from its exports, the government of India has started offering many subsidy schemes ensuring institutional infrastructure to the farmers and other form of support to the farmers who have ventured into this field. Many programmers have also been introduced to tap the potential of the sector and promoting this promising industry. In the VIII plan, an amount of Rs. 17 Crores for the setting of 11 model floricultural centres and another Rs. 40 crores in the Ninth Plan were allocated under the centrally sponsored scheme for commercial floriculture. The 11 Model Floricultural centres (MFCS) in public sector have been opened in Srinagar in Jammu and Kashmir, Bangalore in Karnataka, Trivendrum in Kerala, Pune in Maharashtra, Mohali in Punjab, Gangotok in Sikkim, Ooty in Tamil Nadu, Lucknow in Uttar Pradesh and Calcutta in West Bengal, AP and Himachal Pardesh. However, many of these are not operational (GOI: 1996:49). In the 9th plan also, it was proposed to set up another 5 MFCS in addition to strengthening the existing ones with an outlay of Rs.40 crores (GOI 1996:49).

Recently, the Government of India sanctioned 45 Agriculture Export Zones (AEZ) in 19 states which are acting as the rural motors of export economy and are expected to be the vehicles of growth. Out of these, 5 are exclusively sanctioned for floriculture with 188.09 crores. One zone each has been sanctioned for Karnataka, Tamil Nadu, Maharashtra, Uttaranchal and Sikkim, keeping in view the comparative advantage that a region enjoys and

the local advantage. The AEZ, which is proposed to be set up in Hosur (Tamil Nadu) will be capable of handling 67.5 million flower stems grown within the AEZ and another 27 million stems produced in non- AEZ region.

A significant development in floriculture sector is the enormity of export increase after the introduction of new economic policies in 1991. Indian florists began to export the modern flowers in large scale to other countries, particularly to Netherlands, where the auctions take place. Over a period of time, the exporters experienced a whole lot of problems in the auction centre resulting in less profits. In order to overcome these problems, APEDA has opened a market centre in Amsterdam to provide market infrastructure, reducing handling costs and avoiding middlemen and helping the exporters in smooth marketing of their produce. With these measure it is expected that the profit of the exporters would increase by 5-10 per cent. Apart from these, the government of India has initiated the following actions:

- (i) Import duty on plant and materials has been reduced from 55 per cent to 10 per cent to reduce the cost of the project after the new economic policy.
- (ii) Import duty on pre-cooling units and refrigerated transport units has been reduced by 25 per cent. Floricultural units can avail of the benefits of duty free imports if they export 50 per cent of their production.
- (iii) For export of Tissue culture plants and cut-flowers by air, subsidy on air-freight has been allowed up to a maximum of 25 per cent of the international freight rate.
- (iv) Farmers are allowed to sell even up to 50 per cent of their produce in domestic market.
- (v) Plans have been initiated for setting of floriculture market centres in Bangalore, Mumbai and NOIDA.
- (vi) Efforts have been made to the setting up of cold storage and cargo handling facilities at Mumbai, New Delhi, Bangalore, Thiruvananthapuram, Chennai and Hyderabad Airports.
- (vii) The institutions started for the promotion of exports and Horticultural exports such as APEDA, NHB. NAFED have been strengthened over a period of time.

2.21. States Initiatives for the Development of Floriculture

Many State Governments have also started special Programmers for the development of this industry. In Karnataka, Karnataka State Industrial Investment Development Corporation Ltd. has accorded industrial status to floriculture. Karnataka Agro-Industries Corporation has started floriculture auction centre on the lines of Dutch Model of auction center (For details, see the chapter on Karnataka Initiatives). On the recommendation of the 1995 Agricultural Policy, the State of Karnataka amended the land-ceiling Act and it allowed floricultural units to acquire land of 20 units (108 acres). Flower Auction centres are being set up by Maharashtra govt. at Pune and Nasik to eliminate middlemen and ensure remunerative prices (Anonymous: 2001:62). The Maharashtra Government has also started demonstration and training centre for gerbera, carnations, roses and coloured Capsicum at a cost of 3 crore to train farmers in floriculture cultivation (Anonymous: 2000: 62). Land acquisition has been made easy in Tamil Nadu. The Tamil Nadu Industrial Development Corporation (TIDCO) has set up a floriculture incubator project Tanflora as a joint venture with Bangalore based CLL Flower Ltd. This park provides post-harvest and marketing infrastructural facilities for the common benefit of about 25 member growers (Choudhary: 2000:10). Tamil Nadu also made a Commercial Floriculture Policy in 1996, under which attractive incentives were provided for floriculture. In 1999-2000 a sum of Rs. 191.51 lakhs was spent on various schemes relating to flowers (Choudhary: 2000:10).

Appendix Table- I
Difference Between Modern and Traditional Flowers

Modern Flowers	Traditional Fowlers
Growing modern flower is recognized as lucrative profession with much higher return per unit of land than any other agricultural activity.	Not much lucrative.
The modern flowers are known for prolonged vase life and ability to withstand long distance transport.	Vase life is short.
Grown under protective conditions	Grown in open conditions
Anthurium, gerbera, Carnation, orchids, and Chrissanthem are the major categories.	Tuberose, Gladiolus, Chrysanthemum, Marigold, jasmine and some annuals are the major categories.
Hardly 1.5 per cent of the flowers are grown under green house growthing.	In India, nearly 98.5 per cent of the flowers are grown under open cultivation
They are mainly grown for export purpose though the same are sold in domestic market also in case of lack of demand or export rejects.	They are sold only in domestic markets.
Employs general managers and hierarchy of officials.	No such officials.
Provides less employment.	The traditional flower industry is a booming employment generation proposition, particularly for women in semi-urban and rural areas who are involved in activities like growing, picking, marketing and value additions through making garlands, veni etc.
The cultivation of modern flowers and plants involves a green house/polyhouse structures, where flowers are grown under controlled conditions and have post harvest facilities. This is the recent origin and started in limited in scale. The production is adjusted to Valentines day (February), Christmas (December), and Mothers' Day and Valentines' day. So the production is not constant throughout the year.	Traditional flowers are grown in all seasons and throughout the year without any protective structures. Though demand for flowers is there almost the whole year, higher production is adjusted to special occasions such as Ayudha Pooja/Vjjayadasam, Dushera (October), Ganesha Chaturthi (August-September) and Deepavali (November), Shivarathri (February) and many other Hindu, Christian and Muslim festivals. The average price realized also picks up with the coincidence of festivals and arrivals.
Indian agriculture, which was hither to individual driven, has become corporate driven. The floriculture is one example. Modern flowers are grown by a few well-of or resourceful farmers and a few corporate sectors, multinationals and private limited companies. Birlas (Manjushree plantations Ltd.), RPG Enterprises (Horrison Universal Flowers), MRF Industries (Indo Bloom), Mahyco (Mahyco Flowers Ltd.), CCL Flowers Ltd. are examples of this category. Many medium, small industrial groups also jumped into fray for various reasons. They do not really belong to the farming community.	Traditional flowers are grown by a large number of farmers mostly belonging to small and marginal categories.

(Contd....)

Modern Floriculture is well organized and is concentrated around urban areas.	Traditional floriculture is more unorganized and spread all over the rural areas generating vast employment.
The area devoted to modern floriculture in India is around 500 hectares.	Traditional floriculture was undertaken in 88,607 hectares in 1999-2000.
Modern flowers are sold mostly with stalk up to 60 inches	The traditional flowers are sold in loose farm as well as in tied farm.
The cost of generating a man day is Rs. 1,886 in high tech.	The cost of generating a man day is just Rs.87 in conventional floriculture
The consumption of modern ornamental flowers and flowering plants is generally restricted to the affluent class of the society	The middle class and poor families use traditional flowers.
Heavy investment, risk and uncertainty are more in modern floriculture	Low investment, less uncertainty and risk are greater in traditional floriculture
It has been pointed out that there has been a lot of ecological cost involved in growing hi-tech floriculture.	Eco-friendly.
The high-tech floriculture is associated with high finance and risk, since investment and operational costs involved in their production are quite high. More- over, these units are highly dependent on the export market and hence, they are prone to price instability. Further, they also release the export rejects in the domestic market, which threaten the livelihood security of farmers producing traditional flowers.	Less risk and apprehension.
There is no scope for crop rotation in modern floriculture.	There is scope for crop rotation in traditional floriculture.
Modern floriculture is more profitable due absence of middlemen and organized market system.	Profitability in conventional floriculture is less. This is due to a host of middlemen involved in trade and improper marketing facilities.

CHAPTER III

FLORICULTURE DEVELOPMENT IN KARNATAKA

3.1. Introduction

In this chapter, a historical background of the floricultural development, the pattern of floriculture development in different agro-climatic regions have been presented. In addition, an attempt has been made here to see whether there is any relationship between floriculture development and urbanization, irrigation and per capita income.

Karnataka is famous for floriculture right from the 18th century. During Hyder Ali and Tippu Sultan periods, this sector got impetus and their work was later carried over by the British government. The existing Lalbagh and Cubban Park in Bangalore, which was established in 1856, and Brindavan Gardens in Mysore are testimony to their efforts. Farmers in the state were also started growing various traditional flowers due to the positive encouragement by different rulers. These flowers are being grown either for domestic consumption or for trade in the domestic markets within their vicinity. The roads and railways have been used to transport these flowers.

The traditional flowers such as rose, chrysanthemum, tuberose, aster, jasmine, crossandra, marigold, champaka, gladiolus, and bird of paradise are grown in open conditions. Some of these flowers are also being cultivated as cut-flowers in recent years. The rose, carnations, gerbera, and anthurium were grown under protective covers and these have gained momentum in the last 10 years. Recently, new crops like lilies, calla lily, iris, limonium, alstroemeria gypsophila, liatris, lisianthus and freesia have also emerged as potential cut-flowers in the state. Modern cut-flowers are relatively better in quality, have longer vase life and always fetch high unit price in the market. All these new trends have turned floricultural activity as an important agri-business activity in the state.

3.2. Area and Production of flowers

Today, Karnataka is a major floricultural products growing states in the country with 21,801 hectares and a production of 124,440 tonnes of loose flowers accounting for 24.48 per cent of the country's total area and 23.44 per cent of the production in 1999-2000. If we examine the trends over a period of time, we find rapid increase in both area and production. The area under traditional floriculture increased from 0.05 lakh hectares in triennium ending 1982-83 to 0.22 lakh hectares in triennium ending 1999-2000 with an increase of 0.17 lakh hectares or by 340 per cent.

The production has increased from 0.30 lakh tones in triennium ending in 1978-79 to 1.51 lakh tones in triennium ending 1999-2000 with an increase of 1.02 lakh tones or by 240 per cent. This increase is 100 per cent high compared to the area expansion during this period (Table 3.1). Similar increase is found in all districts of the state, which falls under different agro-climatic regions. However, the central zone comprising of Bangalore, Kolar, Chitradurga, and Tumkur accounted for major increase.

Table 3.1: District wise Changes in Area and Production of Flowers in Karnataka

District	Area		Production		Area Increase	Production Increase	Production: Tones	
	Triennium Ending 1982-83	Triennium Ending 1999-00	Triennium Ending 1982-83	Triennium Ending 1999-00			% Area increase to total	% Production increase to total
Belgaum	252	1033	1398	5403	781	4005	3.58	3.11
Bellary	361	792	2003	8455	430	6452	1.97	5.02
Bidar	18	255	99	1362	237	1263	1.09	0.98
Bijapur	172	921	952	5771	749	4819	3.44	3.75
Dharwar	309	781	1714	555	472	-1159	-2.16	-0.90
Gulbarga	59	241	326	796	182	470	0.83	0.37
Raichur	61	324	336	1191	264	855	1.21	0.66
Northren Dry Region	1232	4347	6829	23533	3116	16704	14.29	12.99
Bangalore Urban	0	1769	0	17521	1769	17521	8.11	13.62
Bangalore Rural	0	1738	1232	5622	6829	30096	31.32	23.40
Bangalore	626	3507	3471	32444	2881	28973	13.21	22.53
Kolar	620	1569	3415	7768	950	4353	4.36	3.38
Chitradurga	600	1439	3319	10964	839	7645	3.85	5.94
Tumkur	378	650	2097	5379	272	3281	1.25	2.55
Central Region	2224	10672	13534	79698	13539	91870	62.10	71.43
Mandya	93	1119	518	8791	1026	8273	4.70	6.43
Mysore	484	1602	2688	8093	1118	5405	5.13	4.20
Hassan	159	604	882	2004	445	1122	2.04	0.87
Southren Region	736	3325	4088	18887	2589	14799	11.87	11.51
U Kannada	170	726	945	1933	555	989	2.55	0.77
D.Kannada	203	815	1124	3428	612	2304	2.81	1.79
Chikkamagalur	247	791	1371	885	543	-486	2.49	-0.38
Kodagu	0	201	0	311	201	311	0.92	0.24
Shimoga	292	939	1618	3748	647	2130	2.97	1.66
Hills and Coastal Region	912	3472	5057	10305	2560	5248	11.74	4.08
Total	5104	21816	29508	132423	21803	128621	100.00	100.00

Note: U Kannada- Uttara Kannada, D-Kannada- Dakshina Kannada.

3.3 Growth Rates

The flower crops registered an appreciable growth in area and production between 1980-81 and 1999-2000. They witnessed a growth rate of 5.54 per cent in area and 10.24 per cent in production (Table 3.2). These growth rates were higher than the growth rate of

horticultural crops, which experienced 2.87 per cent in area and 3.96 per cent in production during the same period (See Table 3.3)

The district wise growth rates of area and production of flowers has been shown in **Table 3.2**. Among the four agro-climatic regions in Karnataka, the southern region experienced highest growth rate both in area (10.26 per cent) and production (10.61 per cent) between 1980-81 and 1999-2000. This was closely followed by North dry zone with 9.82 per cent growth area and 10 per cent growth rate in production. The remaining two regions had similar growth rates in area at 8 per cent. But the production growth rate was slightly higher in central region compared to hills and coastal region. Across districts, Bangalore urban district registered higher growth rate both in area and production followed by Bidar in north dry zone Mandya in the southern region. The districts of Bellary, Kolar and Tumkur have experienced the lowest growth rates in area and production.

Table 3. 2: District-wise Annual Compound Rates of Area and Production of Floriculture (Between 1980-81 and 1999-2000)

Districts	Area	Production
Belgaum	9.53	9.79
Bellary	4.48	5.60
Bidar	19.55	19.48
Bijapur	10.37	11.54
Dharwar	12.55	9.77
Gulbarga	9.05	5.68
Raichur	10.99	9.25
Northern Dry Region	9.82	10.00
Bangalore Urban	14.82	20.69
Bangalore Rural	11.83	16.33
Bangalore	11.36	13.96
Kolar	4.99	5.31
Chitradurga	5.18	6.69
Tumkur	3.37	5.55
Central Region	7.10	9.04
Mandya	14.44	16.41
Mysore	9.00	8.41
Hassan	9.30	7.47
Southern Region	10.26	10.61
U Kannada	7.28	4.25
D.Kannada	7.81	8.17
Chikkamagalur	7.03	0.47
Kodagu	12.33	5.46
Shimoga	7.71	6.40
Hills and Coastal Region	8.43	4.95
Total	8.54	10.24

Note: U Kannada- Uttara Kannada, D-Kannada- Dakshina Kannada.

Table 3.3: Annual Compound Growth Rates of Horticultural Crops in Karnataka Between 1978-79 and 1999-2000

Name of the Crop	Area		Production	
	G Rate	T Value	G Rate	T Value
Fruits	3.91	27.90	3.90	17.56
Vegetables	5.27	16.66	5.87	12.44
Garden / Spices	1.92	8.84	-0.10	-0.19
Flowers	8.84	36.28	9.53	47.18
TOTAL	2.87	24.63	3.96	15.55

3.4 Productivity of Various Flowers

It is worthwhile to examine the productivity levels of various flower crops over a period of time. It is clear from Table 3.4 that the yield/ha of all categories of flowers had increased from 5.60 tonnes per hectare in triennium ending 1980-81 to 5.95 tonnes per hectare in triennium ending 1999-2000 (**Table 3.4**)

Table 3.4: District-wise Average Yield of Flowers in Karnataka

(Tonnes/hectare)

District	Triennium ending 1982-83	Triennium ending 1999-2000	Increase/increase	Increase/increase
Belgaum	5.55	5.23	-0.32	-5.72
Bellary	5.54	10.68	5.14	92.63
Bidar	5.52	5.34	-0.18	-3.27
Bijapur	5.55	6.27	0.72	12.99
Dharwar	5.55	3.46	-2.08	-37.58
Gulbarga	5.53	3.30	-2.23	-40.29
Raichur	5.54	3.67	-1.87	-33.73
Northern Dry Region	5.54	5.35	-0.19	-3.45
Bangalore Urban	0.00	9.91	9.91	0.00
Bangalore Rural	0.00	8.58	8.58	0.00
Bangalore	5.54	9.25	3.71	66.87
Kolar	5.51	4.95	-0.56	-10.19
Chitradurga	5.53	7.62	2.09	37.82
Tumkur	5.54	8.27	2.73	49.26
Central Region	5.53	7.89	2.36	42.71
Mandya	5.57	7.86	2.29	41.08
Mysore	5.56	4.90	-0.65	-11.73
Hassan	5.55	3.32	-2.23	-40.20
Southern Region	5.56	5.49	-0.07	-1.19
U Kannada	5.55	2.66	-2.88	-51.96
D.Kannada	5.54	6.93	1.38	24.89
Chikkamagalur	5.54	1.12	-4.42	-79.82
Kodagu	0.00	1.54	1.54	0.00
Shimoga	5.55	3.99	-1.56	-28.04
Hills and Coastal Region	5.55	3.27	-2.28	-41.04
Total	5.60	5.95	0.35	26.87

Note: U Kannada- Uttara Kannada, D-Kannada- Dakshina Kannada.

The increase was just 0.36 tonnes per hectare in 22 years. However, the increase was mainly contributed by Bangalore district. The other districts either experienced low growth or negative growth. As the land was limited, efforts had to be made to improve the technology and increase the productivity of flowers instead of expanding the area at the cost of other food crops to meet the growing demand and exports. However, a significant increase has been noticed in the case of few flowers (**Table 3.5**). These yield levels were not only low compared to fruits and vegetables but also low compared to total horticultural crops which worked out to be 5.69 tonnes per hectare during the triennium ending 1980 and 6.69 tonnes during the triennium ending 2001.

Table 3.5: Flower-wise Average Yield in Karnataka

(Tonnes/hectare)				
Name of the flower	Triennium ending 1982-83	Triennium ending 1999-00	Increase/decrease	% Increase/decrease
Rose	2.48	2.03	-0.45	-18.02
Chrysanthemum	5.45	7.44	1.99	36.62
Tuberose	7.45	8.51	1.06	14.22
Aster	7.52	8.00	0.49	6.47
Jasmine	4.99	5.20	0.21	4.12
Crossandra	2.98	3.93	0.95	31.80
Marigold	7.49	7.22	-0.28	-3.72
Champaka	4.96	3.71	-1.25	-25.22
Others	4.97	6.19	1.22	24.43
Total	5.60	5.96	0.36	7.66

A substantial increase has been found in area and production in respect of many flower crops, but the increase was more pronounced in the case of marigold and jasmine between 1982-83 and 1999-2000 (**Table 3.6**). If we work out the proportion of area of individual crops in the total area, and production it was again the marigold which accounted for a major share with 24.24 per cent of the area, followed by jasmine 20.59 per cent, chrysanthemum 13.93 per cent. These together accounted for about 41.90 per cent of the floricultural area in 1999-2000. Again marigold accounted for a major share in production with 25.85 per cent. But the jasmine, which was second in area became third in respect of production (17.91 per cent). The chrysanthemum accounted for 19.75 per cent the production, which was third in respect of area.

Table 3.6: Changes in Area and Production of Different Flowers in Karnataka

Area: in Lakh Ha. , Production: in tones

District	Area		Production		Area increase	Production increase	Percentage of area increase to total	Percentage of production increase to total
	Triennium ending 1982-83	Triennium ending 1999-2000	Triennium ending 1982-83	Triennium ending 1999-2000				
Rose	534	1,762	1,326	3,586	1,228	2,260	8.27	2.49
Chrysanthemum	1,137	3,157	6,195	23,493	2,019	17,297	13.61	19.08
Tube Rose	378	1,482	2,815	12,622	1,105	9,806	7.44	10.81
Aster	456	775	3,428	6,206	319	2,778	2.15	3.06
Jasmine	1,242	4,097	6,199	21,299	2,856	15,100	19.24	16.65
Crossandra	246	2,138	733	8,405	1,893	7,673	12.75	8.46
Marigold	815	4,261	6,108	30,748	3,446	24,640	23.22	27.17
Champaka	258	598	1,279	2,216	340	938	2.29	1.03
Others	38	1,676	189	10,374	1,638	10,185	11.04	11.23
Total	5,104	19,944	28,273	118,948	14,841	90676	100.00	100.00

It is worthwhile to examining the performance of individual flowers over a period of time. This is examined in terms of growth rates in area and production (**Table 3.7**). It is clear from the table that the flowers experienced a growth rate of 8.59 per cent in area and 10.24 per cent in production between 1980-81 and 1999-2000. This area increase was not only higher than the agricultural growth rate of 2.5 per cent but also higher than the horticultural crops growth rate of 3.96 per cent during the same period. Among the flowers, the other category of flowers registered higher growth rate both in area and production with 23.28 per cent in area and 24.18 per cent in production. If we consider the individual flowers, crossandra witnessed an annual growth rate of 12.93 per cent in area and 11.07 per cent in production. Marigold registered 9.63 per cent growth in area and 9.88 in production whereas, tuberose witnessed 8.50 per cent growth rate in area and 9 per cent growth rate in production. The aster and chrysanthemum experienced slower growth rate (**Table 3.7**). The crossandra registered a higher growth rate due to great

Table 3.7: Growth Rates of Flowers in Karnataka Between 1980-81 and 1999-2000

Name of the flower	Area		Production	
	Gr. Rate	T. Value	Gr. rate	T. value
Rose	7.49	36.95	6.82	13.23
Chrysanthemum	6.86	10.98	10.73	9.94
Tuberose	8.50	12.89	9.00	14.33
Aster	4.20	9.04	5.97	6.19
Jasmine	7.21	14.89	4.68	4.33
Crossandra	12.93	14.84	11.07	6.45
Marigold	9.63	16.90	9.88	16.97
Champaka	5.47	9.28	4.39	5.94
Others	23.28	9.10	24.18	10.05
Total	8.59	29.08	10.24	30.21

demand from women for adornment of their hair and also due to its sustenance for long life. The marigold also showed higher growth rate on account of thrust it received from the companies which were encouraging the contract farming to get their raw materials for manufacturing medicines and perfumes out of this flower.

Table 3.8: Proportion of Area under horticulture and Floriculture Crops in Karnataka

District	Floriculture Triennium 1997-2000 (Area in Ha.)	Horticulture Triennium 1997-2000 (Area in Ha.)	GCA 1998-99 (Area in Ha.)	Per cent of Floriculture in total horticulture area of the districts	Per cent of Floriculture in GCA of the districts	Share of Floriculture in state's total floriculture area	Share of horticulture in total GCA in the districts	Share of horticulture in state's total floriculture area
Belgaum	1,033	88,570	988,589	1.17	0.10	4.79	8.96	5.81
Bellary	792	41,625	658,056	1.90	0.12	3.67	6.33	2.73
Bidar	255	12,358	429,124	2.06	0.06	1.18	2.88	0.81
Bijapur	662	49,301	583,616	1.34	0.11	3.07	8.45	3.24
Bagalkot	389	16,304	1,420,149	2.39	0.03	1.80	1.15	1.07
Dharwad	781	134,013	433,105	0.58	0.18	3.62	30.94	8.80
Haveri	1,265	38,711	297,491	3.27	0.43	5.87	13.01	2.54
Gadag	647	24,960	873,104	2.59	0.07	3.00	2.86	1.64
Gulbarga	241	23,006	463,681	1.05	0.05	1.12	4.96	1.51
Raichur	190	16,562	644,274	1.15	0.03	0.88	2.57	1.09
Koppal	202	6,103	143,213	3.30	0.14	0.93	4.26	0.40
Northern Dry Region	6,456	451,513	6934402	20.80	0.09	29.94	6.51	29.64
Bangalore (U)	1,769	25,499	95,509	6.94	1.85	8.20	26.70	1.67
Bangalore (R)	1,738	77,490	323,152	2.24	0.54	8.06	23.98	5.09
Kolar	1,569	99,321	464,193	1.58	0.34	7.28	21.40	6.52
Chitradurga	869	112,269	481,150	0.77	0.18	4.03	23.33	7.37
Davanagere	855	37,818	321,685	2.26	0.27	3.96	11.76	2.48
Tumkur	650	110,643	446,237	0.59	0.15	3.01	24.79	7.26
Central Region	7,450	463,040	2131926	14.38	0.35	34.55	21.72	30.40
Mandya	1,119	50,577	486,268	2.21	0.23	5.19	10.40	3.32
Mysore	1,602	63,149	415,689	2.54	0.39	7.43	15.19	4.15
Chamarajanagar	1,022	18,377	248,134	5.56	0.41	4.74	7.41	1.21
Hassan	604	116,978	132,569	0.52	0.46	2.80	88.24	7.68
Southern Region	4,347	249,081	1282660	10.83	0.34	20.16	19.42	16.35
Uttar Kannada	405	33,445	536,289	1.21	0.08	1.88	6.24	2.20
Dashing Kannaada	495	106,634	131,832	0.46	0.38	2.30	80.89	7.00
Udupi	480.5	38,266	128,145	1.26	0.37	2.23	29.86	2.51
Chikkamagalur	791	86,097	189,505	0.92	0.42	3.67	45.43	5.65
Kodagu	201	26,112	463,385	0.77	0.04	0.93	5.64	1.71
Shimoga	939	69,185	485,073	1.36	0.19	4.35	14.26	4.54
Hills and Coastal Region	3,311.5	359,739	1934229	5.98	0.17	15.36	18.60	23.61
Total	21565	1,523,374	12283217	1.42	0.18	100.00	12.40	100.00

Source: Horticultural Crop Statistics of Karnataka at a Glance (Different Years), Directorate of Horticulture, and Government of Karnataka, Bangalore.

In terms of area under floriculture, only 0.18 per cent of the area was under floriculture in the state in the triennium ending 1999-2000. However, Bangalore Urban and rural, Mysore, Kolar and Dakshina Kannada districts were having higher proportion of area

than the state average. Similarly, these districts had concentration of larger share of floriculture area in the stated total floricultural area and higher proportion in the total horticultural crops of these districts (Table 3.8). The differential endowments, climate, demand and irrigation facilities were mainly responsible for variations in area under floriculture across different districts and regions.

