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CHAPTER II
REVIEW OF LITERATURE

2.1. INTRODUCTION

Review of literature helps the researcher to understand the areas researched and explored already, research gaps and new pastures for research adventurism. In any dissertation, review of related studies forms an integral part. When research article and books on related subjects are reviewed, the investigator is able to widen the frontier of his knowledge on the various dimensions of his research problem which have already been subjected to a trailblazing researches during bygone years. It is from the review of related studies that the investigator is able to evolve concepts and a theoretical framework for his entire work. Embodied in this chapter are reviews of certain research articles gleaned from reputed books and journals on floriculture.

2.2. THE FLOWER INDUSTRY AND ITS ECONOMIC SIGNIFICANCE

Kehar Singh and Virendra Singh (2001)\(^1\) found that in India about 4,000 hectares of Damask rose is under production. They found that Damask rose plantation is a capital intensive and highly specialized enterprise. Highly variant and seasonal demand for labour especially during short plucking period may also pose management problems to the enterprises for which the possibilities of contractual labour need to be explored before taking this venture.

Yal Panekar P.H. and Swant G.K (2001)\(^2\) have analysed the problems of flower growers in three aspects viz., economic constraint (high cost of planting material, fertilizer and transport), technical constraint (disease, inadequate knowledge of improved variety) and financial constraint (loan problem).
Ashok Dhillion et al., (2003)\(^3\) have selected three districts and one block from each district on the basis of the area of flower production. From each block the list of villages was prepared to find where flower production was adopted. From these villages 120 growers were randomly selected. This consisted of 65 small, 42 marginal and 13 large growers. This study revealed that flowers were grown in 1,850 hectares during 1996-97 which increased to 2,250 hectare in 1999-2000. According to their findings, in Haryana, flower production has emerged as one of the most lucrative businesses due to the higher potential of returns in comparison to other horticultural crops.

Anjugam et al., (1997)\(^4\) have assessed the performance of flower crops in comparison with other field crops like paddy, sugarcane, cotton and groundnut. They concluded that return on flowers is higher than that of other crops.

Subramaniyam K.V. (1990)\(^5\) examined the need for finance in jasmine production. He found that production cost of jasmine was Rs.23,526 and marketing cost Rs.17,736 per hectare. On the basis of the cost incurred, it was suggested that the required credit was to be provided by the financial institutions to the farmers at least to the extent of 75 per cent of cost.

Ramesh Kumar S.C. and Subramaniyam K.V. (1991)\(^6\) analysed the returns on jasmine production. For their study, they selected 80 jasmine cultivators from two taluks of Madurai district by using multistage sampling technique. They found that jasmine being a perennial crop with a life span of more than 12 years, there would be a flow of returns year after year for the investment made during the first year. The rate of returns was appraised by Benefit cost ratio, Payback period and Net Present Value. They concluded that jasmine cultivation is more profitable.
Gajana T.M. and Subramaniyam K.M. (2000) made a study on production and marketing of Anthurium in Kerala. The objectives of the study were to analyse the production pattern, to estimate the costs and returns and to examine the constraints in cultivation. This study brought out that cost of seedlings accounted for 71 per cent. It is found that 67 per cent of the growers sold their flowers in the field itself to local buyers. The reasons being spot payment and absence of transport cost.

Rahman M.S. et al., (2003) found that flower growers suffered from problems like credit sale, instability of price and high risk. For their study they selected five districts. It was found that 47 per cent of the sample farmers adopted the channel of Farmers-Pharia (small traders) – Bepari (large traders) – Retailers – Users. Further this study found that retailers’ margin was higher than that of other traders.

Samudar Dan S. (2003) found that horticulture production had assumed a significant position in India’s economy due to the right returns per unit area, greater employment generation and more foreign exchange earnings through export. Presently horticulture crop occupies a million - hectare area. This constitutes about 7 per cent of gross cropped area with total production of 115 million tonnes which is about 20 per cent gross value of the agriculture output.

Shaik Alauddin A. (2004) estimated the flowers grow in about 35,000 ha. in the country of which 10,000 hectares are under flowers like rose, carnation, orchid etc. Major flowers grown are jasmine, marigold, rose etc. In many countries including Israel, flowers are cultivated in green house conditions. In India the land and climate are suitable to grow all types of flowers throughout the year in one part or another.
Kumar D. and George Clement R. (2004) observed the world market in horticulture. Indian floriculture industry is witnessing an unprecedented growth and increasing acceptability. A number of corporate houses have entered the fray in the last three to five years in growing flowers. The world market in floriculture is estimated at US $ 50 billion. The floriculture industry is growing at the rate of 17 per cent per annum. The consumption of ornamental and flowering plants is generally by the affluent class of the society. Higher standard of living and growing desire to live in an environment-friendly atmosphere have led to an increasing demand for floriculture in India.

Reddy Y.N. and Naveen Kumar P. (2004) explained in their study, vase life of the most cut-flowers was limited by water stress while in some flowers. It is due to the disturbance in hormonal regulations like colour, shape, size and type. Vase is also an important factor in the commercial use of cut-flowers.

Kanchan Ray (2005) proprietor of Kolkata-based golden floriculture firm speaks about his activities. He is a seller of seedling of ornamental farm and ornamental plants. Farmers import seeds, germinate them and sell the seedlings. Their main focus is the Indian customer. They are basically drawn into export flower bulbs. They import, germinate and sell them. Germination of this seed started from last two years also they are handling cut-flowers.

Mahesh Vijapurkar (2005) conducted his study on consumer taste. Growers predominantly small, have cut down corporates in growing exotic flowers in Maharashtra. Focusing on the domestic market they are even changing the consumer tastes. Thanks to them, urban preferences are shifting from traditional jasmine and
chrysanthemum to the exotic roses, gerberas gladiola and carnation. Floriculture park is coming up near Pune with common facilities like pre-coolers. Some bigger farmer may ‘corporatise’ their approach to directly export.

**Bhandari (2006)**\(^{15}\) encouraged the rose producers in Himachal. For the first time rose is produced on a commercial scale in the four hills of the Shivalik range in Himachal Pradesh. The successful trial of a hybrid variety is carried out by enterprising floriculturist. He has grown 30,000 plants of carnation in one hectare with good result. He says that there is immense scope for floriculture in the hill state. The national Horticulture Board has been urging the government to popularise and encourage the growers to take it to raise income and meet the demands for fresh flowers in major cities of northern India. Hybrid rose is the latest flower variety to be grown in the State.

**Subramaniyam P. and Venugopal (2006)**\(^{16}\) have observed that the jasmine economy in Daksina Kannada and Udupi districts is very much linked with the village economy of these districts. In many village households jasmine cultivation is a way of life as well as a source of employment and income to the families. In the area of study, jasmine cultivators in general are happy with the existing system of marketing in which the agent plays the role of the distributor. In nearly 40 per cent of jasmine growers households jasmine production is the main source of income and for the other 58 per cent it is a source of supplementary income, particularly on consideration of the volume as well as the direction of actual employment and income that it produces in a budding economy.

**Mishra P.K. (2007)**\(^{17}\) in his study entitled, “Center Committed to Holistic Floriculture Growth”, indicated that among the horticultural crops covering fruits,
vegetables spices, medicinal and aromatic plants and the like, floriculture constitutes an important segment. It is the only horticultural commodity which is being grown to improve the aesthetic value rather than culinary purpose. Strictly speaking it is one of the fastest growing industries with huge potential for generating employment opportunities. In effect, its national importance is always on the increase, because flowers are associated with the social-cultural and religious lives of the people, since time immemorial. In recent years floriculture has become a commercial activity due to its capacity to provide high returns per unit area. Today, with the rapid development of the floriculture industry, there has been a sea change in the use of floriculture items in all walks of life. Most of the public institutions have started using flowers in their offices. This is apart from its traditional usages at weddings, religious ceremonies and cultural functions thus making it a blooming sector. He adds that in view of its vast potential (of floriculture) of generating income and employment opportunities promoting greater investment of women and enhancement of export earnings, it has been identified by the Government of India as an important segment for development under the ongoing centrally sponsored schemes on horticulture.

Hazra C.R. (2001)\(^{18}\) in his study entitled “Diversification in Indian Agriculture”, stated that the horticulture crops provide a remunerative means for diversification of land use for improving productivity. He strongly believed that horticulture crops would not only provide nutritional security for the land used but would also bring a lot of employment opportunities for the rural population. His expectation is that horticulture can earn 20 to 30 times more foreign exchange per unit area than cereals due to higher yields and higher prices available. His studies have further shown that cultivating horticultural crops can generate much larger employment of the order of 860–2500 man days as against 143 man days for cereal crops. Going still
further on this point, he has pointed out that horticulture development has gradually moved out of their rural confines into urban areas and from traditional agriculture enterprise to the corporate sector. This trend, according to him, has led to the adoption of improved technology, greater commercialization and professionalism in the management of production and marketing. He closes his analysis with the positive affirmation that cultivation of horticultural crops would go a long way in adding to the glamour of agricultural practices.

Revathy (2006)\(^{19}\) in his study entitled, “Horticulture Gaining Ground”, stated that as a result of the efforts being made by the Haryana government to encourage crop diversification, the area under horticulture has increased in the state. The farmers are taking keen interest in replacing traditional crops by commercial crops like flowers and spices.

Thimmappa K. and Mahesh N. (2006)\(^{20}\) in their work “Conservation Farming as an Alternative to Shifting Cultivation in Meghalaya – An Economic Evaluation” highlighted that among the different farming systems farmers have found out that the horticultural farming can assure any one the maximum annual net return of Rs.40,115 per hectare, closely followed by livestock-based farming system with Rs.35,421 per hectare.

2.3. PRODUCTION AND PRODUCTIVITY OF FLORICULTURE

Sundar P. (2007)\(^{21}\) in his study entitled, “Horticulture Blooms Around India’s Garden City”, has explained that the area under horticulture in Bangalore rural and urban districts has been increased to 5000 acres by the Government. Internationally-reputed varieties of flowers are produced mostly for export purposes in the sprawling
floricultural farms. Efforts are on to try the cloning technique to produce a totally new generation of flowers.

Kaul G.L. (1997) in his study entitled, “Horticulture in India Production Marketing and Processing”, argued that has expressed grave concern over the 20 to 30 per cent loss on production and marketing of flowers annually registered by the floriculture sector due to lack of adequate infrastructure needed to preserve flowers once demand picks up and the markets become buoyant.

Agarwal K.G. and Duhijod D.D. (1997) in their study entitled, “An Economic Analysis of Winter Floriculture Grown in Vicinity of Nagpur City of Maharashtra” have tried to explain how marigold, chrysanthemum and daisy have been produced more than gaillardia, wheat, soybean and irrigated cotton. Marigold generates opportunities for gainful employment for the rural womenfolk who are good at flower harvesting. Human labour costs account for 75 per cent of total input cost in marigold as compared to 45 per cent and 41 per cent in chrysanthemum and daisy respectively. Irrigation cost as a percentage of total input cost is also higher in daisy (40 per cent) as compared to marigold and chrysanthemum. Daisy flower yields the same benefit as chrysanthemum but per kg cost is very low for daisy due to more physical productivity as compared to chrysanthemum.

Krishnaiah J. (1997) in his study entitled “Horticulture in Andhra Pradesh Production and Export Potentials” estimated that among the different regions of Andhra Pradesh coastal Andhra has high potential and ranks first in the production of fruits, flowers, and vegetables and he recommends that awareness should be created for horticulture and about its profitability vis-à-vis other crops.
Prem. S. and Dahiya (1997)\textsuperscript{25} in their study entitled “Horticultural Development in Himachal Pradesh” have deliberated and concluded that the prospects for development of crops such as fruits, floriculture, mushrooms are very bright since the state has several innate agro-climatic advantages.

2.4. STUDIES RELATED TO COST AND RETURN

Nair G.K. (2007)\textsuperscript{26} in his study entitled “Anthurium Prices Set to Rise 20% on Short Supply”, found that the cost of cultivation went up substantially to around Rs.60 lakh per acre from Rs.35 lakh per acre three years ago. Nair holds that it could be attributed to the price of the planting material covering 75 per cent of the total project cost and inflationary trends prevailing in the country. In spite of the unavoidable price hikes, flower producers are making fabulous profits.

Aaditya Mattoo (2007)\textsuperscript{27} in his study entitled “From Competition at Home to Competition Abroad”, found that India’s international transportation costs were 20-23 per cent higher than those in other competing countries. For instance, it costs $790 to transport one metric ton of grapes from India to Netherlands, about two-three times higher than doing the same from Chile.

Anil U (2007)\textsuperscript{28} in his study entitled “Tanflora Export Cut Roses to Europe” stated that during Valentine Day celebrations, along with the bulk order, Tanflora was able to fetch a better price of Rs.20 a stem compared with the previous year’s Rs.16- Rs.18. Normally red roses grown in the country fetch Rs.15-Rs.18 a stem in the European Markets during the season, but owing to bulk supply, our price realization was higher this year.
**Manjunath Reddy** (2006)\(^9\) in his study entitled “Relocating Some Green House Assets from India to Ethiopia” says that Indian growers are battling a steep hike in freight costs, which have increased 300 per cent in three years. Freight costs which account for over 50 per cent of the floriculture earnings from Ethiopia and Europe are lesser by 50-60 per cent compared to the costs from India. Therefore, Indian growers expect to reap the low freight cost advantage by operating from Ethiopia.

**Desai R.G.** (2004)\(^{10}\) in his study entitled “Economics of Floriculture” have stated that in no uncertain terms that the costs of production of cut roses are bound to go up in view of the frightful volatility about the fixed cost which forms 36.51 per cent of the total cost and the variable cost which forms the remaining 63.49 per cent. The cost of production of roses remains volatile in India because the prices of most of its basic inputs have not been under anybody’s control.

**Selvaraj K.N.** (2003)\(^{11}\) in his study entitled “Horticultural Production in the Free Trade Regime” has concluded that the floriculture smaller farmers have lower overheads. For a smaller farmer production costs per flower are about Rs.0.80 while it is as high as Rs.2.10 for larger farmers.

**Kehar Singh** (2001)\(^{12}\) in his study entitled “Economics of Wild Marigold Production and Distillation in Himachal Pradesh” concluded that the production of wild marigold is more profitable than other crops like maize, pulses, wheat and oil seeds. Furthermore, he recommends that it may be grown economically in culturally wastelands, pastures and forests.
Kalirajan K.P. et al., (1997) in their study entitled “Sources of Output Growth in Indian Agriculture” found that the cultivations of horticultural crops like fruits, flowers and vegetables is much more profitable and labour intensive than the field crops.

Kazi et al., (1997) in their study entitled “Techno-Organization Characteristics of Floriculture in West Bengal” found that the input-output ratios for the crops showed that flowers had an advantage over traditional crops like paddy and potato. High cost of inputs and low prices of output were the major constraints.

Pawan Dahiya et al., (1997) in their study entitled “Comparative Economics of Floriculture in Sonepat District of Haryana” revealed that under the present production technology and relative price structure, marigold was found to be considerably more profitable (net return Rs.20,295/ha) over its competing crops i.e. paddy (Rs.9,827/ha) and arhar (Rs.3,380/ha). Similarly gladiolus was also found to be highly profitable (net return Rs.78,808/ha) over its competing crops i.e. mustard (Rs.3,958/ha) and wheat (Rs.1372/ha).