It is widely understood that increase in per capita income, developmental levels and urbanization and irrigation facilities increase the demand and consumption of flower products. But the available data reveals mixed relationship in Karnataka. Bangalore Urban and Rural, Mysore, Shimoga and Bellary districts support this view. In these districts, the level of per capita income is high, urbanization is more than state average. Also, the irrigation facilities are better and the proportion of area under floriculture in the total horticultural crops is higher (Table 3.9). In other districts, the data do not support this view even though they possess these characteristics.

Table 3.9: Ranking Some Indicators of Economic Development

District	SDP 1999-00 Rank	Urban Population 1991 Rank	BPL 1993-94 Rank	Per cent of area irrigated 2000-01 Rank	% of horticulture to GCA 1999-00 Rank	% of Floriculture to GCA 1999-00 Rank	% of Floriculture to total Horticulture 1999-00 Rank
Belgum	10	11	11	4	15	16	14
Bellary	7	3	5	5	16	11	4
Bidar	20	12	1	18	18	18	6
Bijapur	12	8	12	13	17	17	8
Dharwad	14	2	2	17	11	12	15
Gulburga	18	7	4	16	20	20	11
Raichur	19	13	15	6	19	19	12
Northern Dry Zone							
Bangalore Urban	1	1	9	8	5	1	1
Bangalore Rural	8	14	8	14	7	2	3
Total							
Kolar	15	9	3	12	8	3	7
Chitradurga	16	10	7	15	12	10	13
Tumkur	17	15	6	11	13	15	18
Central Region							
Mandya	11	19	10	3	9	4	5
Mysore	9	4	13	7	14	5	2
Hassan	13	17	19	10	3	14	20
Southern Region							
Uttar Kannada	6	6	16	9	2	6	10
Dakshina Kannada	3	5	20	2	1	8	19
Chickmagalur	4	16	18	19	4	9	16
Kodagu	2	20	17	20	10	13	17
Shimoga	5	18	14	1	6	7	9

Note: U Kannada refers to Uttara Kannada and D Kannada refers to Dakshina Kannada.

3.5. Regional Distribution of Floricultural Crops

If we look at the concentration of flower crops in various districts in terms of area, production and productivity, it shows that Bangalore urban district was the top district specialized in the cultivation of flowers. This is reflected in higher share of area under modern floriculture as also in production and yield of these crops. Another interesting fact was that Dharwad district topped first in area of growing jasmine and chrysanthemum. But in production,

Table 3.10: Top Five Districts in Area of Different Flower Cultivation (Based on Triennium Averages 1997-2000)

(Area in Hectares)

	I Rank	II Rank	III Rank	IV Rank	V Rank	Total of Five districts	% in State total
Rose	Bangalore (U) 342	Bangalore(R) 286	Belgaum 152	Chickmagalur 150	Kolar 122	1052	59.67
Jasmine	Dharwad 606	Bellary 566	D Kannada 328	Chitradurga 327	Shimoga 254	2081	50.83
Chrysanthemum	Dharwad 560	Mandya 405	Kolar 363	Bangalore (U) 267	Chitradurga 205	1800	56.99
Tube Rose	Mysore 555	Bangalore(R) 283	Bangalore (U) 166	Dharwad 105	Chitradurga 81	1190	80.27
Aster	Bangalore (U) 180	Bangalore(R) 151	Belgaum 82	Chitradurga 80	Chickmagalur 64	557	70.02
Crossandra	Mysore 379	Dharwad 243	Chitradurga 233	Mandya 186	Kolar 169	1209	56.55
Marigold	Mysore 621	Bijapur 514	Kolar 437	Tumkur 429	Chitradurga 365	2366	55.52
Champaka	Mysore 104	Shimoga 84	Belgaum 56	Bangalore(R) 55	Bangalore (U) 54	353	58.96
Carnation	Bangalore (U) 34	-	-	-	-	34	100.00
Bird of Paradise	Bangalore (U) 17	Bangalore(R) 1	-	-	-	18	100.00
Anthurium	Kodagu 53	Bangalore (U) 11	U Kannada 0	Tumkur 0	Shimoga 0	65	96.52
Gerbera	Bangalore (U) 16	Kodagu 5	Chickmagalur 0	U Kannada 0	Tumkur 0	21	100.00
Gladiolus	Bangalore (U) 64	Kolar 27	Bangalore(R) 6	Kodagu 5	Chickmagalur 2	105	95.47
Hibiscus	Bangalore (U) 23	Kodagu 8	Bellary 6	Belgaum 1	Gulburga 1	39	98.32
Others	Mysore 206	Belgaum 164	Bangalore (U) 159	Shimoga 144	D Kannada 131	803	57.98
Total	Bangalore (U) 1769	Bangalore(R) 1738	Mysore 1602	Kolar 1569	Chitradurga 1439	8117	41.00

Note: U Kannada refers to Uttara Kannada and D Kannada refers to Dakshina Kannada.

Bellary and Mandya were found to be top districts in production. In several flower varieties, this trend continued. These differences emerged on account of differentials in the nature of soil, irrigation facilities, climate and cultivation practices prevailed in different districts (See, Table 3.10, Table 3.11 and Table 3.12).

Table 3.11: Top Five Districts in the Production of Various Flowers

(Based on Triennium Averages 1997-2000)

Production: in Tonnes

Flower	I Rank	II Rank	III Rank	IV Rank	V Rank	Total	% to State total
Rose	Bangalore (U)	Bangalore(R)	Belgaum	D Kannada	Chitradurga	2,332	65.00
	898	490	421	292	231		
Jasmine	Bellary	Chitradurga	Bangalore(R)	D Kannada	Bangalore (U)	14,123	66.30
	6,981	2,263	2,040	1,694	1,145		
Chrysanthemum	Mandya	Bangalore(R)	Bangalore (U)	Dharwad	Chitradurga	14,715	62.63
	3,842	3,154	3,143	2,352	2,224		
Tube Rose	Bangalore(R)	Mysore	Bangalore (U)	Chitradurga	Dharwad	11,176	88.53
	4,515	3,709	1,754	644	554		
Aster	Bangalore (U)	Bangalore(R)	Chitradurga	Belgaum	Dharwad	4,937	79.54
	1,807	1,407	653	638	432		
Crossandra	Chitradurga	Mysore	Bangalore(R)	Bangalore (U)	Mandya	5,284	62.86
	1,612	1,253	896	808	715		
Marigold	Mysore	Bijapur	Tumkur	Kolar	Chitradurga	16,767	54.53
	3,741	3,516	3,432	3,285	2,794		
Champaka	Bangalore (U)	Shimoga	Belgaum	U Kannada	D Kannada	1,563	70.45
	470	352	265	238	238		
Carnation	Bangalore (U)	-	-	-	-	340	100.00
	340	-	-	-	-		
Bird of Paradise	Bangalore (U)	Bangalore(R)	-	-	-	140	100.00
	140	1	-	-	-		
Anthurium	Bangalore (U)	Kodagu	-	-	-	157	100.00
	113	44	-	-	-		
Gerbera	Bangalore (U)	Kodagu	Chickmagalur	U Kannada	Tumkur	160	100.00
	157	3	-	-	-		
Gladiolus	Bangalore (U)	Kolar	Bangalore(R)	Kodagu	Belgaum	924	99.35
	809	71	38	4	3		
Hibiscus	Bangalore (U)	Bellary	Kodagu	Dharwad	Belgaum	244	99.73
	231	6	5	1	1		
Others	Bangalore (U)	Belgaum	Mysore	U Kannada	Shimoga	6184	73.61
	3,290	1,195	626	538	535		
Total	Bangalore (U)	Bangalore(R)	Mysore	Chitradurga	Mandya	63433	53.31
	17,521	14,956	11,201	10,964	8,791		

Note: U Kannada refers to Uttara Kannada and D Kannada refers to Dakshina Kannada.

Table 3.12: Top Five Districts in the Productivity of Different Flower Cultivation

(Based on Triennium Averages 1997-2000)

Flower	Productivity (in Tonnes/Hectare)					Average of 5 Districts
	I Rank	II Rank	III Rank	IV Rank	V Rank	
Rose	Chitradurga	Mandya	Belgaum	Bangalore (U)	U Kannada	3.34
	4.69	4.00	2.77	2.63	2.60	
Jasmine	Bellary	Bangalore(R)	Tumkur	Bangalore (U)	Chitradurga	8.46
	12.33	8.12	7.50	7.45	6.92	
Chrysanthemum	Bangalore(R)	Bangalore (U)	Chitradurga	U Kannada	Tumkur	11.74
	16.04	11.79	10.87	10.00	10.00	
Tuberose	Bangalore(R)	Mandya	Bangalore (U)	Bellary	Tumkur	10.86
	15.97	11.59	10.55	8.17	8.00	
Aster	Mysore	Mandya	Bangalore (U)	Bidar	Bangalore(R)	10.59
	13.29	10.17	10.04	10.00	9.34	
Crossandra	Bangalore (U)	Chitradurga	Bangalore(R)	Tumkur	Bidar	5.92
	7.08	6.93	5.35	5.34	4.88	
Marigold	Bangalore (U)	Mandya	U Kannada	Bellary	Tumkur	10.69
	14.37	14.37	8.50	8.22	8.00	
Champaka	Bangalore (U)	U Kannada	Belgaum	D Kannada	Mandya	5.47
	8.75	5.00	4.71	4.46	4.44	
Carnation	Bangalore (U)	-	-	-	-	10.00
	10.00	-	-	-	-	
Bird of Paradise	Bangalore (U)	Bangalore(R)	-	-	-	4.28
	8.06	0.50	-	-	-	
Anthurium	Bangalore (U)	Kodagu	-	-	-	5.42
	10.00	0.825	-	-	-	
Gerbera	Bangalore (U)	Chickmagalur	Kodagu	-	-	2.92
	10.00	1.00	0.67	-	-	
Gladiolus	Bangalore (U)	Bangalore(R)	Raichur	Belgaum	Kolar	5.37
	12.58	6.00	3.00	2.67	2.62	
Hibiscus	Bangalore (U)	Dharwad	Gulbarga	Bellary	Belgaum	2.84
	10.04	1.50	1.00	1.00	0.75	
Others	Bangalore (U)	Belgaum	Bangalore(R)	Chitradurga	Tumkur	8.93
	20.74	7.30	5.80	5.78	5.00	
Total	Bellary	Bangalore (U)	Bangalore(R)	Tumkur	Mandya	9.06
	10.68	9.91	8.60	8.27	7.86	

Note: U Kannada refers to Uttara Kannada and D Kannada refers to Dakshina Kannada.

3.6. Modern Floriculture

After liberalization, thrust was accorded to this sector and 170 modern floriculture units were established in the country. About 35 units accounting for 20.59 per cent of the country covering an area of 150 hectares with an investment of Rs.500 crores by private entrepreneurs, corporate houses, and big growers were started in Karnataka (GOK 2000:10). Most of these units are concentrated particularly around Bangalore, Kolar and Tumkur. Out of the 35 units located in Karnataka, 14 are located in one taluk, namely Doddaballapur taluk of Bangalore rural district. These 14 Units in total purchased about 250

hectares at the cost of 45,000 per hectare in 1996-98. But the operational area is about 3.21 hectares per unit. On an average, each unit purchased land from 12 farmers mostly belonging to SC/STs. The total Investment in these 14 units is in the range of Rs. 90-120 crores. But the actual average flower cultivated area is 3.21-hectare investing about Rs.3 crores per hectare. Besides these, another 50 cost-effective green houses (protective shade net) are located around Bangalore (Roses), Belgum (Carnation, Gerbera), Coorg (Anthurium), Chickmagalur (Anthurium) Dakshina Kannada and Uttar Kannada (Orchids) districts are cultivating modern flowers.

3.7. Flower Exports form Karnataka

The data on exports of states is very essential to understand the potentials of each state in exports of various agricultural products, industrial good and services. Unfortunately, such data are not available. This limits us in understanding the export performance of total exports and flowers in a particular state. However, an attempt has been made to know the performance of Karnataka flower exports in the state by making use of data collected from Visvesvarayya Industrial Trade Center (VITC), Bangalore, Horticulture Department and APEDA. One of the limiting factors of these sources is that there are wide variations in the export of flowers across sources (See Table 3.13). This may be either due to the fact of considering only rose exports or through exports made from Bangalore airport.

Table: 3.13: Export of Flowers from Karnataka

Year	India		Karnataka					
	Qty: MT	Rs. Crores	KAPPC		Qty MT	Rs Crores	VITC Rs Crores	GOK Rs Crores
			Qty: Million Stems	Rs. Crores				
1994-95	NA				8.11	0.15		0.60
1995-96	NA				132.74	1.32		NA
1996-97	NA	63.39			607.00	4.25	2.21	NA
1997-98	NA	77.50	NA	NA	NA	NA	10.20	NA
1998-99	NA	105.96	54	37.73	NA	NA	60.00	1.00
1999-2000	NA	90.63	58	40.66	NA	NA	80.00	NA
2000-01	NA	132.65		45.00	NA	NA	NA	NA

Note: 1996-97 to 1999-2000 figures relating to India and Karnataka are from VITU; 1998 -99 to 2000-2001 figures for Karnataka are from KAPPEC; 1994-95 to 1996-97 figures relating to India and Karnataka are From APEDA; 1994-95 and 1998-99 figures relating to Karnataka are from GOK.

Source: 1 Government of Karnataka. Visvesvaraya Industrial Trade Centre, Centre for Export Promotion, Bangalore
 2. Agricultural and Processed Food Products Export Development Authority, Bangalore Office,
 3. Government of Karnataka, Export Opportunities for Agro and Processed Products, Karnataka State Agricultural Produce Processing and Export Corporation Limited (A Government of Karnataka Enterprise)

A look at the export data of floriculture as per KAPPEC, shows that there has been consistent increase in flower exports from Karnataka. The value of exports increased from 37.73 crores in 1998-99 to 45 crores in 2000-2001 accounting for 34 per cent of the countries' total floricultural exports in 2000-2001. These are higher estimates compared to horticulture department data According to this source, the value of cut-flowers exports and other flower products exported from the state increased from Rs. 6 million in 1994-95 to Rs.10 million in 1999-2000 (GOK 2000:11). This accounts for nearly 75 per cent of the flower exports from the country. The rose export alone accounted for 90 per cent of the total exports. The rest constituted Carnations, Gerbera, Chrysanthemum, and Bird of Paradise etc. A large proportion of these products are exported to Amsterdam, Germany, Italy, UK, Australia, Japan, and Middle East (GOK 2000:11). The Mysore Mallige, Udupi Mallige and Mangalore Mallige are other products which are famous in the domestic market. A part of these has been exported not only to Mumbai, Chennai, and Kerala within the country but also to Dubai and America. The Variety J. grandiflorum oils, the concentrate of which is being exported to France, Italy and other European Countries. (GOK 2000:9).

As per as the prospects of exports are concerned the Agricultural Finance Corporation projection shows that 6 districts in the state of Karnataka have export potential in Floriculture. It is estimated that about 650 hectares is under the hi-tech floriculture with a Production of 3,249 tones of flowers in these districts in 1999. Among these districts, Bangalore district accounted for major share in area (45.08 per cent) and Production (44.93 per cent) **(Table 3.14)**

Table 3.14: Export of Cut flowers in Karnataka (Projection)

Districts	Area (Ha)	Exports (MT)	% to total area	% to total exports
Bangalore	293	1,460	45.08	44.94
Belgaum	77	383	11.85	11.79
Shimoga	97	489	14.92	15.05
Chickmagalur	78	391	12.00	12.03
D Kannada	59	295	9.08	9.08
Mysore	46	231	7.08	7.11
Total	650	3,249	100.00	100.00

Source: Development of Agricultural and Horticultural Exports from Karnataka
AFC, South Regional Office, Mumbai, September 1999.

3.8. Plan Allocations for the Development of Floriculture in Karnataka

Development of floriculture activities by horticulture department is although evident from the development of Lalbagh and Cubbon Park, the expenditure incurred on floriculture is lacking. This is perhaps due to the meagre amount spent on this sector. However, the things have improved over a period of time and the floriculture sector has been recognized as an important activity of horticulture and has started providing separate outlays and expenditure for this sector.

The government of India has introduced a scheme on commercial floriculture. Under this, the state government received allocations for floriculture development right from the Eighth Five Year Plan. The allocations and expenditure under this scheme since inception in the state is shown in **Table 3.15**. From 1993-94 to 1999-2000, the allocations to floriculture in the state accounted for Rs. 231.91 lakhs for area expansion and establishment of Model Floriculture Centre. The entire amount came from the centre till 2001 and thereafter the centre and the state shared the amount in the ratio of 90 per cent and 10 per cent. Against the total allocation Rs. 231.91 lakhs from 1993-94 to 1999-2000, only Rs.159.22 lakhs have been spent accounting for 68.66 per cent of the allocations. It is observed that in the case of physical achievements about Rs.3,040 lakh hectares of land have been covered under the area expansion programme as against the target of 3,662 lakh hectares which accounted for 83 .01 per cent of the target. Another interesting point is that the year-wise expenditure and physical achievement indicates that the targets were realized not even in a single year except in the year 1993-94, mostly in respect of expenditure (**Table 3.15**).

If we look at the budgetary allocations to floriculture, it is found inadequate and insignificant. The amount allocated to this sector right from 1997-98 to 2002-2003 was Rs. 392.78 lakhs accounting for just 11.63 per cent of the total horticultural outlay. Although this allocation was inadequate its proportion from year to year has been increasing. It was just 0.43 per cent in 1997-98 which increased to 8.02 per cent in 2001-2002 (**Table 3.16**). Out of the funds released by the centre, the State has opened a model floriculture centre and it is functioning well.

Table 3.15: Allocation and Expenditure on Central Sector Scheme for Commercial Floriculture in Karnataka

(Rs. Lakhs)

Year	Allocations Rs. Lakhs	Expenditure Rs. Lakhs	Target area in Hectares	Achievement area in Hectares	Expenditure as % of allocation	Achievement as % of target
1993-94	20.22	20.24	501	324	100.10	64.67
1994-95	39.8	8.52	301	300	21.41	99.67
1995-96	47.29	22.35	400	330	47.26	82.50
1996-97	25	10.33	900	630	41.32	70.00
1997-98	18	17.92	200	171	99.56	85.50
1998-99	54.6	54.3	910	875	99.45	96.15
1999-2000	27	25.56	450	410	94.67	91.11
Total	231.91	159.22	3,662	3,040	68.66	83.01

Source: Government of Karnataka (Reports of Various Years), Department of Karnataka, Planning Section, Lalbagh, Bangalore.

Table 3.16: Plan Allocation for Horticulture and Floriculture in Karnataka

(Rs. Lakhs)

Year	Horticulture		Floriculture		Share of Floriculture in Total Horticulture	
	Outlay	Expenditure	Outlay	Expenditure	Outlay	Expenditure
1997-98	4,514.66	4,257.16	19.5	17.92	0.43	0.42
1998-99	5,093.72	4,784.98	54.6	54.3	1.07	1.13
1999-2000	5,602.8	5,414.51	27	25.58	0.48	0.47
2000-01	4,512.11	2,258.33	73.33	49.41	1.63	2.19
2001-02	2,722.91	2,211.22	218.35	144.44	8.02	6.53
Total	22,446.2	18,926.2	392.78	291.65	11.63	10.75
2002-03	4530	NA	180	NA	3.97	NA

Source: Same as Previous Table.

3.9. WTO and Its Implications on Floriculture

There have been apprehensions that the floricultural activity in India and Karnataka is going to receive setbacks an account of the implementation of the provisions of prescriptions of WTO. According to one provision, the member countries have to implement the plant breed's right. If this is put into operation, it will affect the Indian floriculture growers. However, this threat will not become a reality in the short run because, India is importing the first red and grand gala varieties at present, which are in the maturity stage of the product cycle. Since these varieties are not the latest ones, there will not be any problem in acquiring these varieties without royalty payments. However, India has to amend the Patent Act 1970 in order to protect the native varieties. It is also attributed that the implementation of WTO provisions benefit the Indian floriculture. Firstly, India stands to gain from the removal of "Most Favoured Nation Status" of World

Trade Organisation (WTO) Prescription. Secondly, the export concession to this sector can benefit the industry. Because the subsidies at present have been put under green box condition (Non actionable subsidies). Lastly, there will not be any inflow of exotic flowers into the Indian market due to the removal of QRS. The market in India is not so attractive compared to Africa and Kenya growers who are the present competitors and their cost of cultivation is high compared to India. However, the Indian flowers may face rejection on account of non-compliance of quarantine restrictions, which are put by importing countries. In this regard, India has to give utmost care in using pests and fertilizers. It is also required to strengthen the post- harvest facilities and post-quarantine facilities at the storage and at airport to maintain freshness and quality.

CHAPTER IV

INFRASTRUCTURE FOR FLORICULTURE IN KARNATAKA

4.1. Introduction

Until 1990, there were no systematic efforts or policies to promote floriculture activity and its trade in India as well as in the state. Only a small proportion of flowers were exported and this was very meagre when compared to other small countries like Kenya and Columbia. Recently the Government realized its importance in the international market and has started grabbing the opportunity. In this direction, it has identified flowers as a thrust area along with horticulture and has started giving many facilities to develop and promote the activity for more exports.

4.2. Programmes for the Development of Floriculture in the State:

Several expert groups have identified Karnataka and particularly Bangalore, as the potential area for floricultural development. Having realised this, the Government of Karnataka initiated several measures for the overall development of floriculture. They have remained as milestones in the history of floriculture in recent years. The important among them are: The Agricultural Policy of Karnataka 1995, which has identified floriculture as the sunrise industry. The amendment of land reforms Act 1961 which provides that a non-agriculturist can purchase agricultural land upto 109 acres to take up flower cultivation (Ramakrishnappa 2001:29).

Karnataka Industrial Investment Corporation Ltd. (KSIIDC) has been accorded Industrial Status to Floriculture. Karnataka Industrial Area Development Board and (KIADB) and APEDA Have planned to set up an International Flower Auction Centre on the lines of Netherlands Alsmier International Floriculture Auction centre. The state also plans to set up the Karnataka Floriculture Development Board (KADB) to promote floriculture as the sunrise industry in Karnataka. A memorandum of understanding was signed by the state with APEDA for the creation of AEZ for floriculture development in the state.

NABARD is the other institution which refines extensively for the development of the flower sector. Apart from these, the state Government initiated several programmes.

These programmes related to area expansion programmes, creation of marketing infrastructure, assistance to growers, creation of demonstration centres demonstration centres, technology transfer centres, assistance to prevent post-harvest losses (assistance to cold storages), and export promotion. In addition, several central govt. agencies have played significant role in promoting floricultural crops. A brief note on some of these programmes is presented below.

4.3. Model Floriculture Centre (MFC)

Karnataka is one among the states in India to establish MFC in 1995 in an area of 9.132 acres at Nagarur village near Bangalore with the assistance of the Ministry of Agriculture, Government of India, under the centrally sponsored scheme for commercial floriculture. The Objectives of the centre is to serve as focal unit for the development of floriculture in the State. The following are the specific objectives:

- Demonstrate new technology of flower cultivation to the growers.
- Serve as a germplasm bank for conserving a wide diversity of flowers.
- Act as a planting material bank for area expansion and demonstration programmes on commercial flowers.
- Serve as a training-cum-demonstration centre for post-harvest handling and processing of commercial flowers.

In the above centre, about 500 sq.mts of green house was constructed with the technical and financial assistance from FAO during the VIII Plan to demonstrate adapted technology to the small farmers. It has also been proposed to establish a MFC in Pampavana in Koppal District during the Year 2002-2003 to promote floriculture in Northern Karnataka.

Seed multiplication of new and improved varieties of Chrysanthemum, Tuberose, Jasmine, Gladiolus, Golden Rod and Aster were undertaken and distributed to farmers in this MFC, Nagarur. From 1997-98 to 2000-2001, about 3.55 lakh plants and 292 kgs of seeds of various improved varieties were distributed to the farmers and expanded an area of 215 hectares under these flowers. Besides this, 405 small farmers were trained in greenhouse technology and commercial flower cultivation during the same period. Ten per cent women have been trained since inception (Ramakrishnappa 2001:30).

4.4. Assistance for the Construction of Greenhouse and Shade Net

The trained persons in the MFC have been provided financial assistance to the tune of Rs. lakh (40 per cent of the cost) for the construction of 500 sq.mts cost-effective greenhouse costing Rs.2.5 lakhs, and Rs. 0.50 lakh for the construction of shade net pendal in 500 sq.mts. The objective of this is to produce export quality of flower under protective conditions. A few farmers benefited under these programmes and their farms, serving as demonstration centres for other farmers to follow. The total amount of subsidy distributed to these farmers accounted for 34.546 lakhs for the construction of green hose covering an area of 91,837 sq.mts from 1997-98 to 2000-2001. In addition to the above, the farmers were provided quality-planting material of different flowers under various developmental programmes of the horticulture department.

4.5. Commercial Tissue Culture Laboratory

A laboratory was established at Hulimavu near Bangalore. The objective of the lab was to develop disease-free planting material on a large scale for distribution to the farmers. The multiplication of flowers such as Callalily, Chrysanthemum, Coleus, Areca Lutens, Potted Chrysanthemum, Dracaena, Angilonia, Gerbera, Bird of Paradise, Lantana and Durantha have been developed here. In addition to this, the state has established several indoor nurseries to distribute quality-planting material of flower crops of ornamentals and foliage. There are also 10 commercial tissue culture laboratories producing more than 30 million plants and flower crops.

4.6. Model Floriculture Village:

The Karnataka state is the first one in the country to introduce the concept of Model Floriculture Village. Under this programme, two villages were identified, one near Bangalore and another near Belgaum for demonstrating new varieties of flowers developed by the Indian Institute of Horticultural Research, Bangalore. Several interaction classes between the farming community and scientists were organized in these villages to transfer the improved technology. The impact of this can be witnessed in and around these villages in area expansion under the new varieties (GOK 2000:14).

4.7. Assistance to Growers' Associations

There has been a wide-spread menace of middlemen and commission agents in the traditional flower business. This is hampering the profits of the small and marginal farmers who are mainly growing these varieties. In order to solve this problem, the government is encouraging the forming of the Flower Growers' associations and cooperatives by extending financial support to the registered associations, which are engaged in production, processing and marketing the flowers. The financial assistance, to the extent of 40 per cent of the cost, limited to Rs. 5 lakhs is being provided to such societies for the creation of post- harvest infrastructure facilities for collection and grading, processing and marketing of flowers.

4.8. Marketing Schemes

Having seen the menace of middlemen and frequent fluctuations in prices due to demand and supply conditions, a few organizations came into existence to help the farmers to overcome these problems. The organizations such as APEDA, NHB, NABARD and KAIC are prominent among them.