Bal H.K. and Bal H.S. (1997) in their study entitled “Flower Power in Punjab” say that the flower cultivation is a highly profitable enterprise as compared to other food and cash crops. Favorable climatic conditions, low labour costs, availability of land for floriculture, import of technology are some of the strengths of Punjab floriculture”.

Alagumani et al., (1997) in their study entitled “Performance of Flower Crops vis-à-vis Field Crops in Madurai District, Tamil Nadu” found that for all flower crops
net present worth was positive and the benefit cost ratio was more than one, indicating that capital investment on floriculture was more paying. Among the four flower crops considered, net present worth for Kakaratan was found to be the highest, followed by rose. The benefit cost ratio was the highest for Crossandra (6.00) followed by Kakaratan (5.5). Based in the above findings he concluded that floriculture was more high profitable than field crops.

2.5. FLORICULTURE AND INFRASTRUCTURE DEVELOPMENT

Nikhil D. (2007)\textsuperscript{38} in his study entitled “Poor Infrastructure Hampers Horticulture Growth: A Study” pointed out that the poor infrastructure facilities such as storage, transportation and lack of marketing initiative were hampering horticultural growth in India. Due to inefficiency in the supply chain, the price received by the farmers varied from about 24-58% from the price that the consumer paid.

Soumitra Trivedi (2007)\textsuperscript{39} in his study entitled “High European Demand Spurs Flower Exports”, stated that the exporters of potpourri and dried flowers in Surat and Navasari district of Gujarat were witnessing good growth in business. However the lack of good infrastructure facilities was a big hindrance. Farmers and exporters felt that more pack-house facilities would improve business.

Bhinu V.S. (1996)\textsuperscript{40} in his study, “Flori Potency” says that the controlled cultivation of flowers requires infrastructures like the employment of improved planting materials, green houses, technical knowhow, infrastructure for the essential cold chain comprising pre-cooling and storage facilities near the field, reefer vans for the transportation and cold storage facilities at the airports.
Ajay Kumar (2000)\textsuperscript{41} concludes in his analysis “Floriculture Industry: an Overview” found that many of floriculture units suffered due to lack of infrastructure facilities like cold chain, lack of technical know-how and elite planting material and many of them were closed. And he suggests that up-to-date information is required as to which are the companies surviving and which are the ones closed.

**2.6. THE GROWTH OF THE FLORICULTURE SECTOR**

Mishra P.K. (2007)\textsuperscript{42} in his article “Improve Productivity and Quality” says that Floriculture industry has been experiencing rapid growth, world over, with the increasing demand for floriculture items, which need to be capitalized for the benefit of the farming community. His studies further show that on account of various policy interventions of the Government of India, like liberalization of Seed Act 1988 and focused attention given to the floriculture sector by the Ministry of Agriculture as well as Ministry of Commerce, the production of flowers has increased in the traditional as well as non-traditional areas. Domestic Market, both for cut and loose flowers, has increased significantly due to rapid urbanization, changes in social attitudes increase in income level and with the increasing demand for the use of flowers as gift and bouquets.

Gursharar Singh Kainth (1996)\textsuperscript{43} in his work “Export Potential of Indian Floriculture Products” says that India has a good potential for entering global trade as certain flowers and plants are grown in climates peculiar to India. Hence, the Government has identified floriculture as a high-focus export sector. Several industries either on their own or in collaboration with multinational companies have shown keen interest in the production of flowers.
Pawar S. (2007)\textsuperscript{44} in his study entitled “Centre Committed to Holistic Floriculture Growth”, has stated that the agro-climatic conditions of India permit the cultivation of a variety of flowers and India is already known for its traditional flower cultivation. Now with the introduction of the centrally sponsored horticulture schemes, commercial cultivation of cut-flowers such as roses, orchids, gladiolus, carnation, anthurium, gerbera and lilies, under protected condition has become popular.

Singh A.J. and Sarbjit Dhaliwal (1994)\textsuperscript{45} in their study “Export Prospects for Agricultural Commodities in the New Economic Environment” appreciate that Indian floriculture industry is undergoing an orchid revolution paving the way for a huge amount of foreign exchange earnings. Moreover, since floriculture operations are generally labour intensive, we could have substantial advantage in the international trade.

Sundar P.S. (2004)\textsuperscript{46} in his study entitled “Tamil Nadu Government Out Has Big Plan to Make Niligiris A Floriculture District” says that climate-wise the Nilgiris is best suited for global floriculture business and considering the scope to augment India’s share in the international trade, which is presently negligible, the State Government has drafted an ambitious plan to focus on floriculture development in the Nilgiris and making it as a Floriculture District”.

Nair G.K. (2007)\textsuperscript{47} in his study entitled “Climate Can Help Flower Market Bloom Globally” says that India produces a wide variety of flowers including rose, chrysanthemum, marigold, jasmine, heliconias, and carnations in 1,15,921 hectares spread over Tamil Nadu, Karnataka, Haryana, Andhra Pradesh Maharashtra, West Bengal and Gujarat. The total production in 2004-05 touched 6,54,837 tones which included open air and greenhouse cultivation.
Nageswara Rao A. (1997) in his study entitled “Higher Employment and Income Potential of Horticultural Crops”, have explained that horticultural crops like fruits, vegetables and flower crops have higher employment potential compared to field crops, which is mainly due to the harvesting period in the case of flowers and vegetables. Land productivity is considerably higher resulting from the high yield performance of horticultural crops.

Ram G.S. (1995) in his study entitled “Expanding Agricultural Employment The Strategic Issues”, has explained that major diversion in crop production has occurred through more area under oilseeds, fruits, vegetables and flower crops. These are not only high value enterprise but also labour intensive in nature. The studies show that per hectare labour absorption in horticultural crops, fishing and livestock sectors are 3 to 8 times more than that in the crop production of food grains.

Mohammed Mustaq (2007) in his study entitled “US Floriculture Size: Potential and Prospects” says that the uses of flowers made headlines in western countries. According to him University studies, conducted between 2000 and 2005 on flowers and plants, found that flowers have immediate and long-term positive effects on emotional reactions, mood, social behaviors and even memory for both males and females. The presence of flowers triggers happy emotions, heightens feelings of life satisfaction and positively affects social behavior far beyond what is normally believed.

Chadha K.I. et al.,(2007) in their study entitled “Role of Horticulture in Controlling Environmental Pollution in India” say that instead of going for hi-tech technologies against pollution, the trees, flowering plants and other biomass are effectively adopted for fighting the various types of pollutions. Interestingly scientists
have found that the sea flora is an important agent against pollution and it helps in overcoming the ozone layer depletion.

**Bhattacharjee S.K. (2001)** in his study entitled “Periurban Floriculture and Quality of life” says that India is a treasure house of beautiful trees. In our urban areas, the trees are the dazzle of nature outside our doorstep. The mature trees stabilize temperature and save hundreds of crore of rupees per year by reducing cooling cost and non-renewal fuel consumption and also reduce carbon dioxide emission. Since the plants absorb gaseous and particulate pollutants, air quality is enriched.

**Som Dutt (2002)** in his study entitled “Sustaining Aesthetic Security in India”, has found that the floriculture assumes more significance for its immense contribution to environmental conservation, landscaping, abatement of noise pollution, cleaning of air we breathe and the like. In this way floriculture has increased its value manifold, beyond objects of beauty. This has resulted in greater appreciation for this science of floriculture.

**Anoop Kumar et al. (1998)** in their study entitled “Floriculture in Controlling Pollution” say that the pollution has become a global concern due to rapid decrease in greenery. Pollution can be controlled by increasing more oxygen and decreasing carbon dioxide concentration in the atmosphere which is possible by planting more and more trees and flowering plants. Further, we can protect the natural resources of forest wealth as an aid to decrease pollution.