4.9. Cargo Centre at Bangalore Airport

After 1990, Karnataka made remarkable progress in hi-tech floriculture and its exports. Having realized the exporters' difficulties at airport due to lack of facilities, a Cargo Centre for perishable commodities like flowers, vegetables and fruits was established at Bangalore Airport in 1998. This is the second unit in the country after New Delhi. Agricultural and Processed Food Products Export Development Authority (APEDA) jointly started this unit and Karnataka owned Mysore Sales International Ltd. (MSIL) at a cost of Rs. 2.5 crores in an area of 4,200 sq. ft. developed a receiving area of 1,000 sq.ft. A cold storage unit of 250 tonnes capacity was established in this center to store the flowers before loading the aircraft. This, cold storage is a boon to growers of perishables particularly the flowers in reducing spoilages, besides maintaining the cold chain right from the point where the flowers are grown to foreign auction centres.

4.10. Floriculture Auction Centre

Karnataka Agro-Industries Corporation Limited (KAIC), with a view to providing domestic market for high-tech flowers, established a permanent auction house for flowers in its premises in October 15, 1995, in association with the South India Floriculturists Association (SIFA) and Karnataka Flower Growers' Marketing and Processing Co-operative Society. The basic objective of the centre is to promote high-tech flowers, maintaining transparency in operation and facilitating direct link between the buyers and sellers. This is the only auction centre in India and South East Asia as well. Initially, the centre was functioning for 3 days in a week. Now, it is functioning in all days of the year. The buyers from Delhi, Kolkatta and Gawhathi are coming here to buy the flowers. The export surpluses and flowers rejected for exports and seconds are auctioned here. The centre deals in roses, carnations, gerbera, anthurium, orchids and other cut flowers. During the peak season between October-February, the extent of quantity auctioned in the centre is around 50,000 flowers per day with a realization of over Rs. 75,000 per day and 20,000 flowers with Rs. 20,000 realisation per day in slack (off-season). The base price for all the flowers is fixed by the SIFA. The base price for different varieties would be fixed by SIFA.

About 70 growers of whom 38 are high flower cultivators and 50 buyers have registered in the centre. The auction system followed is on the lines of Dutch system (high to low) with confidential reserve price. Growers or supplier quotes the reserve price to the auction officer only. This is done to avoid delay in auction process. The auction is done with the help of digital display board for displaying rate per stem, batch No, bidder ID. Number etc. The buyer can press a button to initiate his interest in buying the flower at particular price, which will be coming down at a fixed interval and value. The auction is done batch- wise. Before putting the flowers to auction, the quantity is checked. It is mandatory for the buyer to pay the bid amount immediately after the auction and before taking delivery of the flowers. The growers' accounts are settled on a weekly basis after deducting 5 per cent commission. This auction centre provides cold storage facility free of cost. For further development of marketing of flowers, the KAIC in association with APEDA, has drawn up an International Flower auction centre in Bangalore.

The quantities and value of flowers auctioned in the KAIC Auction Centre are presented in Table 4.1.

Table 4.1: Flowers Handled by KAIC Flower Auction Centre

Year	Auctioned quantity In lakh numbers	Value Rs. Lakhs	Exports quantity In lakh numbers	Value Rs. Lakhs	Domestic market, Sales Quantity In lakh numbers	Value Rs. Lakhs	Total Quantity In lakh numbers	Value Rs. Lakhs
1996-97	17.17	31.06	-	-	-	-	17.17	31.06
1997-98	11.48	19.63	1.4	8.5	0.11	0.19	12.99	28.32
1998-99	43.24	78.29	-	-	0.09	0.39	43.33	78.68
1999-2000	69.95	204.77	-	-	-	-	69.95	204.77
2001-02	92.39	270.71	-	-	-	-	92.16	270.71

Note: 1. The KAIC is dealing only with Modern Flowers. 2. Export value includes the cost and freight Charges.

The quantity of flowers auctioned in the centre increased from 17.17 lakh stems in 1996-97 to 92.30 lakh stems items in 2000-2001. During the same period, the value of flowers increased from Rs. 31.06 lakhs to 270.71 lakhs, a whopping annual growth rate of 771.57 per cent. From these trends, three things become clear: (i) it shows the fast growing domestic market, (ii) higher per unit of realization, and (iii) the overall recession in the international market.

The entire quantity handled by the KAIC was cut-flower brought by growers of Karnataka except 5 per cent arrivals from Andhra Pradesh and Madhya Pradesh, Maharashtra, Nasik and Tamil Nadu. A major proportion of the quantity handled in the auction centre were cut-roses constituting 65 to 75 per cent, carnation 10 per cent, gladiolus 10 per cent, and the rest comprising of jerbera, bird of paradise, anthurium, archids, tuberose, lilies.

The floriculture wing of the KAIC is also facilitating the promotion of High Tech Floriculture in the state by way of export of flowers and importing pesticides and plant protection equipments and supplying to the growers and providing consultancy services to the floricultural units in the construction of Polly-houses. The farmers and the buyers are happy with the centre although the farmers are paying 5 per cent as commission charges.

4.11. South India Floriculture Association (SIFA)

SIFA is based in Bangalore. About 36 exporters are members of this body. Of this, 28 are involved in the pursuit of floriculture in an area of more than 100 hectares. Their organisation is facilitating the growers in marketing their cut-flowers and roses by arranging chartered flights, with the support of APEDA and the Ministry of Agriculture for export of flowers to different destinations. Recently, it arranged two chartered flights belonging to Bridge-way Shopping and Flight Services by paying Rs. 30 lakhs to each. About 30 tonnes of flowers, consisting of one million stems of Roses, were exported in these flights to Holland, USA, Japan, Singapore and Australia for meeting the requirements of Valentine's Day Celebrations on February 14, 2000. SIFA is also helping largely the growers in fixing the base price in the auction markets located in KAIC premises.

Apart from these agencies other financial institutions and horticulture department and DICs are showing keen interest in the promotion of this sector

CHAPTER V

MARKETTING OF FLOWERS IN BANGALORE CITY

5.1. Introduction

It is well-established fact that a large volume of flower trade is confined to major cities. In India, this trade is concentrated in five major cities, viz., Calcutta, Mumbai, Chennai, Delhi and Bangalore. In this Chapter, the volume and Value of flowers traded in Bangalore is analysed. This enables us to understand the trends in the arrivals of various loose and cut-flowers in different months. This chapter also analyses the growth of different flowers. Apart from these, it highlights the number of people engaged in trading flowers in this market. To analyse these features the National Horticulture Board data on market arrivals in Bangalore from 1995 to 2001 have been used. Flowers auctioned in KAIC Flowers Auction Centre and secondary data have been obtained. This data have been supplemented by field observations.

The marketing of flowers is taking place throughout the state. These markets in the past were predominantly ruled by the traditional flowers. Today, they are also absorbing the modern cut-flowers. However, the concentration of trade is found in towns and cities. According to one estimate, nearly 60 per cent of the total flower trade in the state is concentrated in KR Market, Yeswanthapur and Sivajinagara in Bangalore City (Chaudhary 2000:10). The rest of the flower trade is taking place in other big cities such as Hubli-Dharwad, Mysore and other district headquarters.

The marketing of traditional flowers is carried out mainly through three channels: They are: 1. Producer-Commission Agent-Wholesaler-Retailer-Consumer, 2. Producer-Pre-harvest Contractor-Commission Agent-Wholesaler-Retailer-Consumer, and 3. Produce-Commission Agent at Primary Wholesale Market-Commission Agent at Secondary Wholesaler to Retailer-Consumer. The first two are operated in the state. The Third channel applies to the flowers produced outside the state but marketed within the state.

It is estimated that 2.5 lakh retailers and flower vendors were engaged in flower trade Bangalore City (GOK 2000: 9). Most of these were involved in door-to-door selling. Another estimate show that the retail stalls (Big and Small) alone accounted for Rs. 40,000 per day (Chaudhary 2000:12). The small vendor earned between Rs.3,000-4,000 and big vendor between Rs.20, 000-40,000 a day. But, Singh's study (1999) shows that there were only 195 wholesalers and 600 retailers in Bangalore City compared to the figures mentioned above. Besides these, there are 850 florist shops dealing with modern flowers against 20 shops a few years ago (Cavale 2002).

A recent visit to KR flower market has revealed that about 100-150 Traders-cum- commission agents were operating flower trade as against 50-60 in 1960. These wren acting as selling agents for the farmers and collected 10-12 per cent as commission. The flowers mainly traded here comprised of loose flowers such as Chrysanthemum, Marigold, Crossandra, and Roses etc. The rest of the varieties did not arrive in this market as the producers themselves sold them outside the market early in the morning by keeping them on footpath. To carry out business here the producer has to bribe the police and the corporation sweepers to the extent of Rs.10 per day.

5.2. Karnataka Agro-industries Corporation (KAIC) Flower Auction Centre

KAIC flower auction center is the only organized market in the country. It handles only modern flowers. The transactions here are more transparent. More than this, it ensures regular payment to the growers. The volume of trade handled in the centre has increased by leaps and bounds from the date of its operation in October 15 1995. It is seen that the volume of flowers auctioned in the centre increased from 17.17 lakh stems in 1996-97 to 92.39 lack stems in 1999-2000 with an increase of 438.08 per cent. During the same period the value of the flowers increased from Rs.31.06 lakhs to Rs. 270.71 lakhs with an increase of 771.57 per cent (**Table 5.1**). Despite this increase, these transactions just accounted for 5 per cent of the total floricultural trade in the City.

Table 5.1: Flowers Auctioned in KAIC During the Year 1999-2000

Flower	Average price/kg.	Arrivals No of stems	Total revenue (in Rs.)
Rose	1.71	6,983,703	11,950,935
Gerbera	3.61	18,661	67,414
Limonium	13.98	18,543	259,246.5
Carnation	4.33	351,953	1,524,109
Bird of Paradise	10.76	22,248	239,459
Gladiolus	4.00	112,442	449,878
Tuberose	1.26	31,641	39,759
Anthurium	11.36	17,046	193,559
Statice	4.45	48,300	214,905
Gysophilla	4.68	7,520	35,188
Chrysanthemum	3.60	10,236	36,818
Others*	8.43	6,014	50,690
Total	72.17	7,628,307	15,061,960.5

Note: *Others Include Lilies, Aster, Cilosia, Wax flower, Hiliconia, liatric and Asparagus.

Bulk of the flowers auctioned in the centre is modern cut-flowers grown under green/ poly-houses. Rose accounts for major proportion of the total trade. It accounted for 92 per cent in quantity and 79.45 per cent in value in 1999-2000. This was followed by other cut-flowers such as carnation 4.62 per cent in quantity and 10.13 per cent in value and gladiolus 1.48 per cent and 2.99 per cent respectively. Several other cut-flowers such as gerbera, bird of paradise, lilies, and tuberose, orchids and anthuriums are auctioned here. Although bulk of the arrivals to the centre is from Bangalore, some quantity is arriving from Coorg, Udipi, Mangalore, Koppa, Ooty, Trivendrum, Pune and Hyderabad (Table 5.2).

Table 5.2: Flowers Handled by KAIC Flower Auction Centre

QtyL: Lakh Stems, Rs. Lakhs

Year	Quantity traded	Value	Exports Quantity	Value	Domestic market sales Quantity	Value	Total Quantity	Value Rs. Lakhs
1996-97	17.17	31.06	-	-	-	-	17.17	31.06
1997-98	11.48	19.63	1.4	8.5	0.11	0.19	12.99	28.32

1998-99	43.24	78.29	-	-	0.09	0.39	43.33	78.68
1999-2000	69.95	204.77	-	-	-	-	69.95	204.77
2001-02	92.39	270.71	-	-	-	-	92.16	270.71

Note: 1. KAIC is dealing with only Modern Flowers. 2. Export Value includes the cost and freight Charges.

About 70 lakh stems worth Rs.204.77 lakhs arrived in to this market in 1999-2000. Bulk of this has been arrived in the month of December (16.25 Per cent), September (12.77 per cent), November (11.78 Per cent) and February (13.32 Per cent). The main reason for this bulk arrival was due to festivals in these months. In terms of value, these months accounted for a major share in December it accounted for 22.35 per cent, February, 12.69 per cent and November, 12.63 per cent. The green houses roses sold between Rs.5-7 on some occasions and on Valentine day they would be sold at Rs.15-20 per stem. In other seasons it would be around Rs. 2-3 per stem. The prices also depended on colour variety etc. In other words, a major proportion of turnover was February (19.81 per cent). The turnover started increasing from September, and peaked in February and slowed down afterwards (**Table 5.3**).

Table 5.3: Month-wise Turnover of Flower Auction at KAIC

(Rs. in Lakhs)

Month	1997-98		1998-99		1999-2000	
		%		%	% to	
April	0.71	3.62	1.28	4.63	5.34	2.61
May	1.12	5.71	1.49	2.43	6.79	3.32
June	0.88	4.48	1.13	1.44	5.42	2.65
July	0.72	3.66	1.18	1.51	10.1	4.93
August	1.61	8.20	3.15	4.02	12.69	6.20
September	1.7	8.66	5.73	7.32	14.95	7.30
October	1.7	8.66	5.1	6.51	14.92	7.29
November	2.13	10.85	7.39	9.44	19.32	9.43
December	3.04	15.49	16.43	20.99	28.5	13.92
January	2.4	12.23	12.6	16.09	29.06	14.19
February	2.36	12.02	16.06	20.51	40.56	19.81
March	1.26	6.42	6.75	8.62	17.12	8.36
Total	19.63	100	78.29	100	204.77	100

Source: KAIC Pamphlet on Floriculture.

5.3. Krishna Rajendra Market (K.R. Market)

Besides this organized market, the trade with stalk is taking place at KRS Market. The volume and value of trade of these flowers in 1999 for which the NHB data was available indicates that about 6,314 MT of flowers arrived into the market valued at Rs. 4,846 lakhs. Bulk of this was accounted for roses. This category alone constituted 33.96 per cent of the total quantity and 76.80 per cent of the value. This was followed by gladiolus and aster. Most of these flowers were sold in pieces, dozens (12 stems) and bundles (80-100 stems).

The loose or picked flowers are an important component of total flower trade in Bangalore market. The volume of trade of this category was about 5291 tonnes accounting for 0.49 per cent of the production in the state valued at Rs. 1,750 lakhs in 1995. This went up to 12,257 tonnes accounting for 6.27 per cent of the state production valued at Rs.5,830.7 lakhs with an increase of 56.83 per cent in quantity and 70 per cent in value **(Table 5.4)**. . The volume of flowers in the market at Bangalore increased more due to demand from various segments in the City. This demand was higher compared to other countries like Kenya, South Africa and Zimbabwe, which did not have much domestic market.

A bulk of the loose flowers arrival into the KR Market was noticed in September (9.45 per cent) followed by December (9.62 per cent), August (9.39 per cent) and January (9.04 per cent) in 2001 **(Table 5.5)**. Among the varieties arrived in 2001, crossandra accounted for 16.76 per cent followed by chrysanthemum 9.80 per cent in 2001 whereas, marigold was highest with 13.91 per cent in 1995 declined to 8.48 per cent in 2001 **(Table 5.4)**.

It is also observed that the season for the sale of cut-flowers sales begin in August-September and peaks up during December and February and starts declining after May. Between October and February, nearly 60 to 70 per cent of the cut-flowers transactions take place in Bangalore and the rest of the trade takes place in other markets in Mysore, Hubli, Dharwad and other places **(Table 5.5)**.

Table 5.4: Market Arrivals and Price Realisation of Traditional (Picked Loose) Flowers in Bangalore

(Revenue: Rs. Lakhs) Arrival: MT

Crop	1995			1996			1997			1998			1999			2000			2001		
	Arrival	Average price (per kg)	Total revenue	Arrival	Average price (per kg)	Total revenue	Arrival	Average price (per kg)	Total revenue	Arrival	Average price (per kg)	Total revenue	Arrival	Average price (per kg)	Total Revenue	Arrival	Average price (per kg)	Total revenue	Arrival (in kg.)	Average price (per kg)	Total revenue
Marigold	736	7.7	56.67	716	9	64.4	846	9.66	81.7	816	10.5	85.7	847	8.58	72.7	971	11.35	110	1041	9.33	971.1
African Marigold	364	3.4	12.37	266	9.1	24.2	313	7.52	23.5	429	9.4	40.3	353	8	28.2	351	11.87	41.7	208	9.87	20.55
Chrysanthemum	643	12.5	80.38	509	12.4	63.1	652	21	137	893	17.4	155	1077	16.5	178	1,021	21.33	218	1,201	21.79	261.7
Aster	703	11.5	80.85	546	12.5	68.3	541	14.8	80.1	658	19.2	126	822	12.16	113	766	22.58	173	1,164	15.33	178.4
Kakada	502	48	241	544	52.25	284	824	45.3	373	947	48.5	459	891	45.54	406	901	51.33	462	938	51.16	479.9
Tuberose	544	19.8	107.7	445	22.3	99.2	620	19.3	120	637	19.25	123	699	21.41	150	821.5	51.77	425	800	51.47	411.8
Jasmine	563	63	354.7	730	64.4	470	894	61.7	552	938	85.5	840	808	90.5	731	1260	90.66	1,142	1,219	85.91	1,047
Crossandra	686	87.4	599.6	630	115	725	986	100.8	994	1,198	112.8	1,351	1,157	98.83	1,143	700	105.75	740	1,130	106.86	1208
Rose	550	39.5	217.3	699	57.3	401	140	70.2	941	178	73	1,302	1,625	49.87	810	2,557	36.83	942	2,054	25.5	523.8
Gladiolus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	832	32.25	268	1,075	30	322.5
Carnation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	527	26.87	142	770	28.41	218.8
Gerbera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	436	28.93	126	650	28.66	186.3
Orchid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3	12.66	0.16
Lilium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	19.5	0.4
Anthurium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	13.83	0.55
Total	5,291		1,750	5,085		2,199	5,816		3,301	6,694		4,483	8,279		3,632	11,144		4,791	12,257		5,831

Source: National Horticulture Board Monthly Bullet

Table 5.5: Triennium Averages of Market Arrivals of Loose Flowers

Month	Growth rate	Triennium 1995-97 (MT)	Triennium 1999-01 (MT)	Per cent total 1995-97	Per cent to total 1999-01
January	13.97	538.67	962.00	9.28	9.04
February	13.31	480.67	791.33	8.28	7.44
March	18.53	446.33	859.00	7.69	8.07
April	22.62	297.00	677.33	5.12	6.37
May	24.62	379.33	886.33	6.54	8.33
June	13.43	440.00	774.33	7.58	7.28
July	14.72	520.67	933.67	8.97	8.78
August	14.92	558.67	999.33	9.63	9.39
September	14.46	596.00	1,008.33	10.27	9.48
October	17.01	528.00	916.60	9.10	8.61
November	16.07	482.00	825.23	8.31	7.76
December	19.88	536.00	1,006.97	9.24	9.46
Total	16.54	5,803.33	10,640.47	100.00	100.00

Source: Same as Previous Table.

Table 5.6: Peak and Slack Seasons for Different Flowers

SL.No	Name of the flower	Peak season	Slack season
1	Jasmine /Kakada	August, September and November.	May and July
2	Marigold	January to March	May to June
3	Tuberose	August to September and November	May to June
4	Chrysanthemum	August to December	March to April
5	Crossandra	August, September and November	January to October

5.4. Growth Rates

The growth rate on arrival, average price, and total revenue recorded 17.19 per cent, 8.66 per cent and 20.68 per cent respectively between 1995 and 2001 (**Table 5.7**). Among the flowers, rose registered the highest growth rate on arrivals with 37.90 per cent whereas, the tuberose witnessed highest the growth rate on an average price per kg with 18.08 per cent. In contrast to this, marigold witnessed the highest growth rate in total

revenue between 1995 and 2001. The African marigold recorded negative growth rate on arrival and average price in roses whereas, all other flowers showed positive growth on arrivals, average price and total revenue.

Although the flowers arrived in all months, only a few months experienced highest growth rates. It is seen that the highest growth rate on arrival was noticed in May with 24.62 per cent followed by 22.62 per cent in April and December 19.88 per cent between 1995-2001 (see Table 5.5). And least growth rate was experienced in February 13.31 per cent and January 13.97 per cent.

Table 5.7: Compound Growth Rates of Market Arrivals of Various Flowers Between 1995 and 2001

Flower	Arrivals	Arrival Price	Total Revenue
Marigold	6.07	3.35	40.29
African Marigold	-3.52	14.50	10.47
Chrysanthemum	14.41	9.38	25.14
Aster	9.76	6.82	17.78
Kakada	11.16	0.58	11.80
Tuberose	9.35	18.08	29.13
Jasmine	12.54	7.39	20.86
Crossandra	6.90	1.50	8.50
Rose	37.90	-8.67	16.19
Total	17.19	8.66	20.68

According to one-estimate city residents nearly buy 1 million cut-flowers every day. This comprise of roses, chrysanthemum, anthurium and orchids and liliams (Anonymous 2004:14).

On the whole, there is a flourishing flower trade in KR Market. The volume of trade comprise cut-flowers grown under protective conditions have been marketed in organized auction centre and near KR Market, and loose /picked flowers are marketed in KR Market which is accounted for 60 per cent of the state trade of flowers, The proportion of loose

flowers traded in Bangalore in terms of value alone accounted for about 56 per cent for flowers sold in KR Market and, flowers with stems accounted for 2.26 per cent and 41.83 per cent at KR Market. Of the total trade in Bangalore, the loose flower accounted for 56 per cent and cut-flowers accounted for 44 per cent. A proportion of this trade also went outside Bangalore.

CHAPTER VI

SOCIO-ECONOMIC PROFILE OF THE SAMPLE GROWERS

6.1. Introduction

This chapter deals with the socio-economic characteristics of the sample flower growers. These characteristics influence the taking up of the most perishable product activity namely floriculture. This chapter also discusses the various characteristics of family size, asset position, livestock, land use pattern, cropping pattern, etc.

6.2. Demographic Features of Sample Growers

The demographic feature of the household reveals that there were 370 members in the 56 households of selected flower sample growers, which worked out to 6.60 persons per family. The adult population accounted for 68 per cent. The interesting fact is that the male adults and female adults were also almost equal. Similarly, the male and female children below 14 years of age were equal. However, across two taluks, the male adult population was higher than the female adult population. The workers were 59.76 per cent of the household population. The proportion of child workers was very negligible (**Table 6.1**).

Table 6.1: Average Family Size and Workforce of the Sample Growers

		Bangalore North Taluk	Bangalore East Taluk	Total
(i)	Family size	6.39	6.81	6.60
(ii)	Number of adult males	2.50	3.00	2.25
(iii)	Number of adult females	2.25	2.31	2.28
(iv)	Number of male children	0.82	0.75	0.78
(v)	Number of female children	0.82	0.68	0.75
(vi)	Workers	3.61	4.29	3.95
(vii)	Adult males	2.04	2.61	2.32
(viii)	Adult females	1.36	1.60	1.48
(ix)	Male children	0.11	1.60	0.05
(x)	Female children	0.11	0.07	0.08

6.3. Caste Background of Sample Growers

The caste background of the sample growers has been presented in **Table 6.2**. The Table reveals that out of total sample growers more than 42 per cent belonged to the Vokkaliga community. This was followed by Kuruba, Tigala and Golla caste. Each caste accounted for 12.50 per cent of sample growers. The Tigala caste who were traditional floriculturists are now not engaged very much in the sector. Across two taluks, the Vokkaliga caste and Kuruba caste households were largely engaged in floriculture. Another interesting fact is that even the SC caste members were also engaged in Floriculture in Bangalore East taluk. This perhaps, they might have realized the profitability of the floriculture and their living in the proximity of city.

Table 6.2: Percentage Distribution of Household by Caste

Sl. No.	Caste	Bangalore North Taluk		Bangalore East Taluk		Total	
		No of households	%	No. of households	%	No. of households	%
1	Vokkaliga	17	60.71	7	25.00	24	42.86
2	Baliya/Lingayath	1	3.57	3	10.71	4	7.14
3	Kuruba	6	21.43	1	3.57	7	12.50
4	Tigala	6	21.43	1	3.57	7	12.50
5	Golla	0	0	7	25.00	7	12.50
6	S.C.	0	0	4	14.29	4	7.14
7	Dhobi	0	0	1	3.57	1	1.78
8	Christian	2	7.14	0	0	2	3.57
Total		28	100	28	100	56	100

6.4. Land Holding Details of the Sample Growers

Land is the most important asset for the farming community. This determines the level of well-being of the family. In this context, it is worthwhile to examine the land hold

particulars of the selected growers. **Table-6.3** presents the land holdings of the growers in the study area in 2001-2002. It is observed that the average size of operational holding was accounted for 1.43 hectares. Across farm categories, the medium-farming group owned operational holding with 1.06 hectares. However, the average size of holdings in case of medium farmer's land was 5.06 hectares in Bangalore East compared to Bangalore North with 4.86 hectares. It is surprising to note that not a single household was possessing more than 10 hectare. This is quite natural around urban areas as many farmers dispose surplus land due to higher prices.

The proposition of irrigated area is 58.09 per cent of the total land owned by sample farmers. It worked out to be 0.83 hectares per household (**Table-6.3**). The interesting fact is that the small and medium farmers had higher proportion of irrigation land compared to semi-medium farmers in both the sampled districts. The area shown more than once is 31.89 hectare accounting for 38.39 per cent of the land owned. Here again, the area sown more than once was more in the case of small and semi medium farmers than the medium farmers,

The cropping intensity across the different size class farmers was total ranging between 119.97 per cent in the case of semi medium farmers to 155.33 per cent in the case of small farmers. In both the sampled taluks, the cropping intensity was found to be 141.13 per cent (**Table-6.3**).

Table 6.3: Land Holding Particulars of the Sample Growers During 2001-02

Particulars of land use	Bangalore North				Bangalore East				(Area in Hectares) Grand total			
	Small	Semi medium	Medium	Total	Small	Semi medium	Medium	Total	Small	Semi medium	Medium	Total
Total land	23.44	13.35	4.86	41.65	24.41	6.88	10.12	41.41	47.85	20.23	14.98	83.06
Irrigated land	16.96	5.65	0	22.61	15.93	2.83	6.88	25.64	32.89	8.48	6.88	48.25
Irrigated land as % total land	72.35	42.32	0.00	54.29	65.26	41.13	67.98	61.92	68.74	41.92	45.93	58.09
Average land	1.07	2.67	4.86	1.49	1.06	2.29	5.06	1.48	1.06	2.53	4.99	1.43
Avg. irrigated land	0.77	1.13	0.00	0.81	0.69	0.94	3.44	0.92	0.73	1.06	2.29	0.83
Net cropped area	22.62	13.35	1.62	37.59	22.6	6.88	10.12	39.6	45.22	20.23	11.74	77.19
Area sown more than once	12.92	2.83	0	15.75	12.1	1.21	2.83	16.14	25.02	4.04	2.83	31.89
Gross cropped area	35.54	16.18	1.62	53.34	34.7	8.09	12.95	55.74	70.24	24.27	14.57	109.08
Cropping intensity	157.12	121.20	100.00	141.90	153.54	117.59	127.96	140.76	155.33	119.97	124.11	141.31

6.5. Sources of Irrigation

Almost all households are using bore wells for irrigating the floriculture crop. Only 2 households are using open wells and another household is using tank water for irrigating the crop.