### 2.7. INDIAN FLORICULTURE AND INTERNATIONAL FLORICULTURE

**Nancy Laws (2007)** in his study entitled “Logistics Hampering Exports” has found that the floriculture marketing consultant from the US says that India tops in
acreage under flower cultivation with over 1.05 lakh hectares but Holland with flower cultivable area of 5,000 hectares, tops in exports followed by Columbia, Ecuador and Kenya. India does not figure even among the top ten exporting countries. The reason is the farmers in India concentrate on domestic market and not on export.

**Vijayakumar A. (2007)**\(^56\) in his study entitled “US Floriculture Size, Potential & Prospect”, say that the production value of nursery and greenhouse crops was the third largest part of crop agriculture in the United States according to the most recent U.S. Census of Agriculture conducted in 2003 surpassed by only corn and soybeans. This agricultural segment is larger than wheat, cotton and tobacco. Of all US agriculture production (plant and animal), floriculture (nursery) plus greenhouse crops were the sixth largest agricultural segment, comprising about seven per cent of total agriculture sales. He further adds that in 2005, the floriculture production segment alone contributed $5.4 billion in production value.

**Jafar Naqvi S. (2007)**\(^57\) in his study “On Trial of Floral Dragon” say that Chinese floriculture sector started a large scale commercialization from 1984 and by 2003 grew almost 30 times. Flower cultivation and usage of flowers is common all over China, especially for traditional usages and medicinal purposes. However, commercial cultivation of flowers for export is about eight years old and is growing at an estimated rate of 20 per cent a year with 82,000 hectares under floriculture and the Chinese floriculture is almost 50 billion Yuan. There are over 2,500 flower markers currently operating and serving over 20,000 retail shops and floriculture sector directly supports over four million people involved in production, logistics, marketing and retail.
Peter Boerlage (2007)\textsuperscript{58} in his study entitled “Indian Floriculture Could Outpace African Floriculture” says that in India, in spite of having suitable climate and soil conditions for flower production, the area could fail to become a proper production place for want of sound infrastructure like transport and cooling options.

Kostwinder G. (2001)\textsuperscript{59} in his study entitled “Floriculture in Holland Many Insights for India”, says that the major producers of flowers, the Netherlands have a long tradition of flower and plant production. Experience and know-how have been passed on from generation to generation. Many nurseries are family businesses run by hard working and flexible individuals. Expertise is stimulated by a good system of Horticulture education, extension and study groups. New innovations are generated by scientific research. The annual production is estimated at US$3 billion or roughly 20 per cent of the total Dutch agricultural production value. Each year, flower producers buy US$1.5 billion work of production materials. The country exports about US$3.5 billion worth cut-flower annually.

2.8. RESEARCH AND TRAINING ON FLORICULTURE

Rahul Wadko (2006)\textsuperscript{60} in his study entitled “Expo to showcase Floriculture Potential” says that the Flora Expo is providing a platform every year for buyers and sellers to interact and understand the latest developments and market trends of the business. The National Horticulture Mission is also subsidizing railway fares for farmer delegations attending the exhibition.

Mohan Murti (2007)\textsuperscript{61} in his study entitled “Government Promoting Crop Diversification Through Horticulture” says that to encourage farmers and to make them confident, the government of Haryana has launched several training programs for horticulture farmers across the state. The farmers are also being paid to get trained at the
rate of Rs.1,500 for seven days training in Haryana and Rs.2,500 for training outside the state.

**Baldev S. Chauhan** (2006) in his study entitled “HP to Participate in Dutch Horticulture Fair”, says that a team of officials and farmers led by State Horticulture minister flew to Amsterdam to attend the international horticulture fair in Amsterdam. The fair focusing on Floriculture technologies and services, provided the team a platform to interact with the best in the field from all over the world and help them assess the procedure for export and discuss with manufacturers, cultivators, dealers, packers, exporters and distributors concerned with the floriculture industry.

**Arun Kumar H.** (2005) in his study entitled “Departmental Assistance for Cultivation of Loose and Cut-flowers” says that in Andhra Pradesh the state government is providing subsidies to the flower growers and in addition to that the selected beneficiaries are also given training in adopting improved technologies in these new crops, assisting in processing better planting material and installation of green house.

### 2.9. MODERN TECHNOLOGIES IN FLORICULTURE

**Mohan Pillai** (1991) in his study entitled “Small Growers’ Programme”, says that the small grower’s programs of the rubber department could be used to train farmers in the flower industry as well. The program’s basic objectives are to upgrade the field practices of the small growers, to advice on correct techniques and the buyback of flowers at very remunerative prices. This program in Mohan Pillai’s opinion is bound to produce positive impact on the floriculture industry. If implemented successfully, this program will bring about increase in the yields and very remunerative prices for the
small growers, saving of processing costs and infrastructure for the small growers and problem-free marketing of all the flowers produced without the introduction of Middlemen. Mohan Pillai concludes the analysis by stating that the small grower’s programs will benefit immensely the small growers all over the country.

David Gray (2007)\(^6\) in his article “Environment Friendly and Production Efficient Solar Heating” says that the solar heating project was first in Africa, and it was the largest of its kind worldwide. The cheapest energy is solar energy. In Kenya, the temperatures drop dramatically in the early morning as other rose growers have found this can have disastrous results with condensation. The basic principles of the system are that a large reservoir tank holding some 800m\(^3\) of water is connected to a series of steel, aluminum and glass panels. The water is pumped through these panels either slowly or fast according to the ambient temperature and thermostatically controlled. He concludes that using this system the growers will get an increase of 15-20 per cent in production and disease control and improved quality.

Marta Pizano (2007)\(^6\) in her study entitled “Challenges for Soil-Less Production” says that production of cut-flowers on raised beds or in containers filled with artificial (soil-less) substrates has increased over the past years, mostly for reasons associated with avoiding soil fumigation. Better quality yields have generally been the reward. Nevertheless, converting to substrates is expensive and time consuming and poses new challenges for growers.

Anabel Evans (2007)\(^7\) in his study entitled “Sea Freight Distribution” says that sea freight will never be synonymous with day fresh products but perhaps the cut-flower sector will refill it because of the aspect of post-harvest treatment. One particular aspect
of post-harvest treatment is cool chain. It is an adoptable one in sea freight; therefore, this alternative to air freight are capacity, availability the lower distribution costs and low CO\textsubscript{2} emissions”

Pathania N.S. and Sharma B.P. (1994)\textsuperscript{68} in their study entitled “Floral Preservatives for Cut-flowers” say that the floral preservatives are used for making the quality better and extending the longevity of flowers. In their opinion floral preservatives perform three functions (i) they provide sugar (carbohydrate) (ii) they supply a bactericide to prevent microbial growth and blockage of the water-conductive cells in the stem and (iii) they acidify the solution. The latter function suppresses bacterial development and through some unknown process, prevents wilting of flowers. Carbohydrate supply is best in quality flowers grown under highlight intensity conditions and harvested at proper maturity but even these flowers will benefit from additional carbohydrates. It is possible to supply adequate carbohydrates for some flowers by making them stand in concentrated sucrose solutions for up to 24 hours immediately after harvest (also known as pulsing).

2.10. GREEN HOUSE TECHNOLOGY AND FLORICULTURE

Ahmed S.G. et al., (1996)\textsuperscript{69} in their study entitled “Plastic Cover for an Energy Efficient Green-House” says that the greenhouses are framed structures connected with transparent and translucent material in which crops can be grown under controlled environment. A plastic film or fiber glass cover acts like selective radiation filter, which allows solar radiation to pass through it but traps thermal radiation emitted by objects inside it. Mid type greenhouses can have cooling and heating arrangements and high type can have auto control mechanisms.
Dharmarajan C. (1996)\textsuperscript{70} in his study entitled “Greenhouse Technology” says that the advantages of growing plants in a greenhouse are (1) It reduces crop damage created by unfavorable weather conditions, modifies local climates and improves the productivity and quality of crops (2) Crops can be grown throughout the year (3) Crops give higher yield (4) Labour and water requirements are less.