6.6. Cropping Pattern - 2001-2002

The data on major category of crops grown by the sample farmers has been presented in **Table-6.4**. It is found that next to food crops, the flowers were the major crop grown by the sample growers. Most of these crops were perennial crops in nature (**Table-6.4**). During Kharif season, the food crops and vegetables dominated the cropping pattern. However, to some extent, the flowers, particularly the marigold and chrysanthemum, were grown in both Rabi and Karif season. The rest of the crops, particularly the fruit crops and other flowers were grown as Perennial crops.

Table 6.4: Season-Wise Cropping Pattern During 2001-2002

Crops	Bangalore North Taluk				Bangalore East Taluk				Total			
	Kharif	Rabi	Summer	Total	Kharif	Rabi	Summer	Total	Kharif	Rabi	Summer	Total
Flowers	7.73 (22.00)	0.00 (0.00)	2.27 (51.95)	10.00 (23.41)	11.23 (30.43)	0.00 (0.00)	0.00 (0.00)	11.23 (26.16)	18.96 (26.32)	0.00 (0.00)	2.27 (25.25)	21.23 (24.79)
Vegetable	2.86 (8.14)	1.00 (31.15)	1.70 (38.90)	5.56 (13.02)	6.40 (17.34)	1.40 (100.00)	0.80 (17.32)	8.60 (20.03)	9.26 (12.85)	2.40 (52.06)	2.50 (27.81)	14.16 (16.53)
Fruits	10.62 (30.23)	0.00 (0.00)	0.00 (0.00)	10.62 (24.87)	9.52 (25.79)	0.00 (0.00)	0.00 (0.00)	9.52 (22.18)	20.14 (27.96)	0.00 (0.00)	0.00 (0.00)	20.14 (23.52)
Food Crops	13.92 (39.62)	2.21 (68.85)	0.40 (9.15)	16.53 (38.70)	9.76 (26.44)	0.00 (0.00)	3.82 (82.68)	13.58 (31.63)	23.68 (32.87)	2.21 (47.94)	4.22 (46.94)	30.11 (35.16)
Total	35.13 (100.00)	3.21 (100.00)	4.37 (100.00)	42.71 (100.00)	36.91 (100.00)	1.40 (100.00)	4.62 (100.00)	42.93 (100.00)	72.04 (100.00)	4.61 (100.00)	8.99 (100.00)	85.64 (100.00)

Note: Figures in the parentheses are percentages to total

6.7. Agricultural Implements and Machinery

The average farm Implements and machinery owned by the sample growers has been shown in **Table-6.5**. It is found that, on an average, the household owned 2.21 farm implements and machinery. Among these, the bore wells has greater incidence. This is followed by sprayers. These findings are not surprising because, these machines are very essential for growing flowers as well as horticultural crops. More than this, around urban

areas, the farmers preferred always-horticultural crops, as there was demand for these crops throughout the year. It is surprising to note that the use of sprinkler sets was negligible which were essential for horticultural and flower crops to overcome shortage of water. Smallholdings and lack of finance were the reasons for not adopting this technology.

Table 6.5: Average Number of Agricultural Machinery and Implements Owned by the Farmer During 2001-02

Implements	Bangalore North Taluk				Bangalore East Taluk				Total			
	Small	Semi medium	Medium	Total	Small	Semi medium	Medium	Total	Small	Semi medium	Medium	Total
Bullock Cart	0.14	0.20	0.00	0.14	0.04	0.67	0.00	0.11	0.09	0.38	0.00	0.16
Bore well	0.91	0.80	0.00	0.86	0.96	0.67	1.50	0.96	0.93	0.75	1.00	0.91
Open wells with pump	0.09	0.00	0.00	0.07	0.09	0.00	0.00	0.07	0.09	0.00	0.00	0.07
Sprinklers Sets	0.05	0.00	0.00	0.04	0.04	0.00	0.00	0.04	0.04	0.00	0.00	0.04
Sprayers	0.64	0.60	1.00	0.64	0.65	0.67	1.50	0.71	0.64	0.63	1.33	0.68
Jeeps	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.04	0.02	0.00	0.00	0.02
Others	0.23	0.00	1.00	0.21	0.39	0.67	2.00	0.54	0.31	0.25	1.67	0.38
Total	2.05	1.60	2.00	1.96	2.22	2.67	5.00	2.46	2.13	2.00	4.00	2.21

6.8. Livestock Resources

Around urban areas farmers find it a problem to rear small ruminants such as sheep and goat for want of grazing lands. At the same time, one should not forget that there is heavy demand for milk. Because of this, some households even today keep some small ruminants as they are able to graze these on many vacant residential sites found around Bangalore. As such, each household owned 0.13 sheep and 0.30 goats. However, we found greater number of milch cows per household and these animals were more than buffaloes in the study area. **(Table-6.6)**. On an average, the animals owned by sample growers were found around 3 animals in both the selected taluks

Table 6.6: Average Numbers of Livestock Owned by the Farmer During 2001-02

Livestock	Bangalore North Taluk				Bangalore East Taluk				Total			
	Small	Semi medium	Medium	Total	Small	Semi medium	Medium	Total	Small	Semi medium	Medium	Total
Bullocks	1.00	1.20	0.00	1.00	0.22	0.67	0.00	0.25	0.60	1.00	0.00	0.63
Milch Cows	1.27	1.60	2.00	1.36	0.83	1.33	0.50	0.86	1.04	1.50	1.00	1.11
Milch Buffaloes	0.14	0.40	2.00	0.25	0.09	0.33	0.00	0.11	0.11	0.38	0.67	0.18
Sheep	0.05	0.00	0.00	0.04	0.09	0.67	1.00	0.21	0.07	0.25	0.67	0.13
Goats	0.23	0.20	1.00	0.25	0.26	1.33	0.00	0.36	0.24	0.63	0.33	0.30
Others	0.09	0.00	0.00	0.07	0.65	3.33	0.00	0.89	0.38	1.25	0.00	0.48
Total	2.77	3.40	5.00	2.96	2.13	7.67	1.50	2.68	2.44	5.00	2.67	2.82

6.9. Household Incomes

The average annual income of the household was Rs.74,109. However, the highest household income was found in Bangalore East, where irrigation facilities were more and land were fertile compared to the Bangalore North, where land was not fertile and irrigation facilities were also inadequate (**Table 6.7**) The table also reveals that the households derived a larger proportion of income from floriculture compared to any other source. The net income from this sector was Rs.23.83 Lakhs accounting for 57.42 per cent of the total income of the households. They derived this income from undertaking cultivation of flowers in 20.45 hectares, which worked out to Rs. 1.17 lakhs per hectare. This was definitely a higher income from flowers than from any of the field crops.

Table 6.7: Household Income of the Sample Growers From Different Sources

Income sources	(In Rupees)				
	Bangalore North Taluk	Bangalore East Taluk	Total	Per household	% to total
Food Crops	110,900	114,300	225,200	4,021	5.43
Horticulture Crops	306,000	450,000	756,000	13,500	18.22
Flower Crops	574,800	1,808,000	2,382,800	42,550	57.42
Livestock	128,900	121,000	249,900	4,463	6.02
Govt/Private Job	240,200	201,000	441,200	7,879	10.63
Agricultural Wages	0	3,000	3,000	54	0.07
Sericulture	37,000	8,000	45,000	804	1.08
Eucalyptus trees	1,000	0	1,000	18	0.02
Petty shop	40,000	0	40,000	714	0.96
Tempo Transport	0	6,000	6,000	107	0.14
Total	1,438,800	2,711,300	4,150,100	74,109	100.00

6.10. Year of Starting Floriculture Activity and Area Change

The sample growers took up floriculture cultivation at different points of time. However, a large segment of the sample growers took up the activity between 1991 and 1995. During this period, 41 per cent of the growers with 32.30 of the total area had taken up floriculture. During subsequent period too, there were some improvement in the activity compared to that before 1985 and 1986-90. The increase in the area under floriculture after 1991 indicates (**Table: 6.8**) that the traditional floriculture also increased along with modern floriculture, which made a tremendous growth after liberalizing the economy in 1990 as well as thrust given to the sector by NHB from 1993-94. Across two sample taluks,

Table 6.8 Year of Starting of Floricultural Activity by Sample Growers.

Year	Bangalore North Taluk			Bangalore East Taluk			Total		
	No of farmers	Initiation Year	Now	No of farmers	Initiation year	Now	No of farmers	Initiation year	Now
Before1985	7	13.25	5.63	2	2.00	3.50	9	15.25	9.13
1986-90	5	4.65	6.85	2	1.50	3.00	7	6.15	9.85
1991-95	11	9.38	7.26	12	11.25	8.75	23	20.63	16.01
1996-2002	5	3.63	3.38	12	9.50	11.85	17	13.13	15.23
Total	28	30.91	23.12	28	24.25	27.10	56	55.16	50.22

it is found that a large number of sample farmers took up floriculture during the 1990s. Even then the absolute increase in area under floriculture was almost stagnant from 1985 to date. Across taluks, it is seen that there was a decline in area by 7.79 hectares in Bangalore North and marginal increase of 2.85 hectares between 1985-2002 in Bangalore East. Another interesting fact is that most of the farmers are in this activity since 15 years.

6.11. Motivating Factors for Taking up Floriculture by Sample Farmers.

Various factors have been attributed by the sample farmers for taking up flower cultivation in two sample blocks of Bangalore urban district. The most common combination of factors attributed is nearness of the market, low cost of cultivation, easy maintenance and good price for the produce. This category accounted for 66 per cent of the sample growers. This is followed by the combination of factors namely, good price, motivation from other farmers, more demand and money transactions every day (9.44 percent) **(Table 6.9)**. Across two taluks, there was not much difference in these factors influencing the farmers in engaging in floriculture activity.

Table 6.9: Distribution of Sample Growers by the Nature of Factor which Influenced Them in Taking up Floricultural Activity

		Bangalore North Taluk	Bangalore East Taluk	Total
1	Nearness of the market, low maintenance cost as it grew old and brought money every day	15 (58.57)	18 (64.28)	33 (58.93)
2	Nearness of the market, low cost of cultivation and easy to grow.	3 (10.71)	3 (10.71)	6 (10.71)
3	Good price/money every day	2 (7.14)	5 (17.86)	7 (12.50)
4	Good price, motivation of other farmers and more demand.	8 (28.57)	2 (7.14)	10 (17.86)
	Total	28 (100)	28 (100)	56 (100)

Note: Figures in the parentheses are Percentage to total.

6.12. Type of Flowers Grown

The sample farmers were growing different flowers such as Rose, Chrysanthemum, Tuberose, Jasmine, Crossandra, Marigold, etc., in an area of 21.23 hectares in two taluks of Bangalore urban district. Among the flowers, the Rose accounted for a major share with 29.30 per cent of the total area under flowers followed by Jasmine (21.95) (**Table-6.10**). Marigold is grown in large area in Bangalore North whereas Rose is grown more in Bangalore East.

The average land owned by sample growers worked out to be 0.35 hectares. Across districts, the average accounted for 0.34 hectares in the case of Bangalore North taluk and 0.37 hectares in the case of Bangalore East taluk. Small proportion of land was under flower crops on account of overcoming the labour shortage during harvesting, facilitating easy transport without much transport (luggage charges), easy harvest, withstand price fluctuations, less fear of crop loss etc.

Table 6.10: Area under Different Flowers During 2001-02

Name of the flowers	Bangalore North Taluk	Bangalore East Taluk	Total
	Total area	Total area	
Jasmine	2.78	2.07	4.85
Marigold	4.04	0.20	4.24
Chrysanthemum	0.06	2.02	2.08
Crossandra	0.60	0.40	1.00
Rose	0.25	5.91	6.16
Tuberose	2.12	0	2.12
Total	9.85	10.60	20.45

6.13. Opinion of the Farmers on Modern Floriculture

Modern floriculture has been emerging as an important sector in crop husbandry of India since 1992. This is mainly because of the thrust given to it by the Government of India. The modern varieties, particularly the rose varieties became more prominent compared to other varieties. The huge demand for this variety in many parts of the country and abroad has been attributed to this emerging trend. The raise in per capita income and changes in the lifestyles of the people in many countries also influenced the demand for modern flowers.

The farmers in the study area are well aware of this trend and also the benefits of flourishing modern floriculture and popularity of cut flowers. About 48.21 per cent of the farmers indicated that they were well aware of modern floriculture. However, they did not have any intention of switching over to modern floriculture from traditional floriculture even though modern floriculture was more remunerative. A wide range of reasons was expressed for this kind of feeling. More than 32 per cent of the sample farmers attributed that taking up of modern floriculture was not possible as their holdings were small and at the same time, resources were not available to take up capital-intensive activity. However, 14.29 per cent of them expressed that modern floriculture was good and one could expect higher yields and returns than traditional floriculture. The rest indicated lack of training and the capital would not permit them too take up modern floriculture (**Table-6.11**). A majority of then farmers reported that they continued to grow flowers in traditional way due to lack of proper information and training. More than this, they were scared of modern floriculture, as it required lot of investment and there was no guarantee of international market for modern flowers, unless, the state gave minimum support price and good infrastructure.

Table 6.11: Opinions of Farmers on Modern Floriculture in Bangalore Urban District
(In Percentages)

Opinions	Bangalore North Taluk	Bangalore East Taluk	Total
1. Good, but the initial investment and cost of cultivation is high as such only big farmers will take up the modern floriculture	7.14	3.57	5.36
2. Good future, but small and marginal farmers do not have money and knowledge for undertaking modern floriculture	42.86	21.43	32.14
3. Good but proper market is required Higher yield can be expected.	0.00	28.57	14.29
4. Not responded.	50.00	46.43	48.21
Total	100.00	100.00	100.00

6.14. Uses of Flowers

The sample farmers grew five varieties of traditional flowers. The total production of these crops was ultimately going for different purposes. The use of flowers was not confined to only single purpose. According to the farmers, the flowers would go for different purposes instead of single purpose. This is evident from **Table 6.12**. However, the use of flower for garland making and decoration in functions was most predominant with 17.86 per cent of the respondents indicating the use of the flower for this purpose. This was followed by adornment of hair by the women. Across flowers, there was

complete absence of exclusive use of them for industrial purposes. However, a few farmers informed that marigold flower went for perfume making and roses went for condiments making (Table-6.12).

Table 6.12: Uses of Flowers in Bangalore Urban District

(In percentages)

Purpose	Bangalore North Taluk	Bangalore East Taluk	Total
1.Garland making and decorations in functions	21.43	14.29	17.86
2.Decoraion of gods and adornment of hair by women	10.71	0.00	5.36
3.Bouquet making and garland making	7.14	0.00	3.57
4.Paints making and garland making	7.14	3.57	5.36
5.Decoration of gods, decoration in functions and	3.57	0.00	1.79
6.Marriage purposes	3.57	0.00	1.79
7.Decoration of gods and use in festivals	3.57	0.00	1.79
8.Decoraion of gods	10.71	3.57	7.14
9.Garland making	10.71	14.29	12.50
10.Garland making and decoration of gods	7.14	10.71	8.93
11.Purfumes making	3.57	0.00	1.79
12.Adorment of hair by women	3.57	3.57	3.57
13.Perfumes making and garland making	3.57	3.57	3.57
14.Garland making and adornment of hair by women	3.57	17.86	10.71
15.Garland making, decoration of gods and adornment of hair by women	0.00	3.57	1.79
16.Garland making, decoration of gods and temples	0.00	7.14	3.57
17.Marrige purpose and garland making	0.00	7.14	3.57
18.Garlnad making, decoration in functions and marriage purpose	0.00	3.57	1.79
19.Marrige purpose and use in functions	0.00	3.57	1.79
20.Bouquet making	0.00	3.57	1.79
Total	100.00	100.00	100.00
	(28)	(28)	(56)

Note Figures in the parentheses are total sample.

6.15. Borrowings for Floriculture Development

It is generally believed that the highly remunerative crop such as flowers requires huge capital. The farmers mobilize the required resources from various sources to meet this investment needs. But, the finding shows that a large segment of this group had not borrowed any money. Only 6 farmers, out of 56 in both taluks, had borrowed from flower commission agents, banks and friends to the extent of Rs. 53,000 of which, 69 per cent had been already repaid. In all, 3 farmers had fully repaid the loan, one had partially repaid and the remaining one was still to repay the loan (Table-6.13).

Table 6.13: Loans Borrowed for Floricultural Development

Source	Bangalore North Taluk		Bangalore North Taluk		Total	
	Number of household	Amount (Rs.)	Number of household	Amount (Rs.)	Number of household	Amount (Rs.)
Flower Agent	3	13,000	1	5,000	4	18,000
Bank	-	-	1	25,000	1	25,000
Friend	1	10,000	-	-	1	10,000
Total	4	23,000	2	30,000	6	53,000

6.16. Benefits Received by the Farmers for Floriculture Development

The state government is extending certain benefits to the commercial flower growers under the centrally sponsored scheme. Some of the sampled beneficiaries would have also benefited from this. However, it is surprising to note that none of the sampled beneficiaries benefited from any government programme. This speaks about the neglect of the sector despite its greater potential in several respects.

CHAPTER VII

ECONOMICS OF PRODUCTION AND MARKETING PATTERN OF FLORICULTURE CROPS IN KARNATAKA

7.1. Introduction

This chapter provides the economics of floriculture, marketing and employment generation. An analysis of the costs and returns of each variety of flowers would be very useful to understand the economics of these flowers. However, this chapter does not venture into the analysis of certain flowers in sample taluks as the area under these crops is very small not even half hectare. Hence, no comparison across the sample taluks has been made. Wherever the land in both the sample taluks is one hectare or more, only in such situations a comparison has been made. Otherwise, the analysis is confined to one taluk. Here again, the analysis is restricted to particular flower which is at least having one hectare of land.

7.2 Costs and Returns of Rose Cultivation

Rose is a perennial crop which has a life of more than 10 years. It can be grown in both traditional as well as modern way. The rose is cultivated traditionally under open conditions and the modern cut-flowers are grown in controlled conditions in playhouses/greenhouses. The roses grown under both the conditions are mostly used for making garlands, decoration purpose, bouquets and vase purpose. Normally, the traditional rose flowers are mostly used in domestically and modern flowers are for export purpose. The rose covered in the survey is traditional Rose cultivated under open conditions. The planting material used is either developed on the farm by the farmer or purchased from nearby nurseries. The production is geared towards meeting the local demand and also marketed in loose form.

Among the sample, 17 farmers were growing roses in an area of 6.16 hectares. Out of these, 15 farmers belonged to Bangalore East taluk growing roses in an area of 5.91 hectares. Therefore, the costs and returns per hectare of Rose cultivation estimated were for Bangalore East taluk only.

The costs of cultivation of rose can be categorized as initial costs or establishment costs and maintenance costs or operating costs. The establishment costs mainly include, land preparation, digging of pits, plant materials, farm yard manure (FYM), pesticides, interest on working and fixed costs. The total cost of establishing one hectare of land is estimated to be about Rs. 124,196 in Bangalore East taluk (**Table 7.1**). The item-wise establishment cost shows that planting material alone accounted for 40.30 per cent of the total variable cost and fixed cost. The FYM and Fertilizers were the other major items of the cost, which accounted for 19.30 per cent and this was followed by weeding, irrigation and land preparation costs.

The maintenance/operation cost incurred by formers for growing Rose in one hectare was about Rs. 116,313 (**Table 7.2**). These included the Planting material, land preparation, which had been apportioned taking into consideration the life-span of the Crop (10 years). Out of the total cost, the labour cost alone accounted for 48.86 per cent. A major proposition of it was incurred on harvesting. This cost included both imputed cost for family labour and wage paid to the hired workers. This was followed by market cost of about 11.34 per cent, which included transportation and packing expenditure. The form yard manure and fertilizers accounted for 10.72 per cent and 9.91 per cent respectively.

The marketing costs among the sample farmers were negligible as the farmers used their own plastic gunny bags, which they recycled after selling the produce. The transport cost was also literally absent as they brought small quantities of flower in small bags for which the bus conductor did not collect luggage. The only cost they incurred was the 10 per cent commission to the trader and one Re. 1 entry fee when he brought large quantities for selling. This was true in the case of almost all flowers.

The average age of the sample rose garden was about 4.4 years. This was the ideal age in which the plants reached full flowering. The results show that they yielded 98.08 quintals per hectare. The gross income realised from this yield was Rs. 329,877 per hectare and the net income realized was Rs. 213,564 over variable and fixed costs were Rs. 223,029 over variable costs (**Table-7.2**). The interesting fact is that the sample farmers reported that a significant proportion of production was going as waste. But, a major proportion of this had been marketed at low prices for condiments (Gulkhan) making. The realisation of this kind had also been included in returns.

Table 7.1: Establishment Costs of Rose Garden in Bangalore East Taluk

(Rs/ha)

S.No	Components	Rs.	% of T/C (VC+FC)
1	Seed & planting materials	50,000	40.3
2	Land preparation (Animal labour & digging of pits)	10,985	8.8
3	Transplantation	1,705	1.4
4	Labour (manure application, weeding, irrigation & pesticide)	13,371	10.8
5	Manure cost	12,470	10.0
6	Fertilizer cost	11,527	9.3
7	Pesticide cost	4,897	3.9
8	Electricity charges	2,500	2.0
9	Total variable cost	107,455	86.5
10	Depreciation charges	833	0.7
11	Land revenue	13	0.0
12	Rental value	3,000	2.4
13	Interest on working capital (@ 12% of VC for 12 months) excluding market cost	12,895	10.4
14	Total fixed cost	16,741	13.5
15	Total (VC + FC)	124,196	100
16	Net income over (VC+FC)	84,211	
17	Net income over VC	95,840	

Note: T/C – Total Cost; VC – Variable Cost; FC – Fixed Cost

Table 7.3: Cost and Returns of Rose Garden in Bangalore East Taluk

(Rs/ha)

S.No	Components	Rs.	% to Total	
1	Seed & planting materials	5,000	4.30	
2	Labour includes Family & hired Labour	Male	26,084	22.43
		Female	30,736	26.43
3	Bullock labour	439	0.38	
4	Farmyard manure	12,470	10.72	
5	Fertilizer cost	11,527	9.91	
6	Pesticide cost	4,897	4.21	
7	Electricity charges	2,500	2.15	
8	Market cost	13,195	11.34	
9	Total variable cost	106,848	91.86	
10	Depreciation charges	833	0.72	
11	Land revenue	13	0.01	
12	Rental value	3,000	2.58	
13	Interest on working capital 12% of VC for 12 months excluding market cost	5,619	4.83	
14	Total fixed cost	9,465	8.14	
15	Total (VC + FC)	116,313	100	
16	Gross income	329,877		
17	Net income over (VC+FC)	213,564		
18	Net income over VC	223,029		

Note: T/C – Total Cost; VC – Variable Cost; FC – Fixed Cost

7.3. Costs and Returns of Marigold

Marigold is a seasonal flower lasting 4 months. It can be grown in all seasons. More farmers prefer this crop on account of less cost of cultivation and easy maintenance. This is mainly grown for both industrial purpose (Medicine preparation) as well as making garlands. After one month of transplantation, it starts yielding and lasts 2 to 3 months. As per the sample survey, 9 farmers out of 56 samples were involved in Marigold cultivation. The total land under the crops was about 4.24 hectares. In Bangalore North Taluk alone 8 farmers were engaged in Marigold cultivation with 4.04 hectares.

The cost of cultivation of this crop was estimated to be Rs. 35,558 per hectare. The labour cost alone accounted for 42.98 per cent of the variable costs and fixed costs and 49.60 per cent of the total variable cost. The variable cost of Rs. 30,644 exceeds the fixed costs Rs. 4,714 per hectare. The farmyard manure and fertilisers were other major input costs, accounting for 8.82 percent and 5.76 per cent of the total costs respectively. The market cost was another item which accounted for 19.88 per cent, which included transportation cost and commission paid to the agent (**Table 7.3**). The yield of Marigold was found to be 69.80 quintals per hectare. The gross returns was found at Rs. 54,078 per hectare and obtained a net income of Rs. 23,434 over variable costs and Rs. 18,720 over variable costs and fixed costs (**Table 7.3**).

Table 7.3: Costs and Returns of Marigold Garden in Bangalore North Taluk

(Rs/ha)				
S.No	Components	Rs.	% of T/C (VC+FC)	
1	Seed & planting materials	763	2.16	
2	Labour including family & hired labour	Male	7,242	20.48
		Female	7,957	22.50
3	Bullock labour	916	2.59	
4	Farm yard manure	3,119	8.82	
5	Fertilizers	2,035	5.76	
6	Pesticides	382	1.08	
7	Electricity	1,200	3.39	
8	Market cost	7,030	19.88	
9	Total variable cost	30,644	86.67	
10	Depreciation	191	0.54	
11	Land revenue	13	0.04	
12	Rental value	3,094	8.75	
13	Interest on working capital (@ 12% of VC for 6 months) excluding market cost	1,416	4.00	
14	Total fixed cost	4,714	13.33	
15	Total (VC + FC)	35,358	100.00	
16	Gross income	54,078	152.94	
17	Net income over (VC+FC)	18,720	52.94	
18	Net income over VC	23,434	66.28	

Note: T/C – Total Cost; VC – Variable Cost; FC – Fixed Cost

7.4. Costs and Returns of Jasmine (Kakada)

This is one of the important commercial flowers. The familiar variety that is being grown in the sample area is Kakada (*Jasminum pubescens*). It starts yielding after 1.6 years of planting. Third year onwards it starts giving good yield which goes for 10 years. Later, the yield starts declining. It yields more during winter and summer seasons.

In the study area, 12 farmers were growing this crop in 2.78 hectares in Bangalore North Taluk and 10 farmers in 2.07 hectares in Bangalore East Taluk. The costs and returns associated with this crop show that over Rs. 38,002 per hectare had been incurred for the establishment of Jasmine in Bangalore North Taluk and Rs. 39,637 per hectare in Bangalore East taluk. The manure and fertilizers accounted for the substantial proportion of establishment expenditure (**Table 7.4**).

In the **Table 7.5**, the details of input costs incurred by the farmers for the maintenance of Jasmine have been presented. From the table it is found that per hectare total cost incurred by the sample farmer was Rs. 70,528 in Bangalore North and 105,373 in Bangalore East taluk. Among the costs incurred the human labour cost was found to be a major item. Its share in the total cost was 37.21 per cent in Bangalore North Taluk and 37.26 per cent in Bangalore East taluk. The farmyard manure and Fertilizers were the other important items on which the formers incurred higher proportion of total costs. The transport cost was literally absent as they marketed small quantities of flowers, transported through gunny bags, and travelled in city services. The only cost they incurred was the 10 per cent of the commission to the trader and Re.1 entry fee, if one carries large quantities for selling.

The average yield per hectare obtained by the sample farmers is found in Bangalore North taluk was that of 51.15 quintals per acre and 66.04 quintals per acre in that of Bangalore East Taluk. The availability of sewage water throughout the year in the sample area of Bangalore West taluk was the reason for higher yield. This implies that the farmers made higher gain in this taluk over the other taluk. This is evident from the gross returns and net returns. The gross return obtained from Jasmine was found at Rs.180,563 in Bangalore North taluk (**Table 7.5**) which was higher in Bangalore East taluk. Similarly, the net returns was higher in Bangalore East taluk than the North taluk. This was due to the higher yield in East taluk.

Table 7.4: Establishment Costs of Jasmine Garden in Bangalore North & East Taluks

Rs./ha

S.No	Components	North Taluk		East Taluk		Average	
		Rs.	% of T/C (VC+FC)	Rs.	% of T/C (VC+FC)	Rs.	% of T/C (VC+FC)
1	Seed & planting materials	500	1.32	353	0.86	427	1.1
2	Land preparation, bullock labour,	3,847	10.12	3,197	7.75	3,522	8.9
3	Transplantation	636	1.67	660	1.60	648	1.6
4	Labour (manure application weeding Irrigation & pesticide)	6,189	16.29	9,428	22.84	7,809	19.7
5	Farm yard manure cost	8,237	21.68	8,717	21.12	8,477	21.4
6	Fertilizer cost	5,281	13.90	5,417	13.13	5,349	13.5
7	Pesticide cost	4,335	11.41	4,142	10.04	4,239	10.7
8	Electricity charges	1,875	4.93	1,800	4.36	1,838	4.6
9	Total variable costs	30,900	81.31	33,714	81.69	32,307	81.5
10	Depreciation charges	381	1.00	500	1.21	441	1.1
11	Land revenue	13	0.03	13	0.03	13	0.0
12	Rental value	3,000	7.89	3,000	7.27	3,000	7.6
13	Interest on working capital (@ 12% of VC for 12 months)	3,708	9.76	4,045	9.80	3,877	9.8
14	Total fixed costs	7,102	18.69	7,558	18.31	7,330	18.5
15	Total (VC + FC)	38,002	100.00	41,272	100	39,637	100.0

Table 7.5: Costs and Returns of Jasmine Garden in Bangalore North & East Taluks

S.No	Components	North Taluk		East Taluk		Average		
		Rs.	% of T/C (VC+FC)	Rs.	% of T/C (VC+FC)	Rs.	% of T/C (VE+FC)	
1	Seed & planting materials	50	0.067	35	0.04	42.5	0.05	
2	Labour including family & hired labour	Male	11,382	15.32	15,577	18.35	13,480	16.93
		Female	16,264	21.89	15,946	18.78	16,105	20.23
3	Bullock labour	114	0.15	82	0.10	98	0.12	
4	Farm yard manure cost	8,237	11.09	8,717	10.27	8,477	10.65	
5	Fertilizer cost	5,281	7.11	5,417	6.38	5,349	6.72	
6	Pesticide cost	4,335	5.84	4,142	4.88	4,239	5.33	
7	Electricity charges	1,875	2.52	1,800	2.12	1,838	2.31	
8	Marketing cost	17,645	23.75	23,474	27.65	20,560	25.83	
9	Total variable costs	65,183	87.75	75,190	88.55	70,187	88.18	
10	Depreciation charges	381	0.51	500	0.59	441	0.55	
11	Land revenue	13	0.02	13	0.02	13	0.02	
12	Rental value	3,000	4.04	3,000	3.53	3,000	3.77	
13	Interest on working capital (@ 12% of VC for 12 months) excluding market cost	5,705	7.68	6,206	7.31	5,955.5	7.48	
14	Total fixed costs	9,099	12.25	9,719	11.45	9,409	11.82	
15	Total (VC + FC)	74,282	100.00	84,909	100.00	79,596	100.00	
16	Gross income			180,563		158,137		
17	Net income over (VC+FC)			95,654		78542		
18	Net income over VC			105,373		87951		

Note: T/C – Total Cost; VC – Variable Cost; FC – Fixed Cost

7.5. Costs and Returns of Tuberose

Tuberose is one of the important commercial flowers. About 884 Kgs. of tubers are required for planting one hectare of land. The crop starts yielding 100 days after transplantation. The life-span of the crop is 2 to 3 years. There are two varieties in tuberose, namely, single variety and double variety. The single variety is mostly used in garland making and another variety is used in making of bouquets. The single variety is fragrant in nature and is used for extraction of perfumes.

In the study area, 6 sample farmers were growing this crop in an area of 2.12 hectares. All these farmers belonged to Bangalore North Taluk. The average life-span of the crop covered was 2 years.

As regards the initial cost of the cultivation was concerned, in the first year of planting, the growers incurred an expenditure of Rs.51,850 (**Table 7.6**). A major proportion (26.68 per cent) was incurred on labour, farm yard manure, fertilizers and pesticides application and irrigation and weeding followed by land preparation cost (3.08 per cent) and seed (11.38 per cent).

Table 7.6: Establishment Cost of Tuberose Growers in Bangalore North Taluk

S.No	Components	Rs.	% of T/C (VC+FC)
1	Seed & planting materials	5,898	11.38
2	Land preparation, bullock labour	1,598	3.08
3	Transplantation	1,617	3.12
4	Labour (manure application, weeding, irrigation & pesticide)	13,832	26.68
5	Farm yard manure cost	8,689	16.76
6	Fertilizer cost	7,408	14.29
7	Pesticide cost	1,617	3.12
8	Electricity charges	2,500	4.82
9	Total variable costs	43,159	83.24
10	Depreciation charges	499	0.96
11	Land revenue	13	0.03
12	Rental value	3,000	5.79
13	Interest on working capital (@ 12% of VC for 12 months) excluding market cost	5,179	9.99
14	Total fixed costs	8,691	16.76
15	Total (VC + FC)	51,850	100.00

Note: T/C – Total Cost; VC – Variable Cost; FC – Fixed Cost

Table 7. 7: Costs and Returns of Tuberose Garden in Bangalore North Taluk

S.No	Components	Rs.	% of T/C (VC+FC)	
1	Seed & planting materials	2,949	2.84	
2	Labour including family & hired labour	Male	14,891	14.36
		Female	29,192	28.15
3	Bullock Labour	399	0.38	
4	Farm yard manure cost	8,689	8.38	
5	Fertilizer cost	7,408	7.14	
6	Pesticide cost	1,617	1.56	
7	Electricity charges	2,500	2.41	
8	Marketing cost	24,429	23.56	
9	Total variable costs	92,074	88.79	
10	Depreciation Charges	499	0.48	
11	Land revenue	13	0.01	
12	Rental value	3,000	2.89	
13	Interest on working capital (@ 12% of VC for 12 months) excluding market cost	8,117	7.83	
14	Total fixed costs	11,629	11.21	
15	Total (VC + FC)	103,703	100.00	
16	Gross income	187,914		
17	Net income over (VC+FC)	84,211		
18	Net income over VC	95,840		

Note: T/C – Total Cost; VC – Variable Cost; FC – Fixed Cost

The per hectare cultivation of tuberose which involved operational costs, fixed costs and market costs has been presented in **Table 7.7**. It is observed that the total expenses incurred were Rs. 103,703 per hectare. A major proportion of this was incurred on labour followed by marketing costs. The average yield per hectare by sample growers was found at 70.05 quintals. The gross return obtained was found at Rs.187,914 and net returns over variable costs and fixed costs was Rs.95,840 over variable costs.

7.6. Costs and Returns of Chrysanthemum

Chrysanthemum is one of the important commercial flowers. The farmers in the state grew different varieties of Chrysanthemum. Some of these are traditional ones and others are modern varieties developed by the Indian Institute of Horticulture Research, Bangalore. They are beautiful with various colours, shapes and sizes. Among these, some varieties, which are yellow in colour, are grown during Kharif season in the study area. This is a four month crop and starts yielding after 2 months of transplantation. The peak period of flower will be over in 3 to 4 months. In the study area, namely, Bangalore West taluk, 4 households were growing this crop in an area of 2.02 hectares.

The economics of chrysanthemum cultivation in the study area has been presented in the **Table 7.7**. It is observed that the investment incurred on chrysanthemum was in the order of Rs. 69,004, which included both variable costs, fixed costs and marketing costs. The variable costs were found to be of higher order in the proportion of 94.08 per cent. The rest accounted for fixed costs with 55.92 per cent. Within the variable costs, the marketing costs accounted for 30.49 per cent. The cost of labour, which involved hired labour, accounted for 23.5 per cent of the total cost. Apart from this, other items such as pesticides (plant protection chemicals) and fertilizers constituted a significant proportion with 12.77 per cent at 9.25 per cent, respectively in the total investment. The cost incurred on seed and planting materials, bullock labour and electricity were found to be of less proportion in the total expenditure.

The average yield obtained by the sample farmers was 169 quintals per hectare, which realised a gross income of Rs. 161,856 per hectare. The net returns obtained over the variable costs was estimated to be Rs. 96,937 and Rs. 92,852 over fixed and variable costs, respectively.

Table 7.8: Costs and Returns of Chrysanthemum Garden in Bangalore East Taluk

S.No	Components	Rs.	% of T/C (VC+FC)	
1	Seed & planting materials	2,574	3.73	
2	Labour including family & hired labour	Male	10,732	15.55
		Female	5,486	7.95
3	Bullock labour	569	0.82	
4	Farmyard manure cost	8,069	11.69	
5	Fertilizer cost	6,386	9.25	
6	Pesticide cost	8,812	12.77	
7	Electricity charges	1,250	1.81	
8	Marketing cost	21,041	30.49	
9	Total variable costs	64,919	94.08	
10	Depreciation charges	319	0.46	
11	Land revenue	13	0.02	
12	Rental value	1,121	1.62	
13	Interest on working capital (@ 12% of VC for 6 months) excluding marketing cost	2,632	3.81	
14	Total fixed cost	4,085	5.92	
15	Total (VC + FC)	69,004	100	
16	Gross income	161,856		
17	Net income over (VC+FC)	92,852		
18	Net income over VC	96,937		

Note: T/C – Total Cost; VC – Variable Cost; FC – Fixed Cost

7.7. Costs and Returns of Crossandra

It is an important crop, popularly known as Kanakambara in Karnataka. Due to its attractive colour and long life, ladies prefer it for adornment of their hair. To grow this crop, the farmers use 2 to 3 month old nursery for planting. It starts yielding 3 months after transplantation. About 19,768 plants are required per hectare of land. Although, this is a perennial crop, it is not surviving in the area. Farmers attribute, water, pollution, root diseases as the main problems for their poor survival. The average age of the crop, studied in the area was 2 years old. As per the study, only 2 farmers, one each in Bangalore North taluk and Bangalore East taluk were growing this crop in an area of 0.40 hectares and 0.60 hectares respectively.

The establishment cost components of crossandra cultivation in the study area have been presented in **Table 7.9**. The per hectare establishment cost of crossandra worked out to be Rs. 41,971 in Bangalore North Taluk and Rs. 44,133 in Bangalore East Taluk. The expenditure on labour alone constituted a major proportion of total cost in both the taluks. The other inputs costs, namely, the farmyard manure, fertilizers, plant protection chemicals constituted major items, with about 9 per cent in Bangalore North Taluk but, in Bangalore East taluk, the proportion of expenditure on this item was larger except on Pesticides. The rental value of land also accounted for a significant proportion of the total establishment cost.

Coming to the costs and returns, it is found that an investment of Rs. 86,267 in Bangalore North taluk and 81,564 in Bangalore East taluk was made to grow this crop. Of this, labour cost accounted for a major share with 39.37 per cent in Bangalore North taluk and 25.87 per cent in East taluk (**Table 7.10**). This shows the labour intensive nature of the crop. The other major cost was accounted for market cost in both the taluks. Among the fixed costs, the interest on working capital in Bangalore North taluk and rental value of land in Bangalore East taluk accounted for larger proportions.

The yield realised from this accounted for 18.5 quintals in Bangalore North taluk and 19 quintals per hectare in Bangalore East taluk valued at Rs. 185,000 and 203,000 respectively. The net returns worked out to be Rs. 111,615 and 137,669 over variable costs in Bangalore North taluk and Bangalore East taluk respectively. Altogether, on an average, Rs. 124,642 net income had been realised by the sample growers in the study area.

Table 7.9: Establishment Costs of Crossandra Garden in Bangalore North and East Taluks

		Rs./ha					
	Components	North Taluk		East Taluk		Average	
		Rs.	% of T/C (VC+FC)	Rs.	% of T/C (VC+FC)	Rs.	% of T/C (VC+FC)
1	Seed & planting materials	5,000	11.91	5,000	11.33	5,000	11.61
2	Land preparation, animal labour,	937	2.23	1,210	2.74	10,73.5	2.49
3	Transplantation	1,400	3.34	1,200	2.72	1,300	3.02
4	Labour (manure application weeding watering & pesticide)	8,700	20.73	6,840	15.50	7,770	18.05
5	Manure	4,569	10.89	6,000	13.60	5,284.5	12.27
6	Fertilizers	4,250	10.13	7,000	15.86	5,625	13.07
7	Pesticides	4,100	9.77	3,750	8.50	3,925	9.12
8	Electricity	2,500	5.96	2,500	5.66	2,500	5.81
9	Total variable cost	31,456	74.95	33,500	75.91	32,478	75.44
10	Depreciation	667	1.59	600	1.36	633.5	1.47
11	Land revenue	13	0.03	13	0.03	13	0.03
12	Rental value	6,060	14.44	6,000	13.60	6,030	14.01
13	Interest on working capital (@ 12% of VC for 12 months)	3,775	8.99	4,020	9.11	3,897.5	9.05
14	Total fixed cost	10,515	25.05	10,633	24.09	10,574	24.56
15	Total (VC + FC)	41,971	100.00	44,133	100.00	43,052	100.00

Note: T/C – Total Cost; VC – Variable Cost; FC – Fixed Cost

Table 7.10: Costs and Returns of Crossandra Garden in Bangalore North and East Taluks

		(Rs./ Ha)						
	Components	North Taluk		East Taluk		Average		
		Rs.	% of T/C (VC+FC)	Rs.	% of T/C (VC+FC)	Rs.	% of T/C (VC+FC)	
1	Seed & planting materials	1,667	1.93	1,667	2.17	1,667	2.04	
2	Labour including family & hired labour	Male	12,240	14.19	7,167	9.32	9,704	11.90
		Female	21,720	25.18	12,720	16.55	17,220	21.11
3	Bullock labour	139	0.16	167	0.22	153	0.19	
4	Farm yard manure	4,569	5.30	6,000	7.81	5,285	6.48	
5	Fertilizers	4,250	4.93	7,000	9.11	5,625	6.90	
6	Pesticides	4,100	4.75	3,750	4.88	3,925	4.81	
7	Electricity	2,500	2.90	2,500	3.25	2,500	3.07	
8	Market cost	22,200	25.73	24,360	31.69	23,280	28.54	
9	Total variable cost	73,385	85.07	65,331	85.00	69,358	85.04	
10	Depreciation	667	0.77	600	0.78	634	0.78	
11	Land revenue	13	0.02	13.00	0.02	13	0.02	
12	Rental value	6,060	7.02	6,000	7.81	6,030	7.39	
13	Interest on working capital (@ 12% of VC for 12 months) excluding market cost	6,142	7.12	4,917	6.40	5,530	6.78	
14	Total fixed cost	12,882	14.93	11,530	15.00	12,206	14.96	
15	Total (VC + FC)	86,267	100.00	76,861	100.00	81,564	100.00	
16	Gross income	185,000		203,000		194,000		
17	Net income over (VC+FC)	98,733		126,398		112,566		
18	Net income over VC	111,615		137,669		124,642		

Note: T/C – Total Cost; VC – Variable Cost; FC – Fixed Cost

7.8. Employment Generation from Flower Crops

Several studies carried out in the country have highlighted the employment potential of these crops. A majority of these studies have indicated that flower crops generate more employment than food crops and horticulture crops (Rao, 1997; Alagumani *et. al.*,1999, Gupta *et. al.*, 1997; Koranne and Naik *et. al.*, 1997 and GOI 1996). The present study although not estimated the generation of employment in food crops, has made an attempt to estimate the employment generation across major traditional floricultural crops. These details have been presented in **Table-7.11**. As per the table, the highest number of man-days of employment generation was noticed in rose cultivation with 1,326 man-days per hectare in Bangalore North Taluk and 1,242 man-days in Bangalore South Taluk. This was followed by tuberose (914 man-days) in Bangalore North Taluk and Jasmine (621 man-days) in Bangalore North Taluk and 700 man-days in Bangalore east taluk. The least man-days of employment generated was observed in marigold with 297 man days in Bangalore North Taluk and 305 man-days in Bangalore east taluk. The lower employment generation in this crop is due to its shorter duration. The higher employment was witnessed in rose as it require more labour for grafting, pesticides and fertiliser application apart from harvesting. One important factor that one noticed was that the employment of female labour was higher in the cultivation of flowers except rose.

Among the various operations, harvesting stage generated maximum employment. The magnitude of employment in this operation ranged between 52.40 per cent in Bangalore East taluk in chrysanthemum and 73.72 per cent in Bangalore North Taluk in Jasmine and Crossandra (**Table-7.12**). Overall, the employment generation was high in the cultivation of flower compared to field crops and horticultural crops (see Chapter II). This was on account of the continuous requirement of labour for picking flowers throughout the year in case of perennial crops and 4 to 6 months in case of seasonal flower crops.

**Table 7.11: Employment Generation of Different Flower Crops in Bangalore Urban District
Man-days/. Ha**

Name of the flower	Bangalore North Taluk			Bangalore East Taluk			Average		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Jasmine	215 (34.62)	406 (65.38)	621 (100.00)	319 (45.57)	381 (54.43)	700 (100.00)	267 (40.39)	394 (59.53)	661 (99.92)
Marigold	112 (37.78)	185 (62.25)	297 (100.00)	66 (21.64)	239 (78.36)	305 (100.00)	89 (29.60)	212 (70.43)	301 (100.03)
Rose	818 (62.69)	508 (38.31)	1326 (100.00)	490 (39.45)	752 (60.55)	1242 (100.00)	654 (50.93)	630 (49.07)	1284 (100.00)
Tuberose	253 (28.68)	661 (72.32)	914 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)	127 (27.68)	331 (72.32)	457 (100.00)
Chrysanthemum	120 (44.12)	152 (55.88)	272 (100.00)	159 (54.45)	133 (45.55)	292 (100.00)	140 (49.47)	143 50.53	282 (100.00)
Crossandra	163 (27.03)	440 (72.97)	603 (100.00)	158 (22.57)	542 (77.43)	700 (100.00)	161 (24.62)	491 (75.31)	652 (100.00)

Note: Figures in the Parenthesis are percentages to total.

Table 7.12: Operation-wise Employment Generation of Different Flower Crops in Bangalore Urban District

Operations	Bangalore North Taluk					Bangalore East Taluk				Total					
	Jasmine	Marigold	Tuberose	Chrysan- themum	Crossandra	Jasmine	Rose	Chrysan- themum	Crossandra	Jasmine	Marigold	Rose	Tuberose	Chrysan- themum	Crossandra
Land preparation	42 (6.76)	21 (7.07)	12 (1.31)	32 (11.76)	7 (1.16)	44 (6.29)	101 (8.13)	37 (12.67)	17 (2.43)	86 (6.51)	21 (7.07)	101 (8.13)	12 (1.31)	69 (12.23)	24 (1.84)
Manure/Fertiliser application	14 (2.25)	12 (4.04)	18 (1.97)	12 (4.41)	21 (3.48)	13 (1.86)	23 (1.85)	14 (4.79)	42 (6.00)	27 (2.04)	12 (4.04)	23 (1.85)	18 (1.97)	26 (4.61)	63 (4.83)
Transplantation	10 (1.61)	15 (5.05)	27 (2.95)	20 (7.35)	20 (3.32)	12 (1.71)	28 (2.25)	19 (6.51)	32 (4.57)	22 (1.67)	15 (5.05)	28 (2.25)	27 (2.95)	39 (6.91)	52 (3.99)
Weeding	27 (4.35)	23 (7.74)	55 (6.02)	26 (9.56)	60 (9.95)	25 (3.57)	40 (3.22)	27 (9.25)	85 (12.14)	52 (3.94)	23 (7.74)	40 (3.22)	55 (6.02)	53 (9.40)	145 (11.13)
Pesticide application	52 (8.37)	3 (1.01)	25 (2.74)	14 (5.15)	18 (2.99)	19 (2.71)	29 (2.33)	17 (5.82)	20 (2.86)	71 (5.37)	3 (1.01)	29 (2.33)	25 (2.74)	31 (5.50)	38 (2.92)
Irrigation	18 (2.90)	28 (9.43)	110 (12.04)	20 (7.35)	30 (4.98)	119 (17.00)	123 (9.90)	25 (8.56)	35 (5.00)	137 (10.37)	28 (9.42)	123 (9.90)	110 (12.04)	45 (7.98)	65 (4.99)
Pruning	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	100 (8.05)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	100 (8.05)	0 (0.00)	0 (0.00)	0 (0.00)
Harvesting	458 (73.75)	195 (65.66)	667 (72.98)	148 (54.41)	447 (74.13)	468 (66.86)	798 (64.25)	153 (52.40)	469 (67.00)	926 (70.10)	195 (65.6)	798 (64.25)	667 (72.98)	301 (53.37)	916 (70.30)
All operations	621 (100.00)	297 (100.00)	914 (100.00)	272 (100.00)	603 (100.00)	700 (100.00)	1242 (100.00)	292 (100.00)	700 (100.00)	1321 (100.00)	297 (100.00)	1242 (100.00)	914 (100.00)	564 (100.00)	1303 (100.00)

Note: Figures in Parenthesis are percentages to total.

7.9. Production, Spoilage/Wastage, Household Consumption and Sale of Flowers

Five major traditional flowers were grown in the study area in an area of 20.45 hectares with a production of 1,679.19 quintals. This worked out to 82.21 quintals per hectare.

Across flowers, it was found that chrysanthemum recorded higher productivity with 167.72 quintals per hectare and the lowest was found in Jasmine with 57.51 quintals per hectare (Table 7.13).

As far as water wastage was concerned, the overall wastage/spoilage was found at 0.23 per cent of the production, which was slightly higher than the household consumption of 0.36 per cent. This apart, about 99.43 per cent of the production was marketed (Table 7.14). The interesting fact is that the proportion of spoilage was higher in Bangalore North Taluk compared to Bangalore South Taluk. In the case of household consumption this was found quite opposite.

Table 7.13: Area Under Different Flowers and Productivity

Name of the flowers	Bangalore North Taluk			Bangalore East Taluk			Total		
	Total area	Total production (Qtls)	Yield Per hectare (Qtls)	Total area	Total production (Qtls)	Yield Per hectare (Qtls)	Total area	Total production (Qtls)	Yield Per hectare (Qtls)
Jasmine	2.78	142.20	51.15	2.07	136.70	66.04	4.85	278.90	57.51
Marigold	4.04	280.96	69.54	0.20	15.00	75.00	4.24	295.96	69.80
Chrysanthemum	0.06	13.50	167.00	2.02	335.35	166.01	2.08	348.85	167.72
Crossandra	0.60	5.80	9.67	0.40	14.00	35.00	1.00	19.80	19.80
Rose	0.25	7.50	30.00	5.91	579.68	98.08	6.16	587.18	95.32
Tuberose	2.12	148.5	70.05	0	0	0.00	2.12	148.50	70.05
Total	9.85	598.46	60.76	10.60	1080.73	101.96	20.45	1679.19	82.21

Table 7.14: Production and Sale of Flowers

Name of the flower	Bangalore North				Bangalore East				Total			
	Wastages	Used for house consumption	Sold	Total	Wastage	Used for house consumption	Sold	Total	Wastage	Used for house consumption	Sold	Total
Jasmine	0.35	0.56	99.09	100.00	0.51	0.37	99.12	100.00	0.43	0.47	99.10	100.00
Marigold	0.00	0.09	99.91	100.00	0.00	0.00	100.00	100.00	0.00	0.09	99.91	100.00
Tuberose	0.54	0.13	99.33	100.00	0.00	0.00	0.00	0.00	0.54	0.13	99.33	100.00
Crossandra	0.34	1.38	98.28	100.00	0.36	0.36	99.29	100.00	0.35	0.66	98.99	100.00
Rose	2.45	0.00	97.55	100.00	0.26	0.55	99.19	100.00	0.28	0.54	99.18	100.00
Chrysanthemum	0.74	1.48	97.78	100.00	0.00	0.10	99.90	100.00	0.03	0.16	99.81	100.00
Total	0.27	0.26	99.480	100.00	0.21	0.38	99.41	100.00	0.28	0.34	99.43	100.01

7.10. Marketing of Flowers

As stated earlier, the flowers are highly perishable. These have to be quickly harvested and marketed. In this section, an attempt has been made to analyse the production, spoilage, consumption and sale of flowers by the sample farmers. A total of 1,669.59 quintals of flower produce was marketed in Bangalore. This accounted for 99.43 per cent of the total production.

Usually, the agricultural produce reaches the final consumer after passing through many channels. In respect of flowers, it has been observed that the sale of flowers at the farm level to the contractor in villages was found totally absent. Almost all producers disposed of their produce in K.R.Market in Bangalore City. Almost all-marketable surplus (95.63 per cent) was sold to commission agents/wholesalers and 3.84 per cent to stall merchants (**Table 7.15**). Only a small proportion (0.50 per cent) was sold to the customers or retailers who, in turn, added value to the flowers and sold them in various places.

One interesting fact is that one could notice that a large proportion of producers had tie-up with particular agents in the market who continuously bought their produce and promptly paid the amount either weekly or monthly after deducting the commission. The flower producers were also tied up with the agents as they had borrowed money against their expected income from their produce. The agents were also happy to finance these produces, as recovery was easy. The commission agents who purchased the flowers from the farmers, further sold them to various retailers who made garlands and bouquets and sold them to different customers.