Shashidhar T.R. et al., (1996)\textsuperscript{71} in their study “Green House Cultivation of Cut-flowers and Ornamental Plants” says that the basic consideration in establishing flourishing greenhouse operations are (1) Before constructing a greenhouse one must take into consideration the location, climate, crops to be grown, cost of production and economic returns. (2) The success of greenhouse production depends on the ability of the grower to use the infra-structure and production inputs optimally. (3) The plants are living materials and they need close attention. People who are working in the greenhouse should have technical knowledge and proper co-ordination between workers and horticulture mentality.

Dhaliwal (2006)\textsuperscript{72} in his analysis on “Horticulture, Floriculture Revolution Sprouting” says that the Himachal Pradesh farmers are supported by Himachal Technology Mission, the National Horticulture Board and the state Horticulture Department for raising of greenhouses. There are farmers getting between Rs.5 lakh and Rs.10 lakh from small plots ranging from 400 square yards to 3,000 square yards.

Edward Bent (2007)\textsuperscript{73} in his study entitled “Greenhouse of the Future” says that the innovative greenhouse was started in the new production of Anthura in the landscape of Bleiswijk. The greenhouse complex has a surface of 12 hectares, plus a 2
hectare double-storied floor of total area provided with the fully automated container system. By means of a maximum climate control system, considerably leaner energy consumption is realizable. This type of modern greenhouse provides a good growing start for micro plants at high humidity and also closed greenhouse system by which warmth can be obtained.

2.11. MAJOR PROBLEMS IN FLORICULTURE INDUSTRY

Jafar Naqvi S. (2007)\textsuperscript{74} in his study entitled “Recommendations and Highlights of 3\textsuperscript{rd} International Flora Expo 2007 Conference”, says that the problem prevailing is lack of communication between growers and wholesale traders and exporters and the fraudulent practices by wholesale traders operating in national and international markets. Another problem which is faced by the farmers is infertile. To make matters worse importers have been finding it difficult to act with growers due to the most dreaded channels of contact between the growers and importers. The author has expressed that they are concerned with the absence of organized marketing channels and monitoring systems and the lack of advertisement for the highly competitive Indian flowers in the ever growing horizon of international market.

Sehgl O.P. et al., (1998)\textsuperscript{75} in their study entitled “Carnation Cultivation in Himachal Pradesh” observed that lack of technical persons, inadequate incentives by the State Government, poor handling of flowers and marketing are the major bottlenecks in the carnation industry of Himachal Pradesh.

Venkataratnam L. (1998)\textsuperscript{76} in his study entitled “Further Thrust in Horticulture” explains that foreign companies from Holland, Israel, UK, Germany and France ventured into direct collaborations with Indian entrepreneurs who had no
experience in this field. Over 100 companies have sprang up in the last five years for export of flowers. As the technologies were not refined to suit Indian conditions Agricultural Universities had no time to embark on industrial research for export of flowers. Many companies folded up and a few companies also took Indian entrepreneurs for a ride and huge losses were incurred. And he found that lack of appropriate Greenhouse technology, knowledge of liquid fertilizers computerization, want of cold chain, lack of cargo space, adequate air transport facilities and poor infrastructure in air ports and procedural formalities caused a serious setback to floriculture industry.

Subrahmanyam K.V. (1998)\textsuperscript{77} in his report “Horticulture in India: Organization of Production Marketing and Processing” found that in the market itself the cultivators faced the risk in the form of cheating by illegal deductions, overcharging, offer of low prices through collusion and under weighing.

2.12. PROBLEMS IN FLOWER EXPORT INDUSTRY

Surinder Sud (2008)\textsuperscript{78} in his study entitled “Ready to Bloom” says that India in acreage of flower production occupies the second position after China. But India’s share in the global flower market is still no more than 1-2 percentages, though the scope for raising it is rather huge. Flowers, being delicate products with very short-shelf-lives, require specialized post-harvest handling, storage and transportation. Cold chains and dedicated transportation and cargo handling facilities are therefore needed for both domestic trade and export. Cold store facilities are desirable even at the export destinations to keep losses to a minimum.
Drabu H.A. (2007)\textsuperscript{79} in his study entitled “Horticulture Industry in Distress” says that banks had largely failed farmers in helping them out with loans and the government had done no better as the industry lacked infrastructure like transport, sale centres and technological know-how. The absence of essential facilities meant that floriculture which could never take off despite natural abundance.

Sushila Srivastava et al., (1996)\textsuperscript{80} in their study entitled “Promising Export Prospects of Horticultural Products” say that in spite of good scope for export of flowers and live plants, India does not have even peripheral presence in the international trade. Inadequate infrastructure for the production of floral crops, lack of appropriate planting materials and improved technology of production and basic inputs such as standard containers growing media and quality packing materials, non-availability of information about the prices in the global market and unorganized domestic market are some of the other major problems for the export of floriculture products.

Patiala S. (2007)\textsuperscript{81} in his study entitled “Concern Over Slow Growth in Floriculture Exports” says that the country’s floriculture exports are likely to fall short by Rs.300 crore against the projected level of Rs.1,000 crore by the end of 2010. This would mainly be because of lack of infrastructure, non-availability of good plant material and production technology. Moreover, cold storage facilities have not been created in leading air ports to handle to such exports efficiently.

Maninder Singh R. (2007)\textsuperscript{82} in his study entitled “Flower Exports May Suffer on Delayed Pay” says that the flower exports till January in the financial year 2007 stood at Rs.350 crore, which was 98 per cent of the Rs.356 crore fixed for the entire
financial year. However, default in payment for previous financial year’s exports was likely to adversely affect fresh shipments.

Malaisamy A. and Ravindran C. (2002)\textsuperscript{83} in their study entitled “Problems of Export Oriental Units in Floriculture” said that the credit support from banks is still not adequately flowing into this sector. This is due to banker’s feeling that the project outlay is too high. Only limited appraisal expertise is available in respect of export-oriented units of agriculture.

Singh A.P. (2005)\textsuperscript{84} in his study entitled “Indian Flowers Fail to Bloom in Global Market” says that the local growers are not too eager to try the India flower species, which are as good as foreign ones. Instead, they propagate foreign varieties illegally. The growers say that the India flowers lack international acceptability.

2.13. STRATEGIES FOR BOOSTING FLORICULTURE

Randerson J. (2007)\textsuperscript{85} in his study entitled “100 p.c. Subsidy for AP Horticulture Farmers” says that the Andhra Pradesh Government announced 100 per cent subsidy to the small and marginal farmers to cultivate horticulture crops up to five acres. Farmers would be, provided with wild saplings, fertilizers and ‘paid labour’ charges for drip and sprinkler irrigation systems at 70 per cent subsidy.

Marcus Dam (2007)\textsuperscript{86} in his study entitled “Government Promoting Crop Diversification through Horticulture” says that the Haryana Government to boost floriculture providing a grant of 50 per cent to small and marginal farmers and 33 per cent to other farmers for flower cultivation. Similar type of grant was provided to the farmers for setting green-houses.
Venkatratnam I. (1998) in his study entitled “Further Thrust in Horticulture” says that the Government of India liberalized import of capital goods, without duty, encouraged soft loans through Horticultural Board and some incentives like rebate on airfreight by APEDA.

Praveen Sharma (2007) in his study entitled “Cut-flowers Exporters Cheer up” explains that based on the feedback received from the floriculture industry there is a strong case for developing a crop insurance scheme specifically targeted at the risk of crop failures and poor productivity depending on the weather conditions like continuous rainfall, excessive rise or fall in temperature and susceptibility to attacks by pests. The insurance scheme will be initially offered by a nationalized insurance company with support from the government.

Jafferson A. (2004) in his study entitled “Tea Growers in Nilgiris Diversify into Floriculture” says that the state government and APEDA in the form of subsidy coupled with the technical support offered by United Plantation of South India, already released Rs.2.24 crore as subsidy to the farmers. Tamil Nadu Horticulture Department proposed to set up two ultra-modern nurseries for production and supply of planting materials at a cost of Rs.4 crore and also Post-harvest management centers would be established very soon for grading, sorting, bunching, and cold storage refrigerated transport on an investment of 4.39 crore.

Sharma K. (2006) in his study entitled “Himachal Pradesh Providing Subsidy to Horticulturists” says that the state government of Himachal Pradesh was providing insurance to horticulturist farmers under the National Crop Insurance scheme and also providing subsidy on agriculture equipment and fertilizers.
Ashok B. Sharma (2007)\textsuperscript{91} in his study entitled “Kashmir Eyes @11 billion Floriculture Business” says that the government distributed resources for creating poly greenhouses with minor irrigation systems to interested entrepreneurs all over the valley, either free or at 50 per cent subsidy rates. The scheme, under the centrally sponsored Technology Mission, was available in every district in Kashmir valley.

Geeta Nair (2007)\textsuperscript{92} in her article “Flower Power Blossoms in Maharashtra” says that Maharastra has identified floriculture industry as a sunrise industry and agri-export zones (AEZs) for flowers have been approved in Pune, Nasik, Kolhapur, and Sangli. The Talegaon floriculture Park in Pune is a symbol of the resurgence of floriculture with roses, gerbera and carnations. She also adds that State Bank of India has started funding these projects and processed 14 proposals and sanctioned Rs.4.1 crore. As the park is under AEZ, the SBI is able to provide finance at a concessionary rate of interest of 8 per cent.

Shashi Kolavalli et al., (1992)\textsuperscript{93} in their report on “Floriculture Industry in India” says that we need better varieties and timely and adequate supply of planting material, expansion of production under controlled environment with appropriate technology, infrastructure for post-harvest care and transport and centralized collective market development for the benefit of small growers.

Dilip De (2002)\textsuperscript{94} in his study observes that lending rates are high in India. They range between 11.5 per cent and 15 per cent. However, it is around 6 per cent in Holland. Agricultural banks in Holland lend money to NABARD at 2 per cent where as local grower is made to pay over 15 per cent interest. To promote floriculture and give a boost ministry of finance should set a ceiling on interest at 6 per cent.
Kajaria and Ajay Kumar (2000)\textsuperscript{95} in their study entitled “Floriculture Industry an Overview” says that the industry interaction is very essential for the survival of the industry. Apprehension about interaction has to be done away with. Many floriculture units fear that if they join together on a common platform, their secrets will be known to the competitors. They do not also allow their staff to interact with others for the fear that competing unit will steal them away by giving better emoluments. They also fear that their technology will be revealed. This is a wrong medieval concept. The staff should be given freedom to interact and they should be given technical and management training.

Sindhu S.S. and Mishra R.I. (1997)\textsuperscript{96} in their study entitled “Problems and Prospects of Flowers in India” explain that support price for floricultural crops should be decided by the government. At least two full-fledged institutes to strengthen the research may be started. Some incentive in basic facilities, marketing, cargo space and cool chain must be given to the growers.

Malaisamy A. et al.(2002)\textsuperscript{97} in their study entitled “Problems of Export-oriented Units in Floriculture” says that the government should tackle the very important issues of duty charged for Indian flowers i.e., 12 per cent during season and 17 per cent during off season, which is not imposed in other countries like Sri Lanka and African countries.

Pawar S. (2007)\textsuperscript{98} in his study “Center Committed to Holistic Floriculture Growth”, explains that in the developed countries particularly Europe, North and South America, Australia Japan and Singapore climatic conditions do not favour round the year for the cultivation of cut-flowers and many of them import flowers from other
countries. India could capitalize on this situation by adopting scientific technologies for improving productivity and quality.

Pal B.P. (1991)\textsuperscript{99} in his book named “The Rose in India” has comments on marketing of rose. He referred to the fact that the government undertaking the State Trading Corporation decided to sponsor a project on the export of cut roses to the Western European market. He says many farmers around Pune and Nasik have two main centres in Maharashtra for the cultivation of roses for this trade has found it more profitable to convert their grape and sugarcane holdings into rose farms. It is an indication of the diversification of agriculture. Both Pune and Nasik are near to Mumbai airport. Due to this, there is a developed flower market. According to his study, the rose occupies the first position followed by chrysanthemum and carnation. It observed that the flower trade in India is a recent one but it has immense potential of export cut rose from India to European countries during winter. He pointed roses are being exported from Pune to the Middle East countries though in very limited quantities. Post economic reform, the Government of India, Agricultural and Processed Food Products Export Development Authority (APEDA), and State Trading Corporation of India has given encouragement and support to floriculture export trade.

Armitrge Aller M. (1991)\textsuperscript{100} in the book named “Introduction to Floriculture”, has contributed much to “Specialty Cut-flower”. He studied various reports and reviewed the production of specialty cut-flower. He concluded that specialty flowers were economical in field but not in the greenhouse. He studied detailed guidelines concerning the cost of production of field grown specialty flower. According to his observation, any business person has ability to make profit. It depends upon keeping cost of production down and factors that affect cost included location, size, and
managerial skill, and market channel, time of year and space utilization. Cut-flower can be profitable if done efficiently. He concluded that overall cost might be broken down into variable costs (cost per crop) and overhead (cost per acre). The cost per crop was relatively unchanged regardless of size but cost per acre reduced as acreage increased. He mentions that, variable costs were allocated to individual crop for material that is fertilizer, seed, plants pots, potting soils and mulch and labour cost including any benefits such as employee compensation, social security, paid holidays and sick leave, and retirement policies. Overhead costs, equipment depreciation, interest, repairs, taxes and insurance are incurred whether crop is grown or not which includes insurance, cost of land, electricity and fuel and management fee.

Sing D.K. (2008)\textsuperscript{101} calculated the cost of cultivation of selected flowers in his study on “Development of floriculture in Uttar-Pradesh”. To evaluate the economic gains and to identify prospects in the production of selected flowers were the main objectives of his study. For this study, four flowers namely gladiolus, tuberose, rose and marigold were selected based on their importance in Uttar Pradesh. Flowers were taken into account as a criterion of maximum coverage of area under such a flowers in 1998-99. As per this criterion, Dehradun Muzzaffarnagar, Harthrus and Meerut were selected for gladiolus, tuberose, rose and marigold respectively. Multistage random sampling was adopted for the selection of sample units. Then, for each district, one block covering a larger area under the flowers was selected, from each selected block four flower-growing villages were selected as samples. The floriculturists from each selected village were chosen according to probability proportion to size of farms. He observed that gladiolus is very high profitable flower as compared to the other flower crops. He worked out the cost of cultivation of gladiolus at Rs.3,56,643 per hectare and
net income derived at Rs.1,38,630 per hectare. He concluded gladiolus was the most
capital and labour intensive ornamental flower in reference year. He worked out the cost
of cultivation on tuberose at Rs.1,54,625 and per hectare net income was Rs.1,73,280.
He worked out the cost of cultivation of rose per hectare at Rs.23,547 and net income
was Rs.57,138 per hectare. The cost of cultivation of marigold per hectare was
Rs.19,901 and net income was Rs.41,839. He remarked that the marigold cultivation
was highly profitable in the reference year.