Table 7.15: Marketing Channels for Different Flowers in Bangalore Urban District

Name of the flower	Bangalore North Taluk					Bangalore East Taluk					Total				
	Agent/Whole-sale	Flower stall merchants	Consumers	Total	Total quantity sold In Qtls	Agent/Whole-Sale	Flower stall merchants	Consumers	Total	Total quantity sold In Qtls	Agent/whole-sale	Flower stall merchants	Consumers/retailers	Total	Total quantity sold In Qtls
	%	%	%	%		%	%	%	%		%	%	%	%	
Jasmine	92.90	7.10	0.00	100.00	140.90	100.00	0.00	0.00	100.00	135.50	96.38	3.62	0.00	100.00	276.40
Marigold	100.00	0.00	0.00	100.00	280.70	100.00	0.00	0.00	100.00	15.00	100.00	0.00	0.00	100.00	295.70
Tuberose	100.00	0.00	0.00	100.00	147.50	0	0	0	0		100.00	0.00	0.00	100.00	147.50
Crossandra	100.00	0.00	0.00	100.00	5.70	100.00	0.00	0.00	100.00	13.90	100.00	0.00	0.00	100.00	19.60
Rose	80.39	0.00	19.61	100.00	7.14	90.52	9.39	0.00	100.00	575.00	90.39	9.28	0.24	100.00	582.19
Chrysanthemum	100.00	0.00	0.00	100.00	13.20	97.91	0.00	2.09	100.00	335.00	97.98	0.00	2.02	100.00	348.20
Total	98.08	1.68	0.24	100.00	598.28	94.31	5.03	0.65	100.00	1074.4	95.63	3.84	0.50	100.00	1669.59

7.11. Post Harvest Management/Marketing by Sample farmers

The harvesting of the flower should be done immediately soon after it matured and marketed immediately. The harvesting of different flowers took place in the study area at different timings. It is reported that the crossandra flowers were plucked between 6 am and 12 noon. The

roses, Jasmine/dela and Chrysanthemums were normally plucked in the afternoon. These timings were mostly preferred by the farmers as the atmosphere was cool during this period, which was important to maintain the freshness and the quality of the flowers and less post-harvest losses. Those farmers, who were little away from the city market, harvested the flowers in the evening and brought it to the market the next morning. Those who were near the city harvested the flowers in the morning and marketed on the same day. None of the traditional flowers had pre-cooling or cold storage or cold chain during post harvest handling.

The wages for the plukers were paid on piece-rate basis when they were employed in for half a day and daily wages (Rs 50 per day plus coffee) if they are employed on full time basis. In some cases, the laboures were employed for other works in the morning and for flower plucking in the evening. It is reported that about 3-4 kgs of flowers were plucked by each labour, if they worked from 6am-12 noon and received Rs.10 to 12 per kg as wages.

After harvesting the traditional flowers, they were packed either in loose form or in bundle form in gunny bags, polyethylene bags or bamboo baskets before marketing. Each bundle normally contained 12 bunches, The Gladiolus, Tuberose Aster, Carnations and Gerbera were bundled before selling. They brought the flowers to the market places early in the morning through various modes of transport such as buses, cycles, tempos, and trucks. Grading was very essential for getting higher prices; however, none of the farmers had undertaken grading of flowers before marketing.

The marketing of traditional flowers was taking place in three ways: a) some farmers soon after harvesting, marketed the flowers themselves; b) whereas, some farmers sent the flower to the specified commission agent in the market through transport agent who collected flowers from a group of growers. He was paid some remuneration monthly/ weekly for his services; and c) sent their produce with one of their fellow growers. The latter arrangements were normally practised in order to avoid a visit to the city by all farmers with small quantities of flowers and loose working days on the farm. The farmers went to the commission agent once in a month to see the total volume and values of his flowers maintained by the commission agent and settle the account after paying commission. Though, this arrangement appeared to be advantageous, they failed to get adequate market information and were likely to get lower price and also mis-appropriation by the transport agent. It has been reported that the some farmers sent their produce to a particular stall owned by him who advanced money to them without charging any interest. But in the process lost the bargaining choice. The trader advanced the farmer after inspecting the area under the flower. If the loans were being provided to these farmers by any organized financial institution,

they would have got the freedom of selling their produce to any commission agent and would have had the bargaining advantage for better price.

The Commission agents in the KR market does not bear any risk arising out of the perishable nature of the produce brought by the farmers, but only rendered services to them such as free storage, sorting, cleaning and counting. The fixing of price was by the commission agent, it was based on the supply and demand during previous days. The farmers reported that the commission agents fixed the price early in the morning. If nobody bid they reduced the price. This process continued till the lowest prices. The auction of flowers was a rare phenomenon here. The buyers from the commission agents or wholesalers were the retailers who were engaged in retail selling of flowers as it was or after value addition and also took contract of flower decoration in marriages and parties in different parts of the city, state and other states. So, the channel identified in this market was producer-commission agent-wholesaler-retailer (florist)-consumer. The mode of payment was normally weekly or monthly or as wished by the farmers. While marketing, the producer was also required to pay the gate fee to enter into the market with his produce. Normally, many did not pay toll as they brought small quantities of flowers into the market.

CHAPTER VIII

PROBLEMS OF FLORICULTURE

8.1. Introduction

This chapter mainly presents various problems confronted by the traditional flower growers. However, some of the problems that confront modern floriculture are also presented here. These have been gathered from discussions with entrepreneurs of high-tech floriculture. These help us to take some appropriate policy measures for the sector. This sector is making inroads into export basket of India and has better prospects. The problems relating to traditional sector have been presented in Section-I and the problems relating to modern sector in Section-II.

Section I

8.2. Problems Faced by Flower Growers

The area under floriculture is rapidly increasing in the State. The favourable factors for this development are plenty. Conducive climatic conditions, raising demand for flowers, rise in per capita levels of income, highly remunerative nature are some of the factors inducing the farmers to shift their low income crops to high valued flower crops. However, much attention has not been devoted to provide infrastructural facilities needed for the development of the sector in the villages. The field level data or the perceptions about the various infrastructure facilities speak about these shortcomings. These are coming in the way of development of floriculture and hampering the prospects of growers and villages.

The problems or constraints perceived by the growers have been broadly classified under: (i) transport related problems (Tables 8.1 and 8.2); (ii) storage related problems (Tables 8.3 and 8.4); (iii) material related problems (Tables 8.5 and 8.6); (iv) market related problems (Tables 8.7 and 8.8), and (v) other problems (Table 8.9).

8.3. Transport Related Problems (Approach Road and Transport)

A good network of roads from the village to market places is essential for the overall development of the villages. It is equally important and necessary for the quick disposal of highly perishable flowers. But, in the field area, 32.15 per cent of the farmers expressed that they have been deprived of proper approach roads. Among these, 16.07 per cent indicated that the roads had not been metalled. Another 14.29 per cent reported that the village roads were not all-season approach roads. The rest accounting for 67.86 per cent, did not give any views on the approach roads (**Table 8.1**).

When asked about their opinion on transport facilities, about 79.43 per cent said that they were facing transport problems (**Table-8.2**). Among them, lack of vehicles and high transport charges were indicated as major problems.

8.4. Problem of Storage Facilities (Storage and Cold Storage)

Storage facilities are pre-requisite for maintaining the freshness of the flowers particularly the modern flowers. However, the flowers covered in the study are traditional varieties which do not require this facility. The reason being that the farmers grow only a small quantity and dispose them quickly. However, a small proportion of the traditional flower producers (21.44 per cent) expressed that they did not have sufficient place even to keep their small quantity of produce (**Table-8.3**).

Cold storage facilities are very essential for the flowers to maintain freshness, quality, texture and life-span. However, none of the flower growers had either possessed these facilities or the Government had provided such facilities. Even then a majority of them were of the opinion that they did not require this facility as they grew in small quantities and disposed it as quickly as possible (69.85 per cent) (**Table-8.4**). They were also of the opinion that such facilities on co-operative basis might help them to keep their flowers in cold storage to overcome price fluctuations.

8.5. Packing and Planting Material Problems

The sample growers' impressions on packing material availability indicated that a majority of the growers did not face any problem in both the sampled taluks. However, 8.93 per cent of them maintained that there was lack of improved packing materials and high cost of materials (**Table-8.5**). The observation in the field shows that a majority of the farmers were

packing their produce in polythene bags or gunny bags for marketing, which they already possessed.

As far as the planting materials were concerned, majority of the farmers expressed the non-availability of quality seeds and improved varieties of planting materials. They attributed these reasons for low yield and non-disease resistant plants. A significant proportion of them expressed that the prices of these were quite high (7.14 per cent) **(Table-8.6)**.

8.6. Market Related Problems (Marketing and Market Information)

With regard to market, the sample growers expressed single or combination of constraints that they faced in market. The prominent single constraint expressed was more commission followed by middlemen problem and deduction of more charges **(Table 8.7)**. Some sample farmers mentioned that the agents did not take the consent of the farmers while selling the produce to a particular price.

Regarding market information, per capita of the sampled growers has been sought. In both the taluks it was found that there was complete absence of market information on demand and prices. About 66 per cent of the producers expressed this view **(Table 8.8)**. The discussion with the farmers revealed that they were able to get some information from the fellow producer who visited the market on the previous day. This indicates that the growers were not getting day-to-day information about the prevailing demand in the market.

8.7. Production Constraints

In addition to the above problems/constraints, a significant proportion of sampled growers reported some important constraints that are affecting production. Among these, the depletion of groundwater and frequent power failure and unscheduled power load shedding were reported by 6.88 per cent of the respondents. Another major chunk of respondents accounting about 31.03 per cent expressed that the prices of pesticides were not only high but also of sub-standard quality **(Table-8.9)**. The remaining respondents reported that the cost of labour was going up, as the labourers were demanding more wages. One interesting fact was that, about 5.17 per cent of the growers reported that they had not been given the information about modern floriculture **(Table-8.9)**.

8.8. Diseases

There has been a growing concern among the farmers about increasing pests and diseases to the floricultural crops. They have little knowledge about the appropriate pesticide for the controlling these of diseases. They reported that the prices of pesticides were high but the quality was low. The diseases reported by growers have been shown in Table 8.10.

Table 8.1: Problems Faced by the Growers Regarding Approach Road in Bangalore Urban District

(In percentages)

Reponses	Bangalore North Taluk	Bangalore East Taluk	Total
No all seasons approach road	0.00	17.86	14.29
Road is not metalled	17.86	14.29	16.07
Transport problem	0.00	3.57	1.79
No problem	71.43	64.29	67.86
Total	100.00	100.00	100.00

Table 8.2: Problems Faced by the Growers Regarding Transportation in Bangalore Urban District

(In percentages)

Reponses	Bangalore North Taluk	Bangalore East Taluk	Total
Lack of vehicle	14.29	25.00	21.43
Lack of refrigerated vehicle	0.00	14.29	7.14
High transport charges	17.86	14.29	16.07
Lack of vehicle & high transport charges	3.57	46.43	25.00
Lack of vehicle, lack of refrigerated Vehicle & high transport charges	3.57	0.00	1.79
No problem	60.71	0.00	28.57
Total	100.00	100.00	100.00

Table 8.3: Problems Faced by the Growers Regarding Storage Facility in Bangalore Urban District

(In percentages)

Reponses	Bangalore North Taluk	Bangalore East Taluk	Total
No storage	14.29	25.00	19.65
Inadequate storage facility	0.00	3.57	1.79
No problem	85.71	71.43	78.57
Total	100.00	100.00	100.00

Table 8.4: Problems Faced by the Growers Regarding Cold Storage Facility in Bangalore Urban District

(In percentages)

Reponses	Bangalore North Taluk	Bangalore East Taluk	Total
No pre-cooling facility	17.86	10.71	14.30
Lack of refrigerated vehicles			
Inadequate pre-cooling facility	3.57	3.57	3.57
No cold storage facility	0.00	10.71	5.36
No Precooking facility and cold storage facility	7.14	7.14	7.14
No problem	71.43	67.86	69.65
Total	100.00	100.00	100.00

Table 8.5: Problems Faced by the Growers Regarding Packing Material in Bangalore Urban District

(In percentages)

Reponses	Bangalore North Taluk	Bangalore East Taluk	Total
Shortage of packing material	0.00	3.57	1.79
Higher prices	7.14	0.00	3.57
Lack of improved packing material	7.14	3.57	5.36
No problem	85.71	92.86	89.29
Total	100.00	100.00	100.00

Table 8.6: Problems Faced by the Growers Regarding Planting Material in Bangalore Urban District

(In percentages)

Reponses	Bangalore North Taluk	Bangalore East Taluk	Total
Non availability of quality seeds	14.29	25.00	19.64
Non availability of plant material	0.00	7.14	3.57
High prices of seeds and materials	10.71	17.86	14.29
Non Availability of seeds and improved Plants	35.71	10.71	23.21
No problem	39.29	39.29	39.29
Total	100.00	100.00	100.00

Table 8.7: Problems Faced by the Growers Regarding Market Information in Bangalore Urban District

(In percentages)

Reponses	Bangalore North Taluk	Bangalore East Taluk	Total
Inadequate information	42.86	60.71	51.79
Information for limited market	7.14	3.57	5.36
Inadequate information & information for limited market	14.29	3.57	8.93
No problem	35.71	32.14	33.93
Total	100.00	100.00	100.00

Table 8.8: Problems Faced by the Growers Regarding Marketing Problem in Bangalore Urban District

(In percentages)

Reponses	Bangalore North Taluk	Bangalore East Taluk	Total
More commission	42.86	25.00	33.93
Middle man problem	3.57	25.00	14.29
Deduct more charges	28.57	0.00	14.29
Delay in payment			
Do not take our consent while selling	3.57	7.14	5.36
Quote lower price than actual prevailing price	3.57	7.14	5.36
More commission & do not consult While selling	7.14	0.00	3.57
More commission & delay in payment	0.00	7.14	3.57
More commission, middleman problem & deduct more charges	0.00	17.86	8.93
No Marketing place	0.00	3.57	1.79
No problem	10.71	0.00	5.36
Total	100.00	100.00	100.00

Table 8.9: Other Problems Faced by Flower Growers in Bangalore Urban District

(In percentages)

Problems	Bangalore North Taluk	Bangalore East Taluk	Total
Depletion of groundwater and electricity problem	3.57	7.14	5.36
Labour demands more wages	7.14	7.14	7.14
High prices of pesticides but low quality	42.86	39.29	41.07
Not provided information on modern floriculture	0.00	10.71	5.36
Not given any response	46.43	35.71	41.07
Total	100.00	100.00	100.00
	28	28	56

Table 8.10: Crop-Wise Diseases in the Study Area

Name of the crop	Crop Problems
Crossandra	<ul style="list-style-type: none"> ▪ High mortality rates after 2 months of planting due to some disease (white Patch) in the months of November to January. ▪ Farmers do not know reasons for diseases. ▪ Even after application of Pesticides, the disease has not come down. ▪ Farmers do not know what type of pesticides to be used to control this disease. ▪ Improved and pest resistance seeds are not available.
Marigold	<ul style="list-style-type: none"> ▪ Dog disease is most prevalent which is affecting the yield. ▪ 25 per cent of the seed used is not sprouting.
Jasmine	<ul style="list-style-type: none"> ▪ Black spot leaves affecting the yield.
Rose	<ul style="list-style-type: none"> ▪ A powdery mildew disease is more common and affecting the yield. The red spider mite, black spot and powdery mildew are common pests and diseases. ▪ There has been formation of black colour on the border of petals and stock adversely affecting the quality of flowers.
Gerbera	<ul style="list-style-type: none"> • Powdery mildew and root disease affecting Gerbera plants. Start dying after one month of planting. Farmers are not aware of the exact reason.
Tuberose	<ul style="list-style-type: none"> • There has been attack of " Root borer" after nine months of planting causing death of plants and low yield.
Chrysanthemum	<ul style="list-style-type: none"> • The incidence of "Blight Disease" causing drying of leaves and flowers and ultimately destroying the plants.

Section II

8.9. Constraints for Modern Floriculture

Exports of modern floricultural products are on the rise in the last 7 to 8 years. But the industry is not performing well and many units have become sick. In the last few years, most of the units have lost their fragrances and a large number of units have been closed down (Anonymous 2001:62). This has been attributed to their poor performance. The factors that have contributed to this situation are:

8.9.1. Transport Constraints

1. Efficient, more reliable and direct flights to different destination are the pre-requisite for the quick disposal of the product and better realisation. In India, these facilities are inadequate. There are no direct flights to international markets such as Amsterdam, and Copenhagen. In Karnataka, the exporters have to transport flowers through Mumbai or Chennai airports, where connection to international flights is available. Even, in the available flights, adequate space is not accommodated for flowers. In February 2003, several tonnes of flower in Bangalore was stranded in the airport for lack of space in flights (Thakur 2003). Again, there were several instances

of diverting the flowers to domestic market on account of insufficient plights. All these led to delays in exports and deterioration in the quality of the flowers.

2. The high freight charges are affecting the viability of the floricultural units. It was reported that the freight charges for transporting 1 kg of flower was Rs.100. It had been worked out that the minimum freight per stem of roses was Rs. 2.30 to 3.50 (Negi 2000: 14). To ease the matter, subsidy on airfreight to the extent of the 25 per cent of IATA rates are provided to the exporters. But the airline rates are much higher than the IATA rates. It is said that the rates are higher than one prevailing in Israel and African countries.
3. The exporters are required to book space in the flight one month in advance. Even after booking, there were instances of cancellation of booking and some times cancellation of flights caused heavy losses to the exporters. There were also instances of cancellation of flight and cancellations of advance booking.

8.9.2. Constraints at Airports

1. There was lack of post-harvest infrastructure such as cold storage facilities at Airports. This led to the exposure of the flowers to open conditions.
2. The procedure followed at the airport in checking the quarantine element before transit was taking lot of time. This lead to delays in exports and affected the quality of the product. At the destination also, some countries conducted phyto-sanitary tests for flowers. For Instance, Japan fumigated all flowers at their ports which could spoil the quality of flowers as they were using Methyl Bromide.

8.9.3 Destination Problems

1. Most of the shipments were sent to agents who were acting as middlemen. In these Procedures no body knew how the realisation were made.
2. The quality of Indian flowers was also low compared to other countries like Ecuador, Kenya and Ceylon.

3. There are no secured buy back arrangements in the case of modern flowers as in the case of many exportable commodities like gherkin and grapes in Karnataka. This led to uncertainty of the prices and export orders.

8.9.4. High Cost of Production and High Duties

1. The modern floriculture is incurring losses due to high overheads and high establishment costs compared to small units. This is evident from the production cost. In the small unit, the production cost per flower was Rs. 0.80 which was less compared to production cost per flower which was as high as Rs.2.10. (Anonymous 2001)
2. The units borrowed heavy amounts at the rate of 14-18 per cent, which eroded most of the resources and also affected the viability of the units.
3. European countries did not charge any import duty on floricultural inputs from Israel, African countries (except South Africa) and, Latin American countries thus making them competitive whereas, on the Indian exports, there has been imposition of import duty on Indian cut-flowers which resulted in pushing the cost of marketing of flowers and low realisations. The European Economic Countries including Holland, except Switzerland are imposing 15 per cent during winter and 25 per cent during summer (Negi: 2000:14). These were reduced later. The rates were 12 and 10 per cent with certificate of origin and 8.5 and 7.5 per cent during winter (see, Raghava and Dadlani 2000:152). It is said that 35 per cent of the revenue went to commission agents for handling and clearing the consignment and another 35 per cent went towards freight charges, that left 30 per cent with which they had to meet the operation costs with low profits. Realising these were high, India was diverting its exports towards Japan, Singapore etc., where the import duties were absent.

8.9.5. Heavy Dependence on Imported Technology and Lack of Experience

1. Many of the units heavily depended on the imported technology and materials for installation of units. This had pushed the unit cost.
2. Not enough technical support and guidance was received from the government and horticulture departments. As such, many of the operations were carried out as per the directions of the consultants incurring heavy consultation charges.
3. The collaborators, mainly the Dutch and Israelis have given technical guidance to flower growers without proper examination of the locations, conditions causing the closure of units. The projected levels of Yields have not been achieved in many places. The yield is

just 120 flowers per sq.mt. The units established in such locations resulted in closure. According to available data about 20 units had closed already (Abraham 2000: 14).

4. Entrepreneurs with industrial and business background have entered the field of floriculture due to three reasons: (a) to make a name in the field as in every field; (b) entered into the field as many of the big industrial concerns are entering into the field; and (c) to diversify their business. However, many of them have entered the field without having any previous experience in the field. Many times buying up the real estate, import of technical consultancy enough for the sector. What they failed is understand how difficult to manage flower business without previous experience. As a result, several industries became sick and some of them closed. Already 20 units of such units have been already (Abraham 2000:14).
5. Many units have invested heavily in the industry by borrowing from banks without assessing the local conditions, without relying on indigenous technology. This is one of the reasons for the increasing losses.

8.9.6. Other Constraints

1. Lack of transport vans equipped with refrigeration facilities to transport flowers to long distance markets, lack of information about world market and non-availability of planting materials of varieties suitable for export, procedural delays and inadequate promotional campaigns and huge bank debts accounting for Rs. crores have been attributed for bad performance of this sector.
2. Information regarding the market trends in terms of opportunities for new varieties, value-added packaging and developments taking place in other parts of the world was also not available to the growers.
3. The higher debts of modern banks accounting for more than Rs. 100 crores as per Tata Economic Consultancy Services making them unviable.

On the whole, the major problems faced by the producers are dearth of infrastructure, absence of technology transfer, lack of inputs, such as quality seeds and planting materials and the absence of cooperative marketing, high transport cost, import duties, and irregular power supply to modern floriculture. These have to be tackled on priority basis, if the industry wants to sustain. Apart from this, encouragement has to be given for setting up more processing units to avoid post-harvest losses as to overcome market glut, otherwise, the farmers continue to face the problems.

CHAPTER IX

PROSPECTS FOR FLORICULTURE INDUSTRY

9.1. Introduction

This chapter presents prospects for both traditional and export-oriented modern floriculture. The points highlighted in respect of traditional floriculture are based on the primary data. In the case of modern floriculture, prospects have been highlighted based on secondary information and discussions with the entrepreneurs in the field. The prospects relating to traditional floriculture has been presented in section 1 and prospects relating to modern floriculture have been presented in section II. The prospects presented under section 1 are based on the perceptions of the sample growers. The prospects presented under section II are based on secondary information, which are applicable to floriculture, in general.

Section I

In recent years, there has been much talk about cash crops/high valued crops particularly the floricultural crops. The farmers in the study area were well aware of this situation and continuing the cultivation of flower crops. However, there were divergent views on the future prospects of floriculture. About 50 per cent of the farmers were of the view that floriculture would have better prospects due to rapid urbanisation and increasing demand for flowers from various sectors. Against this view, 35.71 per cent of the farmers reported that this sector did not have future on account of competition from modern floriculture. Another 14.29 per cent had expressed that they intended to stop traditional floriculture on account of depletion of groundwater and high cost of production (**Table 9.1**).

Table 9.1: Farmers Opinion on Future Prospects for Floriculture in Bangalore Urban District

Opinions	No of farmers	% to total
1. Intend to stop floriculture due to high cost of cultivation	8	14.29
2. Having good future	28	50.00
3. No future	20	35.20
Total	56	100.00

For further development of floriculture in future, the growers provided a wide range of suggestions for the improvement of floriculture. These have been broadly grouped into three categories, viz., (i) suggestions related to inputs, improved implements, (ii) suggestions related

to improved seeds and plants, and (iii) suggestions related to market information and Minimum Support Price (MSP). Out of the total sample, 82.15 per cent provided these suggestions. Of this, a major proportion expected that the government should provide sprinkler sets, modern agricultural equipments, pesticides and fertilisers (39.29 per cent) at subsidized rates. Another 28.57 per cent of the farmers suggested that government should provide minimum support price as market gluts were leading to frequent and violent fluctuations in prices in the market (Table 9.2). These were reducing the profitability of the farmers and making them to suffer and this made them to leave the activity. In order to make them to stay in this activity, there was need to introduce a mechanism for effective price support and stability in the production

Table 9.2: Suggestions Given by the Growers for the Improvement of Floriculture in Bangalore Urban District.

(In Percentages)

Nature of suggestions	Bangalore North Taluk	Bangalore East Taluk	Total
1. Government should provide sprinkler sets, modern equipments, fertilisers and pesticides at subsidized rates	32.14	46.43	39.29
2. Government should provide improved and disease tolerant seeds/plants	21.43	7.14	14.29
3. Needs timely market information and minimum support price	42.86	14.29	28.57
4. Not given any suggestion	3.57	32.14	17.86
Total	100.00	100.00	100.00

Section-II

Floriculture is flourishing in the country as well as in the state. It has bright future and prospects. The following present features and developments would definitely support this view:

- India can emerge as a major producer, exporter of flowers and allied materials as it has several advantages such as favourable climate to grow different flowers throughout the year, cheap labour, rapid urbanization, huge scientific and managerial talent and strategically located for exports, good demand for this natural product, eco-friendly product, having prolonged shelf life particularly the modern cut-flowers which are widely accepted globally.
- There has been an upward trend in area and production of traditional and modern flowers. This would grow further.
- The flower exports of the country which were few lakhs a decade back became crores after 1990s. This trend would continue on account of increasing demand for our flowers in other countries.

- The general consumption and use of flowers from various segments increased as a result of improvement in rising income levels or general level of well being in the country and increased affluence particularly among middle class and this is likely to increase further. This is evident from emerging strong domestic market in recent years, which also indicates better prospects. Domestic markets for cut flowers are witnessing marked pick up.
- In recent years, the elections have become a regular phenomenon. The uses of modern flowers (Roses) in these election campaigns become more popular than the traditional flowers.
- Religion is emerging as one of the major reasons for the increasing demand for the exotic/modern flowers. This is evident from the use of these flowers in famous temples in India such as ISKON, Tirupathi and Tiruvannamalai. According to the managing director of Bangalore based Karthuri Floritech about Rs.10 lakh worth of Dutch flowers was supplied to Tiruvannamalai in the last year.
- The process of liberalization and globalization of the Indian economy has paved the way for transformation of this traditional activity into a burgeoning commercial enterprise. This is on account of a dramatic change in the life-styles of people in India especially in Metropolitan Centres in the post liberation era.
- The traditional flowers can be grown in open field, like any other field crop without sophisticated structures and heavy capital cost involved in cut-flower production. They are also very lucrative, which bring in, handsome returns to the farmers compared to the growing of other agricultural crops.
- Domestic markets have also started absorbing the modern flowers besides expanding. People are using the modern flowers even in small functions.
- There is also much talk on this activity in seminars, media and in literature in recent years.
- The demand for cut-flowers in Cities has increased as the culture of presenting bouquets on all occasions is spreading. Florist shops have sprung up in cities like Mumbai, Chennai, Kolkotta, Delhi, Hyderabad, Chandigarh, Bangalore and Pune and making brisk business throughout the year. The florist stalls in many parts of the country, which undertakes attractive flower arrangement in the corporate offices, hotels, marriage halls, welcoming of guests and passengers with flowers and bouquets in airports and meetings have become the practice in recent years. The presenting of bouquets to the patients for speedy recovery instead of earlier practice of fruits is the order of the day in city hospitals. The presence of florist shops near hospitals is a good indicator of this. Even in marriages the couples are blessed with bouquets rather than the presenting gifts.