Bose T.K. (1999)\textsuperscript{102} discussed the various aspects of floriculture in his book
named “Floriculture and Landscaping”. He focused on the prospect of floriculture in
India. He mentioned commercial floriculture is an activity, which has assumed some
importance only in recent times. In most parts of country, flower growing has been
carried out on smallholding, only as a part of the regular farming system. According to
his study Karnataka, Tamil Nadu, West Bengal, Andhra Pradesh, Maharashtra and
Rajasthan are the leading states in hi-tech floriculture. He also observed that more than
two-thirds of present floriculture are under cultivation of traditional flowers like
marigold, jasmine aster, rose, chrysanthemum, crossandra etc. The modern day cut-
flowers with stem e.g. rose, carnation, gladiolus, tuberose, orchid, etc., are grown. The
states important for these crops include Maharashtra, Karnataka, Delhi, Haryana, Uttar
Pradesh, Punjab, Sikkim, Himachal Pradesh and Jammu & Kashmir. He chooses
flowers like tube rose, rose, etc., as loose flowers as well as cut-flowers (with stem) in
different region. He mentions that the domestic flower market is highly unorganized.
India has considerable the advantage in terms of natural resources contributing to lower
production costs. Hence, the export-oriented floriculture is also caught-up in the recent
years. The liberalized economic policies of the government and the development
initiatives have encouraged a large number of entrepreneurs for setting up 100 per cent export-oriented units.

Jitendra Singh (2002)\textsuperscript{103} in his book “Basic Horticulture” has discussed the concept of horticulture. He states that floriculture is the science of flower production. He remarks, apart from fruits and vegetables, floriculture industry in India comprising of florist trade, nursery plants, potted plants seed and bulb product has been observed as sunrise industry. There has been soaring business of flowers in almost all metro cities in India. He observes that developed flower market has been set-up in various states in India. In Maharashtra, Mumbai, Pune, Nasik and Nagpur are major flower market cities. He mentioned that the U.S.A is the major importer of the flowers across India. He points that flora-crops are high value crops. As far as concern to employment generation, hi-tech floriculture has increased person-days p.a. Moreover, processing industry has been developing through flower production.

Bhattacharji and Chandra De (2003)\textsuperscript{104} in their book “Advanced Commercial Floriculture” has given information related to traditional and modern floriculture in India. Recently, Indian Government gives incentives to floriculture industry as the part of foreign trade policy. According to this policy, Pune, Bangalore, Nasik, Palanpur, Trivandrum, Ooty, Shimla and other cities in India have geared up the floriculture business. They observed that the highest number of small greenhouse units for growing flowers was found in Maharashtra. They mentioned that many problems had been facing flower industry e.g. lack of basic infrastructure, non-availability of pesticides, high cost of production, tax burden, import duty, high rate of loyalty, poor facilities for post-harvest handling, poor market information, delay in claiming subsidies, etc. They
observed major constraints faced by traditional flower grower, were lack of availability
of good quality planting material and seeds, lack of adequate storage facilities and
transportation, etc. They suggested, for improvement of the situation of loose flowers,
there should be arrangement for supply of better quality planting materials and seed,
equip the farmers with better growing technology of flowers, provide financial help to
flower growers, provide cheap transport facilities, etc.

**Prasad and Kumar** (2005)\(^{105}\) in their book “Commercial Floriculture" have
stated that each crop has its own science and technology and floriculture is one of the
branches of horticulture. Ornamental horticulture more appropriately covers the
complete industry of flowers. Floriculture has a greater annul growth potential of 25 to
30 per cent, which is 25 to 30 times more than that of cereals or any other agricultural
produce. India is especially well placed to meet the international demand of cut-flowers
that peaks during winter months. They have remarked that the government has approved
24 projects with total foreign investment of 847 crore cleared to boost flower export.
The Indian companies are almost forced to sell their products in auction held in
Holland. Authors also discussed other aspects of floriculture, taken up as a career. They
remarked that, floriculture has a wide and great variety and diversification of job
opportunities. In general, ornamental flowers are classified variedly. To the commercial
producer or whole-seller or the retailer or flower producer or to the manufacturer or
seller or floriculture supplier it is business and to the homeowner it is a fascinating
hobby. There are many career opportunities i.e. the production of flowers, the buying
and selling of floriculture products, processing of floriculture products, the landscaping
of private and public properties and research, teaching and extension phases of
floriculture, etc.
Sudha. M., (2006) discussed “Economics of greenhouse cultivation of cut-rose for export” in the book named “Advances in Ornamental Horticulture”. The author observes that hi-tech floriculture in India is synonymous with the protected cultivation of rose for export though hardly around one per cent of total area under rose was under protected cultivation. She observed, that initiated with a very high investment of over 250 crore this export oriented production was based mainly on the four major metro polis. The author also mentioned the capital-intensive investment is also technology intensive and requires high maintenance cost and is a high-risk venture. She shows the global trade in floriculture on one hand was expanding with increasing demand and scope for new entrants like Kenya and India to capture the market. However, on the other hand Indian growers so far have not been successful in doing so because of the high cost of marketing and high technology transfer costs and failure of technology to local situation leading to low capacity utilization. She concluded Indian horticulture is yet to be stabilized due to increased capacity utilization and appropriate marketing strategies. Hi-tech floriculture now depicts a high cost, high risk, low profit venture and adoption of suitable measure such as cost minimizing the technology option. She found one important thing that is diversification into cut-flower other than the rose is the most important strategy for tapping the potential. She suggests that changing global trade order in the form of WTO and Trips prescriptions have immediate impact on the industry, though there is the need for institutional and legislative support.

Sale and Ganvir (2006) in the book named “Advances in Ornamental Horticulture” have discussed “Marketing of cut-flowers and potted plants in India. The author discuss marketing aspect of cut-flowers. They focus on export-oriented approach
of government. According to authors’ opinion, in the post liberalization era, floriculture has been identified by the government as one of the major thrust areas for export. They pointed that the earnings have increased, the area has increased, the prices of flowers being remunerative and the returns in flowers are high. They have analyzed various theses on marketing of flowers and reviewed that the main item in the total cost was the marketing cost. Its share observed to be 38 and 58 per cent of the total cost (cultivation cost + marketing cost) during the respective years. They reviewed marketing channels and identified the four important types of marketing channels for the cut-flower trade. First cultivator-packer-wholesaler-retailer-consumer, second is cultivator-packer-retailer-consumer, third is wholesaler-retailer-consumer, and fourth is cultivator-consumer those are various part of the India. They analyzed market margins that showed the producer gets only 40 paisa from the consumer rupee. They recommended that the floriculture industry needs modernization, Government of India can help in creating more facilities in the form of various infrastructural facilities.

**Manohar and Kathinathare (2007)**\(^{108}\) in their book “Greenhouse Technology and Management” have discussed the various aspects of greenhouse production economics, such as capital requirements, production economics and the condition influencing returns, etc. They have observed that the cost and returns of protected agriculture vary greatly, depending on the system used the location and the crop grown. They find, that greenhouse agriculture is the most intensive system. Year round greenhouse crop production is, therefore, much more intensive than seasonal use of mulches and raw covers. They have observed that the fixed capital cost for greenhouse clearly exceeds those of other systems of protected agriculture, but varies in expense according to the type of structure and environmental control and growing system. The
operating cost and fixed cost are annual expenditure and these can be substantial. Annual cost may co-relate to some extent with capital investment. They concluded greenhouse production system might be far more expensive than open field system. They observed production economics should consider the various components of fixed and variable cost. On an average basis, wages account for approximately 85 per cent of the total variable cost. Wages are the greatest expenditure in green house production followed by amortization cost and energy costs. They suggested that the greenhouse system economy could be improved, where labour can be more efficiently utilized, low cost capital will be available, some management and marketing skills will be available.