- International Flower trade Council has identified Bangalore as a potential export centre in India, The expert group of the floriculture development in India, constituted by the Government of India, has identified Bangalore as a potential zone for floriculture development and trade centre (GOK 2000). More effort is needed to develop Bangalore, keeping in view of these positive initiations within India.
- The proposed Dubai flower centre is going to be a more promising market for Indian flowers on account of no import duties, less traveling time and low flight costs.
- As of now, the small and marginal farmers are not undertaking modern floriculture. They are hesitant to take it up due to prohibitive costs and the risk involved in it. Still there is scope for motivating them to take it up by providing cost-effective technology to produce export quality flowers and take advantage of the increasing global demand for the flowers and earn better incomes.

On the whole, it is difficult to say whether traditional floriculture is having future or modern floriculture is having future. However, on the basis of types of flowers grown by these sectors, it can be said that both have prospects. There is great export market for modern flowers whereas, the traditional flowers have strong domestic market. But the traditional market is larger in terms of area production and employment generation in the rural as well as in the urban areas in the value added process. It is also worthwhile for India to increase its production of flowers in view of the tremendous demand for flowers from European and western countries where there is less possibility of growing the flowers. There is severe cold and heavy snow during the winter season. Growing flowers in this season and meeting the demand is difficult. They have to depend on other countries. India has to utilize this opportunity, as the cost of growing flowers in India is less compared to Holland, Israel, France, but the quality should be maintained. Emerging new markets like Japan, Singapore, and Hong Kong for the Indian flowers may increase in the years to come, but the small units may exit due to uneconomic returns and high overheads. There is vast scope for furthering floriculture provided some facilities like research in cut-flowers availability of good seed and planting materials are created. Seed is another area which has not developed. Some seed companies in Kolkata, Bangalore, Pune are encouraging seed production as there is good demand. This has to be developed further besides encouraging tissue culture.

9.2. WTO and Its Implications for Floriculture

There are apprehensions that the floricultural activity in India and Karnataka is going to receive setbacks on account of the implementation of the provisions or prescriptions of WTO. According to one provision, the member countries have to implement the plant breed's right. If this is put into operation, it will affect Indian floriculture growers. However, this threat will not become reality in the short-run. This is because, India, at present, is importing the first red and grand gala varieties, which are in the maturity stage of the product cycle. Since these varieties are not the latest ones, there will not be any problem in acquiring these varieties without royalty payments. However, India has to amend the Patent Act 1970, in order to protect the native varieties. It is also attributed that the implementation of WTO provisions benefit the Indian floriculture. Firstly, India stands to gain from the removal of "Most Favoured Nation Status" of WTO provision. Secondly, the export concession to this sector can benefit the industry because, the subsidies at present have been put under green box condition (Non-auctionable subsidies) Lastly, there will not be any inflow of exotic flowers into the Indian market due to the removal of QRs. The market here is not so attractive to African and Kenyan growers who are the present competitors of India, whose cost of cultivation is high. However, the Indian flowers may face rejection on account of non-compliance of the quarantine restrictions, which are put by importing countries. In this regard, India has to give utmost care in using pests and fertilizers. It is also required to strengthen the post harvest facilities and post- quarantine facilities at the storage and at airport to maintain freshness and quality.

There is also a possibility of competition between the local traditional growers and modern growers, if the modern flower growers market them in the domestic market, and this may be a threat to the livelihood security of villagers. At present, the farmers get 30 paise per rose flower, which are grown in open conditions and sold in the wholesale market whereas, the modern flower grower gets Rs. 1.50 to 2 per stem. If the Proposed International Floriculture Auction Centre became a reality and removal of QRs is effected there may be flood in the flowers into India, it may threaten the domestic market. Further, as the people are most quality conscious now, the flowers grown under open conditions are becoming less competitive in domestic market as well as international markets due to quality-consciousness of the buyers. These kinds of situations may progressively eliminate the traditional small growers from floriculture. At the same time, the small farmers will not grow the quality roses as it requires green houses which they cannot afford, requires huge investment, which they cannot provide.

India may also face stiff competition from other developing countries like Zambia, Zimbabwe, Malaysia, Morocco and Mauritius, which are enjoying similar climatic conditions and

producing good quality flowers. So, India has to develop high technology and infrastructural facilities for the development of floriculture.

In view of this, the government should protect the domestic market and small and marginal farmers by way of providing simple technology and improving the quality of flowers if at all our floriculture sector has to flourish

CHAPTER X

SUMMARY AND POLICY RECOMMENDATIONS

10.1. Introduction

Karnataka stands first in the country in the production of traditional and modern flowers. The area under the crop increased from 0.04 lakh hectares in 1986-87 to 0.21 lakh hectares in 1999-2000. The production increased from 0.21 lakh tonnes to 1.32 lakh tonnes valued at about Rs.250 crores during the same period. In terms of its share in the country's total floricultural area and production in 1999-2000 it accounted for 23.48 per cent and 34.44 per cent respectively. The conducive climate in the state is one of the favourable factors for this impressive growth. Its performance on the export front is also remarkable. In 1999-2000, about 58 million loose flowers were exported from the state. The realisations from these exports accounted for Rs.44.66 crores in 1999-2000, around 44.80 per cent of the country's total flower exports. Despite this good performance, certain districts in the state have lagged behind in floriculture activity.

At the county level, we find little progress in the area of floriculture on account of various constraints. This is reflected from its meagre share in the World floricultural trade. The country's share in the world trade of fresh flowers is just 0.40 per cent to 0.50 per cent which is also low compared to Netherlands 59 per cent, Columbia 10 per cent, Italy 6 per cent, Israel 4 per cent, Kenya 1 per cent and other countries 20 per cent. The area under floriculture is also relatively low compared to many countries. The per capita consumption of flowers is also considerably low when compared with other developed countries like Western Europe, Japan and USA. In other words, the vast potential of floriculture seems to be not fully tapped.

The domestic market for flowers is also not well developed due to several constraints such as lack of awareness about its potential, lack of quality planting material, weak infrastructure support, lack of post-harvest facilities, lack of good markets, exploitation of farmers by middlemen, weak database etc. It is also viewed that a large section of small and marginal farmers are involved in growing these crops face many problems. There is hardly any comprehensive study to examine all these issues in the state. Therefore, an attempt has been made to highlight these factors apart from providing database for identifying the magnitude of the problems and prospects of this sector and also suggesting appropriate measures for tackling the problems of the growers and improving the floricultural industry.

10.2. Objectives

Keeping the above issues in mind, the objectives of the study are:

- to analyse the trends in area, production and yield of floricultural crops in Karnataka;
- to study the infrastructural facilities available for floriculture development in Karnataka;
- to study the trends in traditional (domestic) flower market and modern markets (international markets);
- to study the socio-economic conditions of flower producers;
- to estimate the income and employment generated from floriculture cultivation;
- to identify the problems faced by the growers; and
- to suggest policy measures for the healthy growth of the sector.

10.3. Scope of the Study

Both modern floriculture and traditional floriculture are simultaneously growing in our economy. Although, both are important, the traditional floriculture is more important as it is more predominant in the state in terms of area and production. The state is slowly moving towards modern techniques. Hence, the proposed study has been carried out mainly focusing on the traditional flower-growing farmers for understanding their socio-economic conditions and income and employment generation from flowers.

10.4. Methodology and Data Sources

The study has used both secondary as well as primary data. The secondary data have been collected from various sources, which have some connection with floricultural industry. The primary data have been collected from flower-growing farmers in the sample villages. The secondary data have been gathered from various publications for analysing the status of floricultural activity in India and Karnataka. The primary data has been used for analysing the background of the flower growers and floricultural economy.

10.5. Study Area and Sample Size

Bangalore urban district has been selected for in-depth analysis. It was selected on the ground of having the largest area under floriculture in the state. A cluster of villages in two

taluks of this district were selected to draw sample farmers. Among these taluks, one is having the largest area under floriculture and another less in area. From these taluks 28, flower growers each were selected and data relating to various issues of floriculture and the growers' background were collected. These details were collected for the reference period 2001-2002 through well-structured schedules.

10.6. Major Findings of the Study

A. Floriculture Development in India

The area under floriculture in India increased from 53,000 hectares in 1993-94 to 88,607 hectares in 1999-2000 with an increase of 35,602 hectares. This area was 0.72 per cent of the total horticultural crops and 0.05 per cent of the gross cropped area in 1999-2000. This was well ahead of the projected area of 0.5 million hectares by 2000 AD by the National Commission on Agriculture (NCA 1976: 355). However, the area of floriculture under protected conditions is very less compared to other countries. In Netherlands, the proportion of area under protected area was 70 per cent and in Colombia (90 per cent) whereas in India it was 500 hectares accounting for 0.22 per cent of the total area under floriculture and the rest was under traditional flowers. Efforts are needed to increase the area under hi-tech at least to 2,000 hectares in view of its growing demand.

The production of loose flowers increased from 233,000 tonnes to 509,193 tonnes and that of cut flowers increased from 5,555 lakh numbers to 6,806 lakh numbers during the above period. The favourable factors such as warm temperature, soil conditions, relatively cheap labour, different agro-climatic zones in the country have helped the growth in area and production.

The growth rates of floriculture shows that they are not only high, but also quite high compared to other horticultural crops. The growth rate of floriculture was 6.91 per cent in area and 4.32 per cent in production between 1993-94 and 2001-2002, whereas the growth in area and horticultural production was 5.7 per cent and 5.08 per cent respectively.

Across states, Karnataka has the largest area under floriculture with 20,801 hectares, followed by Tamil Nadu 18,120 hectares, Andhra Pradesh 18,087 hectares, West Bengal 13,227 hectares, Maharashtra 6,606 hectares, Delhi 3,450 hectares and, Haryana 2,250 hectares in 1999-2000. These states accounted for 98.64 per cent of the total floriculture area in the country.

There is a general belief that the flower crops generate more income and employment. This belief has been found true according to some studies. The studies show that the extent of employment from flower crops is in the range of 913 to 1,210 man days/ha and this is more than the employment generation of food crops which is in the range of 105 to 305 man days/ha. Similarly, the income generated by flower crops is to the extent of Rs. 8 to Rs. 9 lakhs/ha compared to Rs. 4,000 to Rs. 52,000 in the case of food crops.

The trends in domestic market of flowers have shown tremendous improvement. According to available data, the domestic trade increased from 205 crores in 1996 to 500 crores in 2000. But the producer did not benefit much from this progress due to a multiple of mediators in the market. According to evidences, the producers benefited by 24 to 64 per cent of the consumer price in different flowers.

The growth of modern floriculture and its exports is another significant development in the post economic reforms. In between 1991 and-1996 about 170 export-oriented floricultural units had been set up. As a result of this, the export of flowers increased from 14.80 crores in 1991-92 to 132.65 crores in 2000-2001 with increase by 790.94 per cent during this period. In spite of this increase, our exports just accounted for 0.5 per cent of the world's trade of flowers compared to Netherlands with 65 per cent, Colombia with 12 per cent and Israel with 6 per cent.

Although one hears a lot about the potentialities of modern flowers in recent years, there are very few studies to show its environmental impact in terms of deterioration in soil conditions, depletion of underground water and on the health of the workers. It has been pointed out that 10 years of cultivation of modern floriculture requires about 30 years to rejuvenate the land to make it fit for agriculture again.

Post-harvest losses of floriculture are another issue, which is bothering the producers and policy makers for quite some time. Estimates show that the loss of flowers in the post-harvest period is in the range of 20 to 35 per cent. In order to arrest this, the governments have created many agencies to provide infrastructural facilities. The NHB, APEDA are some of the agencies providing assistance of various kinds to promote and create cold storage facilities to prevent flowers getting spoiled.

Besides these attempts, the central government has been hiking outlays in each successive plan to promote this sector. The outlays have increased from 17 crores in the

seventh five year plan to 40 crores in the ninth five year plan. For increasing flower exporters, 5 AEZS were sanctioned with an investment of Rs. 188.02 outlay. Import duties on many items required for modern floriculture have been reduced in recent years to facilitate the floriculture sector.

B. Floriculture Development in Karnataka

Karnataka is in the limelight for floriculture right from the 18th century. Today, it is a major producer in the country accounting for 24.44 per cent of the country's total production and 23.48 per cent of the area in 1999-2000. Both traditional floriculture and modern floriculture are expensive simultaneously. But the increase in area of traditional flower is greater than modern floriculture. The area under traditional flower increased from 0.05 lakh hectares in triennium ending 1982-83 to 0.22 lakh hectares in triennium ending 1999-2000 with an increase of 0.17 lakh hectares or by 425 per cent. Production also increased from 0.30 lakh tonnes in 1978-79 to 1.51 lakh tonnes in 1999-2000 with an increase of 1.02 lakh tonnes or by 240 per cent. This increase was 100 per cent higher compared to the area expansion during this period. Increase has been noted in all districts of the state and in all agro-climatic regions. However, the central zone comprising of Bangalore, Kolar, Chitradurga, and Tumkur have accounted for larger increase.

The annual compound growth rate of flower production shows that it recorded an annual compound growth rate of 8.54 per cent in area and 10.24 per cent in production between 1980-81 and 1999-2000. This was higher than the growth rate of horticultural crops, which experienced a growth of 2.87 per cent in area and 3.96 per cent in production during the same period.

The proportion of area under floriculture in the state was found to be 0.18 per cent of the gross cropped area in triennium ending 1999-2000. However, Bangalore Urban and rural, Mysore, Kolar and Dakshina Kannada districts were having higher proportion of area than the state average. Similarly, these districts had a concentration of larger share of total floricultural area in the state and higher proportion in the total horticultural crops of these districts. The differentials in endowments, climate, demand and irrigation facilities are mainly responsible for large variations across districts.

The crop-wise proportion of area shows that marigold accounted for a major share with 24.24 per cent of the area followed by jasmine 20.30 per cent, chrysanthemum 13.93 per cent. These together accounted for about 58.47 per cent of the floricultural area in 1999-2000. Again, marigold accounted for a major share in production with 34.74 per cent. But jasmine, which has

the second area become third in respect of production (13.48 per cent). The chrysanthemum accounted for 19.72 per cent the production, which was third in respect of area. These two crops also registered highest growth rates. Crossandra witnessed an annual growth rate of 12.93 per cent in area and 11.07 per cent in production. The crossandra registered higher growth rate as this flower was in great demand particularly from women for adornment of their hair and also for its longevity. The marigold also showed higher growth rate on account of thrust it received from the companies which were encouraging contract forming to get their raw materials for manufacturing medicines and perfumes.

Among the four agro-climatic regions in Karnataka, the southern region experienced highest growth rate both in area (10.26 per cent) and production (11.61 per cent) between 1980-81 and 1999-2000. The central region closely followed this with 7.10 per cent growth rate in area and 9.04 per cent growth rate in production. The remaining two regions had similar growth rates in area at 8 per cent. Across districts, Bangalore urban district registered higher growth rate both in area and production followed by Mandya in southern region and Bidar in northern dry region. The lowest growth rate in area and negative growth rate in production was experienced by Kodagu district.

It is generally believed that increase in per capita income, developmental levels, and urbanization and irrigation facilities increased the demand and consumption of flower products. But the available data reveals mixed relationship in Karnataka. Bangalore Urban and Rural, Mysore, Shimoga and Bellary support this view. This finding is not found valid in case of some districts even though they are good in the indicators highlighted earlier.

Modern floriculture has progressed well in the state. About 40 units covering a cultivable area of 150 hectares have started production around Bangalore with a capital investment of Rs. 500 crores.

On the export front, the state exported 54 million stems in 1998-99, which increased to 58 million stems in 1999-2000. In value terms, it exported Rs. 37.73 crores worth of flowers in 1998-9 and Rs.15 crores in 2000-2001 accounting for 34 per cent of the total exports of the country in 2000-2001. A large proportion of these products were exported to Amsterdam, Germany, Italy, UK, Australia, Japan, and Middle East.

The progress of floriculture depends on the progressive increase in outlays. But the evidences show that not much attention was paid to the development of floriculture in the early

plans and only later that it found a place in the plans of the state. However, thrust has been given from the eighth plan onwards. The available data show that the proportion of outlay for this sector in the total horticultural outlay had increased from 0.43 per cent in 1997-98 to 8.02 percent in 2001-2002.

C. Infrastructure for Floriculture in Karnataka

Realising its importance and potential, both state and central governments created several institutions for its development. The National Bank for Agricultural and Rural Development (NABARD), National Horticultural Board (NHB), Agricultural and Processed Food Products Export Development Authority (APEDA), District Industries Centre (DIC), South India Floricultural Association (SIFA) and the Karnataka Flower Growers' and Processing Co-operative Society are some of these agencies, which have shown keen interest in developing the sector.

Apart from these institutions, the state government has initiated several programmes under state plans as well as under centrally sponsored schemes. The state Agro-Industries Corporation has started floriculture auction centre on the lines of Dutch Model of auction centre. On the recommendation of the state Agricultural Policy 1995, land-ceiling Act was amended and provision was made for the floricultural units to acquire 20 units of land (108 acres). A Model Floriculture centre (MFC) was established in 1995 in an area of 9.132 acres near Bangalore to act as focal centre for the development of floriculture in the State. A laboratory was established at Hulimavu near Bangalore to develop disease free planting material on a larger scale. The multiplication of flower seeds and plants has been carried out in this laboratory. Under the concept of Model Floriculture Village, two villages were identified. Several interaction classes between the farming community and scientists were organized in these villages to transfer the improved technology. Several demonstration classes on the new varieties developed by IIHR were conducted here. The impact of this has been witnessed around these villages in terms of area expansion and use of new varieties.

In order to curtail the menace of middle men and commission agents in the traditional flower markets, the government is encouraging the forming of flower growers' associations and extending financial support to these associations.

A Cargo Centre for perishable commodities like flowers, vegetables and fruits was established at Bangalore Airport in 1998. This, the cold storage, is a boon to the growers in reducing spoilages of flowers besides maintaining the cold chain right from the point where flowers are grown to foreign auction centres.

To provide domestic market for high-tech flowers, KAIC established a permanent auction house for flowers in its premises on October 15, 1995. About 70 growers, of whom 38 are high flower cultivators and 50 buyers have registered in the centre. The quantity of flowers auctioned in the centre increased from 17.17 lakh stems in 1996-97 to 93.39 lakh stems in 2001-2002. During the same period, the value of flowers increased from Rs. 31.06 lakhs to 270.71 lakhs, a whopping annual growth rate of 771.57 per cent.

South India Floricultural Association, based in floriculture (with 36 growers and exporters), is facilitating the growers in marketing their cut-flowers and roses in arranging chartered flights with the support of APEDA and the Ministry of Agriculture for export of flowers to different destinations.

Apart from these agencies, the Indian Institute of Horticultural Research, Bangalore, has done a tremendous job in evolving new varieties. They are being made popular with the extension agencies of the University of Agricultural sciences (UAS), Bangalore, and the state Horticulture Department.

D. Marketing of Flowers in Bangalore City

The trade in Bangalore City has increased by leaps and bounds over a period of time. This is reflected in the volume of trade taking place in the City KR Market and KAIC Floriculture Auction Centre. It is seen that the volume of modern flowers auctioned in KAIC floriculture auction centre increased from 17.17 lakh stems in 1996-97 to 92.39 lakh stems in 1999-2000 with a whopping increase of 438.08 per cent. During the same period, the value of the flower increased from Rs.31.06 lakhs to Rs. 270.71 lakhs with an increase of 771.57 per cent. In spite of this increase, the transactions in the centre account for 5 per cent of the total trade in the city only.

In another market, namely, the KR market, both cut-flowers and loose flowers were sold in large scale. The volume and value of cut-flowers traded in 1999 was 6,314 MT Stalks/stems worth Rs.4,846 lakh. Bulk of this accounted for roses. On the other hand, the volume of trade of loose flowers was about 5,291 tonnes accounting for 0.49 per cent of the production in the state, valued at Rs. 1,750 lakhs in 1995. This went up to 12,257 tonnes accounting for 6.27 per cent of the state production valued at Rs. 5,830.7 lakhs with an increase of 56.83 per cent in quantity and 70 per cent in value in 2001.

The growth rate in arrival, average price, and total revenue between 1995-2001 was 17.19 per cent, 8.66 per cent and 20.68 per cent respectively. Among the flowers, rose registered the highest growth rate in arrivals with 37.90 per cent whereas, the tuberose showed the highest growth rate in average price per kg with 18.08 per cent. And the marigold witnessed the highest growth rate in the total revenue between 1995 and 2001.

E. Socio-Economic Profile of the Sample Growers

The demographic feature of the sample household reveals that there were 370 members in the households of 56 selected flower sample growers, which worked out to 6.60 persons per family. The proportion of working population was found at 59.76 per cent of the total household population. The adult male and female and male and female children below 14 years were almost equal. The Vokkaliga community was found to be in large numbers among the sample growers. This was followed by Kuruba, Tigala and Golla castes. Though the Thigala caste members were traditionally flower growers, in present day scenario number is not considerable.

A large segment of the sample growers took up this activity between 1991 and 1995. Various factors have been attributed for the cultivation of flowers during this period. The most common combination of factors attributed is the nearness of the market, low cost of cultivation, easy maintenance and profitability of the venture.

A total of 20.45 hectares were brought under flower cultivation. A majority of this was devoted for rose crop cultivation followed by jasmine. According to the farmers, a bulk of this production went for the purpose of garland making and decoration purposes.

It is observed that the average size of operational holdings accounted for 1.43 hectares. However, the average size of holdings in case of medium farmer's land was found at 5.06 hectares in Bangalore East compared to Bangalore North with 4.86 hectares. It is surprising to note that not many people owned, larger sized holdings. This was quite natural around urban areas as many farmers disposed surplus land due to higher prices. The proportion of irrigated area was 58.09 percent of the total land holding by sample farmers. It worked out to be 0.83 hectares per household. The cropping intensity was found at 141.13 per cent.

As far as cropping pattern is concerned, the food crops are found to be the major crops grown by the sample growers. In Kharif season, the food crops and vegetables dominated the cropping pattern. To some extent, the flowers, particularly the marigold and chrysanthemum,

are grown in both Rabi and Kharif season. The rest of the crops particularly the fruit crops and flowers are grown as perennial crops.

It is generally believed that the urban areas are characterized by the absence of small ruminants. However, it is found that several households around Bangalore Urban District are rearing these animals. This is because of the availability of vacant residential sites around. The households possess mainly milk cows and buffaloes.

The average farm implements and machineries owned by the household was 2.21. Among these, the sprayers accounted for more. This finding is not surprising since, these are very essential for pesticides spraying of flowers crops as well as horticultural crops.

The welfare of the family depends on the incomes that they receive from various sources. The household data shows that, on an average, the household annual income was found at Rs. 74,109. About 58 per cent of this accounted for floricultural activity.

It was expected that the farmers over a period of time switch over to modern floriculture, as it is more remunerative than traditional floriculture. But none of the sample farmers opted for modern floriculture despite their awareness of its benefits. The small holdings, lack of resources and price fluctuations in the markets were attributed for not opting.

Some of the sample growers would have benefited under programmes available for floriculture. However, it is surprising to note that none of the sampled beneficiaries benefited from any government programme. This speaks about the neglect of the sector in spite of its greater potential in several respects.

F. Economics of Production and Marketing Pattern of Floricultural Crops

The economics of production and input use of different flowers varied across different kind of flowers. The establishment cost per hectare was found highest in the case of rose followed by tuberose. Similar trend was found in the case of operation costs/maintenance costs in respect of these flowers. However, in respect of returns, rose remained as most remunerative crop followed by crossandra. The net returns of rose over the total costs were found at Rs. 2.14 lakh/ha and Rs.2.23 lakhs/ha over variable costs, whereas the net income in respect of crossandra was found at Rs. 1.13 lakhs over variable cost and fixed costs and Rs1.25 lakhs over variable costs. The lowest returns are observed in the case of marigold compared to other flowers.

The employment generation in growing different flowers was also found with substantial differences. The highest number of man-days were generated by rose crop (1,284 man-days/ha). This was followed by tuberose with 914 man-days. The lowest man-days of employment was found in marigold with 297 man-days/ha due to its short duration. A larger proportion of this employment was used at the harvesting stage of flowers.

The overall wastage/spoilage was found at 0.28 per cent of the production, which was slightly higher than the household consumption of 0.34 per cent and the rest 99.43 per cent of the production was marketed. A major proportion was sold to commission agents/wholesalers was accounted for 99.50 per cent. Only a small proportion (0.50 per cent) was sold to the customers or retailers who, in turn, added value to the flowers and sold in various places.

Farmers reported various problems which were coming in the way of better performance. Among these, lack of proper transport, market information, cold storage facilities and menace of middlemen were cited as major problems

G. Prospects and Threats

Going by the present trends in area, production, exports and enhancement of outlays for floriculture development one can definitely predict a bright future to the sector. The mushroom growth of bouquet stalls in the urban areas, rapid urbanization, increase in per capita incomes, change of life-styles, Information Technology and corporate boom are responsible for the rapid growth. The growing popularity of flowers in corporate sector, IT sector, elections, switching over to flowers presentation in place of cash and material presentations is another indicator of its future development. The identification of Bangalore by many agencies as a potential area for floricultural products and exports and proposed floricultural flower centre and improvement of the present floricultural action centre at KAIC and plans to shift later to nearby proposed international airport will boost further development of floriculture in the state and export units around Bangalore. The jasmine and tuberose are rich in aromatic oil content. The encouragement to farmers to set up units to extract oils from these crops will definitely benefit the farmers in getting more income than the income they realize from selling these in loose form.

However, one should not be complacent about these developments. The sector is likely to face threats from developments taking place in other countries. Zambia, Zimbabwe, Malaysia, Morocco and Mauritius enjoy better climate like India. Kenya and Ecuador are

producing World-class flowers. These countries are likely to pose a severe competition to our flowers. The proposed international flower auction centre near Bangalore and the removal of Quantitative restrictions (QRS) may likely to affect both traditional markets and modern flowers. The traditional flowers grown in open conditions, mostly by small and marginal farmers, may face threat from the imported flowers of high quality. Similarly, the modern flowers also may face threat, as our flowers are not as good as of other countries. Unless, the quality of both traditional and modern flowers is improved by providing better infrastructure facilities, India is not going to benefit from liberalised trade regime.

H. Acton Points/Suggestions

- The trends in area and production in the state have shown rapid increase. However, the increase in yield is not significant. Apart from this, the area under floriculture is mainly concentrated in few districts despite the soil conditions in other districts being conducive to the growth of flowers. Efforts are needed to increase the yield by providing technical guidance and supply of improved plants and seeds to increase yields and avoid concentration of flower cultivation in few districts by extending extensive services to other districts for undertaking floriculture **(Att: Horticulture Department)**.
- Few sources provide data on the state exports of flowers. But this information is scanty and inadequate and does not clearly reflect on exact exports. With this information it would not be possible to draw any inferences. A separate body at the state level like APEDA is required to compile and publish data on state exports **(Attn: Horticulture Department)**.
- The allocations to the floriculture development in the state are inadequate. It is ranging between 0.43 per cent and 8.02 per cent. Considering its potential in generating more income and employment than other crops the outlays have to be increased in the coming plans **(Attn: Horticulture Department)**.
- Several institutions such as APEDA, NHB, NABARD etc., have helped this sector by providing financial assistance. The magnitude of assistance given to these institutions is not available and there is no single source to provide these details across the states to understand the status of help rendered by these agencies together. An effort is needed to compile the total assistance extended to this sector by various agencies to overcome this data gap **(Attn: Ministry of Agriculture and Cooperation)**.

- The trends in arrivals of traditional flowers in the KRS market of Bangalore show a substantial increase over a period of time. But there has been congestion and lack of proper infrastructure in the market. There is no agency to regulate the prices in the market. Apart from this, there are no estimates on the modern flowers grown in open conditions sold by the farmers by keeping them on footpath outside the market. Lack of specified area for the farmers is responsible for this. Another deficiency in the marketing system is that there is no agency to compile the market arrivals of flowers in other parts of the state. To overcome some of these problems, a separate market yard may be established like KAIC, which is handling modern flowers in a systematic way **(Attn: Horticulture Department and Marketing Board)**.
- The over-exploitation of groundwater in the entire state and in the study area has caused depletion of groundwater. As a result, the bore wells owned by sample growers are not getting enough yield from these bore wells to irrigate their flower crop. As a result they are not getting good yields. Some of them are thinking of giving up the floriculture due to water crisis. To overcome the shortage of water, the government has to help the farmers by way of financial assistance for the purchase of sprinkler and drip irrigation systems for better water management **(Attn; Horticulture Department)**.
- Among the flowers, rose has been found as the major remunerative crop. The increase in demand from various sectors in recent years for this beautiful flower has been attributed as the major reason. In view of this, the growers of this crop have to be given more support by the government **(Attn: Horticulture Department)**.
- The farmers lack adequate and cheap mode of transport and proper roads for quick marketing of the flowers, which are highly perishable in nature. These have to be provided to the villagers, which not only help the flower growers, but also for the overall development of the villages **(Attn: Transport Department and Public Works Department)**.
- Almost all farmers who are cultivating flowers in the state are small and marginal farmers. This small nature of their holdings comes in the way of undertaking scientific cultivation and even to take up the traditional flower cultivation. The prices in the market are also fluctuating very frequently. Therefore, co-operative farming may be encouraged to realise the economies of scale, minimize price fluctuations, and regulate the supply of the flowers with the demands. To accelerate the rate of adoption of modern techniques flower

extension workers of horticulture department should organize production demonstration in the field of small flower growers **(Attn: Department of Co-operative Societies and Extension wing of Horticulture Department)**.

- Several farmers have indicated that there is lack of suitable technology, proper knowledge about the use of quality planting materials, inadequate or absence of guidance have resulted in low productivity. These have to be made available to the farmers so that the farmers can reap the benefits of technology and increase their productivity **(Attn: Department of horticulture and other agencies such as APEDA, BHB, etc)**.
- There is no suitable technology for storing and marketing of traditional flowers as in the case of modern cut-flowers. As such, they are disposing of these varieties in local markets at whatever prices prevailing in the market. Many a times, they have incurred losses due to glut in the market and delay in payments by the commission agents. These can be set right by opening cold storage facilities in market places and fixing minimum support prices to the flower products on the lines of food crops **(Attn: State Agricultural Price Commission)**.
- The Government has accorded "Thrust Area Status" to modern floriculture, which is just covering 500 hectares in the country and 150 hectares in the state. Similar status should be extended to traditional flower cultivation, where a large segment of small and marginal farmers are cultivating in large area **(Attn: Department of Horticulture and Planning Department)**.
- A coordinated committee may be constituted comprising members from the state horticulture department, cooperative marketing department, Mandi merchants (Commission agents-cum-wholesalers) and few growers. This body should periodically assess the status of floriculture sector and advise the state government for taking necessary steps for the development of the sector **(Attn: Department of Cooperative, and Regulated market departments)**.
- The milk cooperative societies in the state are purchasing milk and marketing them in various places. Similarly, there are HOPCOMS which are playing a prominent role in procuring horticultural crops and marketing them in various places. But there is no such agency for flower growers. These types of institutions are required to handle the flower products. The procurement and marketing of flowers may be entrusted to any one of these

institutions or separate organization may be created for marketing flowers **(Attn: Horticulture Department)**.

- Due lack of market information, the farmers are heavily depending on intermediaries who do not give much attention to them. Similarly, information is lacking regarding market trends in terms of opportunities for new varieties, value added, packaging and development taking places in other parts of the country. In order to overcome these problems, the NHB is providing market information on horticulture crops including flowers through media and publication. But they are not very popular. More publicity in this regard and other issues mentioned above are essential for the benefit of the farming community **(Attn: National Horticulture Board and Horticulture Department)**.
- There has been a demand for our Jasmine in East Asia. Therefore, appropriate post- harvest technology should be developed for the export of this highly perishable flower. **(Attn: Horticulture Department)**.
- The surplus from hi-tech green house is being sold in local markets resulting in competition with open grown flowers resulting in low returns to the farmers. Thus, the quality of the local flowers grown in open conditions has to be improved to get remunerative price for the traditional varieties **(Attn: Indian Institute of Horticulture Research)**.
- Technology adopted by high-tech floriculture is not possible to adopt in the traditional flower cultivation. This is due to farmers' weak economic conditions. Cost-effective technology should be provided to traditional flowers to improve their quality and compete with modern sector **(Attn: Horticulture Department)**.

H. Action Points for the Improvement of Modern Floriculture

Apart from encouraging the traditional floriculture, the modern floriculture is to be encouraged as it is providing more employment and is export-oriented. As of today, modern floricultural industry is in the recovery stage. Even then, it is facing many bottlenecks, which are coming in the way of further progress. In order to make them more viable, some of the following policy measures need to be undertaken.

- Before actually putting the flowers in the aircraft, the floriculture products have to undergo quite a number of procedures. These relate to quarantine procedures, which are cumbersome and time-consuming. These make the floriculture products to lose considerable quality. To overcome this problem, the quarantine procedures have to be

simplified for quick clearance. At the destination also some countries conduct phytosanitary tests for flowers. For Instance, Japan fumigates all the Indian flowers at their ports which can spoil the quality of flowers as they are using Methyl Bromide. So, the Government should persuade Japan to fumigate our flowers at our ports as done by the Australian Government **(Attn: Air Authority of India and Ministry of Commerce)**.

- The flowers are traded with several countries in the world. However, a major proportion is being sent to the European countries. These countries are levying higher import duties, which are pushing the cost of exports, ultimately reducing the margin of profits. To help the exporters and growers, pressure should be brought on EU to reduce the high rate of import duty on modern floriculture exports **(Attn: Ministry of Commerce, Government of India)**.
- The modern floricultural units have borrowed heavily from the commercial banks at exorbitant rates of interest. The units which are in the initial stages of setting expect good returns to facilitate repayments. However, many of the units have been unable to reap the expected returns an account of various factors. But continuous insistence on principal as well as interest repayments have eroded lot of their resources. Many of them are unable to cope with this and end up in bad shape. In order to help them overcome this critical problem, the banks have to convert 50 per cent of their individual loans as equity shares so that they can become viable in the coming years. The waiving of accumulated interest and reducing the rate of interest to less than 10 per cent from the current bank rate ranging between 15 to 19 per cent may be thought off to make them viable **(Attn: Ministry of Finance and Reserve Bank of India, Scheduled Commercial Banks)**.
- The available flights for the transport of flowers to Western markets (Europe and America) and Eastern markets are limited. Their frequency is also very inadequate apart from less space for the flower consignment in these flights. All these are contributory factors for not reaching the flowers to various destinations on time. This is also affecting the quality of flowers due to lack of direct flights to various destinations. Adequate and direct flights with enough space should be arranged to overcome this problem **(Attn: Ministry of Aviation, Government of India)**.
- Quality of the flower is a most important aspect of the export of flower. Quality can be achieved if expert opinion is made available to the growers. Unfortunately, this is not

made available adequately by the Horticulture departments in our country. As such, many of the entrepreneurs depend on the expert opinion of foreign countries at high cost of consultancy. This has many a times eroded not only the resources of the units but also low yields than expected. This can be overcome by expert guidance to floriculture units at low cost from horticulture department **(Attn: Horticulture Department)**.

- There is lack of technology to grow standard and internationally acceptable quality flowers. This is not only affecting the profitability of growers but also lesser demand for flowers in international markets. This needs attention and proper research to improve the quality of the product **(Attn: Indian Institute of Horticultural Research)**.
- Individual arrangements for exports are increasing the costs and risks. To overcome this, all growers-cum-exporters should collectively arrange the flight services as in Israel where marketing of the flowers is directly undertaken by cooperatives and marketed under a single brand. **(Attn: Cooperative Department, and APEDA)**.
- Many growers are currently sending flowers to Amsterdam for auctioning. In this system, there are middlemen who play a major role in the reduction of prices, chances of rejection of flowers in auction on various grounds, ultimately resulting in less profits. This system can be reversed by advising the flower exporters to export directly to those countries where auction system is not prevailing. The Far East, East Asia, Southern Europe are some of the countries favourable to this system **(Attn: SIFA and Horticulture Department)**.
- At present, roses are the major export item. There are chances of competition to this flower from Kenya and Columbia and other countries which grow quality ones. This situation is likely to affect our rose export prospects. Therefore, the growers should be advised to grow other varieties of flowers such as carnations, gladiolus, anthuriums and lilies, which not only fetch more price in the international market but also has greater demand as many countries are not growing these varieties **(Attn: Department of Horticulture)**.

REFERENCES

- Abraham, V.K, (2002). The International Conference on Commercial Floriculture, *Summary Report*, 11-12 August, Bangalore.
- Agricultural Finance Corporation Ltd. (1999). *Development of Horticultural Exports From Karnataka*. Mumbai: AFC South Regional Office.
- Agarwal, K.G. and D.D. Duhijod (1997). An Economic Analysis of Winter Floriculture Grown in the Vicinity of Nagpur City of Maharashtra. *Indian Journal of Agricultural Economics*, 52(3): 622-23.
- Ajjan, N. and N. Raveendran (2002). Economics of Production and Marketing of Cut flower – Gladiolus in Nilgiri District, Tamilnadu. *Plant Horti Tech*, 2(4): 68-70.
- Ajjan, N. and N. Raveendran (2001). An Economic Analysis of Production and Marketing of Cut Flowers – Carnation and in Niligiri District, Tamil Nadu. *Plant Horti Tech*, 2(5): 53-58.
- Alagumani, T.M. Anjugam and R. Rajesh (1997). Performance of Flower Crops vis-à-vis Field Crops in Madurai District, Tamil Nadu. *Indian Journal of Agricultural Economics*, 52(3): 620-21.
- Ali Md. Hasrat and B.N. Banerjee (2000). An Economic Analysis of Marketing Aspects of Bela Flower in West Bengal – A Case Study. *Agricultural Marketing*, Vol. XLIII(3): 5-8.
- Anonymous (1998). AP Plans Model Farm to Keep Floriculture Units in the Pink. *Economic Times*, Bangalore, July 14.
- Anonymous (2001a). Floriculture Will Bloom". *Plant Horti Tech*, 2(6): 62.
- Anonymous (2001b). Horticulture - Karnataka's Growth Engine. *Agriculture and Industry Survey*, September 20, pp.28-30.
- Anonymous (2001c). Southern States in Forefront of Flower Production. *Floriculture Today*, October: 35.
- Anonymous (2002a). Bio-Technology for Improvement of Flower Crops. *Agriculture Today*, January: 54.
- Anonymous (2002b). Five New Flower AEZs Additional Exports of Rs. 611 Crores in Five Years. *Floriculture Today*, July: 38.
- APEDA (1996). *Formulation of Ninth Plan, Working Group on Agricultural Exports*. New Delhi: APEDA, Ministry of Commerce, Govt. of India. Mimeo.
- APEDA (1999a). *Presentation on Floriculture Export by APEDA*. Mimeo.
- APEDA (1999b). *Report on APEDA's Participation in Tokyo International Flower Show*, April 24-25, Mimeo.

- Asokan, S.R. and S.N. Chokshi (1997). Export of Floricultural Products: Problems and Prospects. *Indian Journal of Agricultural Economics*, 52(3): 609-10.
- Bal, H.K. and H.S. Bal (1997). Flower Power in Punjab. *Indian Journal of Agricultural Economics*, 52(3): 639.
- Banerjee, B.N. and Md. H. Alli (2001). Chrysanthemum Flower Trade in West Bengal. *Agricultural Economics Research Review*, 14(1): 74-80.
- Bansal, R.N. (1994). Export of Fruit and Vegetables – Problems and Prospects. *Agricultural Marketing*, October-December: 7-10.
- Cavale, Sangeeta (2002), " It's Raining Roses", The Times of India, December 24.
- Cebeco Pvt. Ltd. (1999). "Techno-Economic Feasibility Study for Setting up Flower Marketing in Europe". New Delhi: Hauz Khas Enclave.
- Chadha, K.L. (1999). Horticulture: New Avenues for Growth. *The Hindu Survey of Indian Agriculture*, 155-160.
- Chadha, K.L. (2001). Record Growth in Floriculture Exports. *Plant Horti Tech*, 2(5): 63.
- Chengappa, P.G. and T.V. Reddy (2002). Post Harvest Handling and Marketing of Traditional Flowers. In T.V. Reddy, R.L. Misra and T.Janakiram (ed.) *Indian Floriculture in the New Millennium*. Bangalore; Indian Society of Ornamental Horticulture, NHB.
- Chaudhary K. Surjit (2000). Floriculture Development in Tamil Nadu. *Floriculture Today*, December: 9-10.
- Choudhary, M L, Janakiram and K.V. Prasad (2000). Karnataka: Floriculture at a Glance. *Floriculture Today*, March: 9-12 and 70-75.
- Dattatreyyulu, M. (1997). *Export Potential of Fruits, Vegetables and Flower From India*. Mumbai: NABARD.
- Devi, Neeraja (1990). Economics of Production and Marketing of Kakada Flowers in Bangalore District of Karnataka State. An *M.Sc. Thesis*. Bangalore: Department of Agricultural Economics, UAS.
- Ghose, Sugata (1998). Commercial Floriculture in Orissa. *Financing Agriculture*, January-March: 20-21.
- Government of India (1996). *Report of Working Group on Horticulture Development for the Formulation of Ninth Five Year Plan*. New Delhi: Department of Agriculture and Co-operation, Ministry of Agriculture.
- Government of Karnataka (2000). *Floriculture in Karnataka*. Bangalore: Floriculture Division, Directorate of Horticulture.
- Government of Karnataka (2001). *Horticultural Crop Statistics of Karnataka State at a Glance: 1997-98 to 1999-2000*. Bangalore: Statistical Wing, Directorate of Horticulture, Lalbagh.

- Government of Karnataka (1993). *Policy and Strategy for Integrated Development of Horticulture and Processing Industry in Karnataka: Report of the Expert Committee on Integrated Development of Horticulture and Processing Industry in Karnataka.*
- Gupta, S.K., A. Shrivastava, A.M. Mishra and M.C. Athavale (1997). "An Economic Analysis of Comparative Performance of Potato and other Crops in Indor District - Madhya Pradesh, *Indian Journal of Agricultural Economics*, 52(3): pp.610-11.
- Indian Institute of Horticultural Research (IIHR), (1999). Ornamental Varieties Released by IIHR, Bangalore.
- Industrial and Technical Consultancy Organization of Tamil Nadu (1996). *Export Market and Feasibility Report*, Tamil Nadu.
- Irulappan, I. (2000). Lucrative Export Avenues. *The Hindu Survey of Indian Agriculture*, 209-210.
- Jadhav, M.S., P.P. Inamdar and B.V. Pagire (2000). Export Potential and Marketing of Flowers in India. *Indian Journal of Agricultural Marketing*, 14(3): (Conference Special): 125-134.
- Karnataka Agricultural Produce Processing and Export Corporation Ltd. (KAPPEC) (2002). *Export Opportunities for Agro and Processed Products*, Bangalore: KAPPEC.
- Kaul, G.L. and N.K. Dadlani (1995). *Development of Floriculture in India: Present Status and Future Prospects*. In G.L. Kaul and N.K. Dadlani (eds.) *Prospects of Floriculture in India*. New Delhi: Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India.
- Kaul, G.L. and N.K. Dadlani (eds.) (1995). *Prospects of Floriculture in India*, New Delhi: Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India.
- Koranne, V.M. and N.B. Naik (1997). Floriculture: An Economically Viable Enterprise", *Indian Journal of Agricultural Economics*, 52(3): 612.
- Krishnaiah, J., V. Ram Mohan and I. Narender (1993). Variability and Relationship Between Prices and Market Arrivals for Flowers and Fruits: A Case Study of Hyderabad Market. In K.C. Talukdar and B.C. Bhowmick (eds.) *Marketing of Perishable Products*. New Delhi: B R Publishing Corporation (A Division of D K Publishers Distributor Pvt. Ltd.).
- Kulkarni, Vishwanath (1998). Valentine's Day Gives Kiss of Life to Floriculture Units. *Economic Times*, Bangalore: February 12: 17.
- Kulkarni, Vishwanath (1999a). Rehabilitation Package in the Offing for Floriculture Units. *Economic Times*. Bangalore: November 18: 16.
- Kulkarni, Vishwanath (1999). Saying it with Flowers. *Economic Times*, Bangalore: August 23: 6.
- Kundu, K.K., Jai Singh, V.K. Singh and K.S. Suhag (1997). India's Floriculture Exports – Growth, Status, Constraints and Export Strategies: An Analysis. *Indian Journal of Agricultural Marketing*, II(1 & 2): 14-21.

- Malik, R.P.S. (1998). *Economics of Export Oriented Horticultural Crops – A Case Study of Floriculture in Haryana*. Delhi: Agricultural Economics Research Centre, University of Delhi.
- Mirakhur, Rajkumar (2001). Farmers move into Commercial Floriculture – Positive and Healthy Sign. *Floriculture Today*.
- Modak, A.A. Mitra and T.K. Das (1997). Emerging Scenario of Flower Trade in the World *vis-à-vis* India. *Economic Affairs*, 42(4): 241-49.
- National Horticulture Board (2002). *Horticulture Database 2001*. Gurgaon: NHB.
- National Commission on Agriculture (NCA) (1976). Volume 6. New Delhi: Ministry of Agriculture and Irrigation, Govt. of India.
- Negi, J.P. (2000). Current Status and Development in Floriculture. *Floriculture Today*. Delhi.
- Pawan, K. Dahiya and S.K. Goyal (1998). Economic Feasibility of Rose Cultivation in Haryana. *Agricultural Economics Research Review*, 11(1): 66-71.
- Prakash, T.N. (2002). High Tech Floriculture, Sustainability and Food Security Issues – The Case of Rose Cultivation around Bangalore City. In Vandanasiva and Gitanjali Bedi (eds.) *Sustainable Agriculture and Food Security: The Impact of Globalisation*. New Delhi: Sage Publication.
- Raghava, S.P.S. (1996). Floriculture High Growth Industry. *The Hindu Survey of Indian Agriculture*.
- Raghava, S.P.S. and N.K. Dadlani (1999). Floriculture: Strategy Needs Review. *The Hindu Survey of Indian Agriculture* : 147-149.
- Raghava, S.P.S and N.K. Dadlani (2000). Revival of Fortunes. *The Hindu Survey of Indian Agriculture*: 151-152.
- Ramkumar, Rajani and S.G. Ajith (2002). Problems and Prospects of Dry Flowers and Plant Material Production and Export from India. In T.V. Reddy, R.L. Misra and T.Janakiram (eds.) *Indian Floriculture in the New Millennium*. Bangalore: Indian Society of Ornamental Horticulture, NHB, Department of Horticulture, Govt. of Karnataka: 60-62.
- Ramakrishnappa, K. (2001). Floriculture In Karnataka. *Agriculture and Industry Survey*, September: 29-30.
- Ramanna, K.N. and K.Chandra Kandan (2000). Constraints Faced by Cut Flowers Exporters. *Agro India*.
- Ramesh, G.R. (1997). Economics of Production and Marketing of Crossandra Flowers in Chitradurga District, Karnataka. An *M.Sc. Thesis*, Bangalore: Department of Agricultural Economics, UAS.
- Rai, Muthappa, B.G., T.Venkata Reddy, J.V. Narayana Gowda (1988). "Export Potential of Ornamentals". Paper presented in a seminar on *Export Potential of Horticultural Produces*. Bangalore: University of Agricultural Sciences.

- Rao, A. Nageswara. (1997). Higher Employment and Income Potential of Horticultural Crops. *Indian Journal of Agricultural Economics*, 52(3): 584-91.
- Raut, R.C. and V.S. Rasane (2000). Marketing of Roses in Nasik District (Maharashtra). *Indian Journal of Agricultural Marketing*, 14(2): 32-40.
- Reddy, T.V. (1995). Traditional Flowers: Present Status and Potential. In G.L. Kaul and N.K. Dadlani (eds.), *Prospects of Floriculture in India*. New Delhi: Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India.
- Reddy, T.V. (2002). National Symposium on Indian Floriculture in the New Millennium held on February 25-27, 2002, *Plant Horti Tech*, Vol. 3(3): 18-23.
- Sachin, K.S. (1997). Trade: Not So Flowery a Path. *Deccan Herald*, September 29.
- Shah, Deepak, K.G. Kshirasagar (2001). "Evaluation of Soft Loan Schemes for the Development of Post-Harvest Infrastructure for Horticultural Crops in Maharashtra". Pune: Agro-Economic Research Centre, Gokhale Institute of Politics and Economics (Mimeo).
- Sharma, M.R. (2002). Role of NABARD in Promoting the Floriculture Industry with Credit Support in India. In T.V. Reddy, R.L. Misra and T. Janakiram (eds.), *Indian Floriculture in the New Millennium*. Bangalore: Indian Society of Ornamental Horticulture, NHB, Department of Horticulture, Govt. of Karnataka.
- Sharma, L.R., A.L. Nadda and Preeti Sharma (1997). Export Oriented Floriculture in India – Status, Constraints and Strategies. *Indian Journal of Agricultural Economics*, 52(3): 637-38.
- Sharma, M.R. (1995). Financial Assistance for Floriculture Projects: Role of NABARD in Floriculture Development in India. In G.L. Kaul and N.K. Dadlani (eds.), *Prospects of Floriculture in India*. New Delhi: Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India.
- Sharma, Purushottam (2001). Economics of Production and Marketing of Marigold in Jaipur District of Rajasthan. *Agricultural Economics Research Review*, 14(2): 163-69.
- Swarup, Vishune (1995). "Floriculture Industry in India". In G.L. Kaul and N.K. Dadlani (eds.) *Prospects of Floriculture in India*.
- Singh, Foja (1998). Indian Floriculture: No Longer in the Pink but in the Red. *Economic Times*, Bangalore, June 29.
- Singh, D.V. (1999). *Marketing of Flowers (Domestic and National): Problems and Prospects in Himachal Pradesh*. Shimla: Agro-Economic Research Centre, Himachal Pradesh University.
- Singh, R.B., R.N. Prasad, H.K. Nigam and R. Saran (1997). Economics of Flower Production in District Farrukhabad, Uttar Pradesh. *Indian Journal of Agricultural Economics*, 52(3): 621.

- Subrahmanyam, K.V. (1995). Production and Marketing Research on Ornamental Plants. In K.L. Chadha and S.K. Bhattacharjee (eds.), *Advances in Horticulture – Ornamental Plants*. New Delhi: Malhotra Publishing House.
- Sudha, M. (2001). Economics of Protected Cultivation of Cut Rose for International Markets: Role of Price Production Models in Integrating Production with Marketing. *Agricultural Economics Research Review*, 14(1): 1-15.
- Sudha, M. (2002). Implications of WTO Prescriptions on the Cut-flower Industry. In T.V. Reddy, R.L. Misra and T. Janakiram (eds.), *Indian Floriculture in the New Millennium*. Bangalore: Indian Society of Ornamental Horticulture, NHB, Department of Horticulture, Govt. of Karnataka.
- Swamy, Mahadeva (2001). Horticulture: Karnataka's Growth Engine. *Agriculture and Industry Survey*.
- Thakur, Panchalee (2003). Grounded Roses. *The Times of India*. Bangalore: February 7.
- Thippaiah, P. (2001). *Evaluation of Soft Loan Schemes for the Development of Post-Harvest Infrastructure for Horticultural Crops in Karnataka*. Bangalore: Agricultural Development and Rural Transformation (ADRT) Unit, Institute for Social and Economic Change, Mimeo.
- Tilekar, S.N. (1998). A Study on Costs of Production and Price Differentials between Domestic and Export Markets for Rose Cut-flowers Produced under High-Tech Agriculture. *Indian Journal of Agricultural Economics*, 53(3): 380.
- Vaidya, Bankimchandra V. (2000). Floriculture – An Innovative Industry for Rural People. *Kurukshetra*, 50(9): 34-37.
- Vedini, K H (1994). Potential Location of Flower Processing Units in Karnataka and Marketing of Jasmine in Mysore City. An unpublished *M Sc Thesis*. Bangalore: Department of Agricultural Economics, UAS.
- Veena, S. (1998). When the Till Buys of the Tiller. *Deccan Herald*, Bangalore: May 8: 15.
- Viswanathan, T.A. (1995). Export Opportunities for Floriculture and the Role of APEDA in Promoting Exports. In *Seminar Manual – Opportunities for Cut-Flower Production and Marketing: An Analysis*, UPASI-KVK Publication.
- Walt, Vivienne (2001). Flower Trade from Field to Vase. *National Geographic*, Vol. 200: 104-118.
- Yadav, I.S. (1999). Floriculture: Technology for the Farmer. *The Hindu Survey of Indian Agriculture*, 151-153.