Somani L.L (2009) in his book “Cut-flower Industry” has given information regarding cut-flower industry. According to his study, demand for floriculture products has been rising all over world and traditional consumption markets in United Kingdom, Japan and Europe are becoming more critical. He pointed that commercial transaction system also expected to change with added role of information technology. He observed, after studying world floriculture challenges that need to addressed are enhanced production and flow of products, which depend upon specialized organization with efficient purchasing process and logistics backed by information technology to meet the challenges in changed economic circumstances. He mentioned floriculture would expect to grow well but have many challenges and advantages of growth, which can be harnessed only with well-planned strategies. He noted that India has excellent infrastructure for research, only visualize the need and put all the efforts in the right direction. He says hopefully that India has no doubt with its capable scientists and entrepreneurs added with Government support, floriculture would progress dynamically.
Sharma A.R. (2000)\textsuperscript{110} has discussed development activities of floriculture and credit support in his article on “NABARD” s Role-Credit Support to Floriculture” He mentions “NABARD” has sanctioned several schemes for floricultural development. He observes major emphasis has been given to floriculture under controlled conditions. The states, which are contributing a lot to floriculture, are Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu. NABARD has much refinance for floriculture project. The bank has contributed in a very big way to improving the export earning of fresh flowers by the sanctioning of export-oriented project in cut-flowers. He observes that, “NABARD” has been playing a very important role regarding refinance facilities to floriculture units which are, to arrange periodical meetings with concerned research institutions or bankers, to circulate the model schemes of different types of flowers, to publishing the quarterly document entitled “Technical Digest”- research results and sharing dialogue with bankers. He also observes the constraints in financing floriculture project i.e. import of varieties and technologies increase the project cost, lack of cold storage facilities at airport, inadequacy of air cargo space, delay in clearance of import of exotic plants and seed materials.

Ramkumar and Ajith (2003)\textsuperscript{111} in their article “Dry Flower Production and Export” have given importance to economics and marketing. They have expressed that dry flower industry is important as fluctuation of price level is concerned. There are flowers near natural dried, preserved and processed which is cheaper year round availability of raw material, reducing transport cost and dried arrangements are time savers and these suit the modern times, not dependable on weather. They say second aspect of importance is labour intensive industry. India has a share of 10 per cent of the total global dry flower market. This business can be run in small size. They have
worked out the economics of dry flowers. It shows that the entrepreneurs can earn 100 per cent net profit by selling floral craft items made out of dry flowers. According to their study, if the floral craft item costs Rs.1 it can be sold at Rs.2. They have recommended, this specialized industry needs special attention and encouragement by the government.

Bhanumathy V. and Sita Dev K., (2003)\(^{112}\) analyze the marketing cost, margins and producers share in consumer’s rupee in their research project, “An Economic Study of Marketing Cost, Margins and Price Spread of Jasmine in Chidambaram Taluk of Cuddalore District, Tamil Nadu”. Chidambaram taluk was selected purposely for the study of marketing aspects of jasmine based on the area and production of flowers. One block was selected, and similarly five villages were selected randomly. Sixty farmers growing jasmine flowers were selected by probability proportionate method from these selected five villages. For collection of information pertaining to marketing aspects, 15 commission agents cum wholesalers and 15 retailers were selected at random. The pre-tested schedule was used to collect data through survey method. This study was related to the agricultural year 2000-01. The study analyzed that the commission agent cum wholesalers were playing very crucial role in jasmine flower marketing. The main marketing channel identified in the study area was producer-commission agent cum wholesaler-retailer-consumer. In this study price spread analysis indicated that the producer received a gross price of Rs.650 per quintal. His share in the consumer’s rupee was 45.65 per cent. Marketing cost accounted for 22.80 per cent of consumer’s rupee including costs incurred by farmer and 31.55 per cent of consumers rupee was marketing margin for intermediaries. As a result, the study concluded that there is a need to regulate the activities of the intermediaries by
establishing a co-operative market for flower marketing. All the growers are also of the view that there is a need for the government intervention in the form of minimizing or fixing minimum commission charge and establishing co-operative market, so that it will be more beneficial to the producers as well as consumers.

Singh H.P. and Upadhya R.C., (2007) in their article “Exploring Floricultural Potential” have given data concerning Indian floriculture. They have remarked that the scope of floriculture in India has been increased tremendously which is evident from the increase in area from 53,000 hectare in 1993-94 to 1,06,477 hectare during 2001-02. There is 100 per cent increase in area, 230 per cent increase in loose flower production, and 480 per cent increase in cut-flower production. They point out that the floricultural export took a quantum jump in the last decade from Rs.14.45 crore in 1991-92 to Rs.249.50 crore in 2003-04. They have also given data of export. The floricultural exports registered a noticeable growth during last decade. The floriculture export that stood at Rs.63 crore during 1996-97, almost tripled to Rs.211 crore during 2004-05. The overall exports of floricultural produce from India soared to Rs.304.69 crore by end of 2005-06 from Rs.180.77 crore. They have observed some export constraints i.e. non-availability of planting materials for international market, lack of technical knowledge for climatic controlled greenhouse, infrastructural problems, uneconomic size of the units, etc. They have also observed that the domestic consumption of loose flowers has been increasing. They have remarked that protected cultivation is in limited area (5% of the total crop area) yet its contribution to total floricultural export is significant.

Barreto and Jagtap (2009) in their article, “Get Quality Bloom of Gerbera in Greenhouse” have given information about cultivation of gerbera. They observe a well-
drained, rich natural or slightly acidic soil is most suitable. The temperature in greenhouse should be maintained at 12-32°C. The cultivation of gerbera in pots is more economical than in beds. If plants are infested, the whole pot will be replaced. They suggested that the N.P.K dose should be given at initial stage with 15:15:15: and in the second stage with 19:19:19. They have also given idea about application interval, quantity of water, fertilizer etc., and they recommended intervened pest management. They observe that the malformation about gerbera flowers like bull’s head, incomplete opening of petals and stem break are most common problems faced by its growers. They keep a proper check during the various growth stages and supervise change in fertilizer dosage. They remarked timely intervention is crucial for successful production of gerbera in open ventilated green house.

Singh H.P., (2009)\textsuperscript{115} in his article, “Prospects of Diversification in Floriculture” has discussed the traditional and hi-tech flower cultivation. He says the domestic consumption of loose flowers especially of marigold, China aster, jasmine, crossanadra ballerina etc., has increased tremendously. According to his study, area under traditional flowers has increased significantly (79%) of total flower crop. He recommends there is requirement of research development on high yielding varieties, year round production and promotion of crops etc. He remarks that protected cultivation of flowers is in limited area that is only 5 per cent of total crop area. The major hi-tech units are growing roses, but can be diversified into orchids, antherium, gladiolus and tuberose.

Tomar and Singh (2009)\textsuperscript{116} in their article “Marigold for Year Round Livelihood” give importance to marigold as loose flower. This is highly suitable for cultivation under different agro climatic conditions. It is free flowering has short
duration, and providing attractive colored flowers in good shape, size and keeps quality. They mention that to get maximum return from its cultivation its scientific cultivation needs selection of suitable varieties, quality seed, health nursery raising, adequate plant population and other cultural practices. They suggest that selection of variety should be according to climatic conditions, field should be leveled, free from seasonal weeds, normal fertility and adequate facility of drainage is essential. They suggest that 6-8 beds of 3 meter length and 60cm width are sufficient for raising nursery for an acre. They also give ideas about manures, fertilizers, weed control, pinching, spacing, irrigation, etc. The authors have given details about management of diseases and insects. They estimated the net return (per hectare) from winter, early winter and summer crops comes to Rs.40,000, Rs.60,000 and Rs.90,000 respectively.

Reddy et al. (1992)\textsuperscript{117} in their study suggest that the scope for developing Orchid cut-flower and production of Orchid plants in India as a cottage industry is immense. They have estimated the profitability for a period of six years based on the assumption of cultivating 1,750 plants in pots under shade house condition in an area of 100 square meters. They have also assessed a net profit of Rs.6,000 per month after deducting the initial cost of investment excluding the value of land.

Chakrabarti, et al., (1995)\textsuperscript{118} analyses the trend in exports of Orchid plants from 1983-1992 and the domestic trade in Orchids in India. He has identified some of the important varieties of Orchid and the destination for Indian exports. The study reveals that about 79,000 plants of 62 genera were exported during 1984. However, due to the imposition of strict control on Orchid export imposed by Indian Import and Export Policy (April 1988 - March 1991), only4 genera of 478 Orchid plants were exported in 1988. During 1990 no export of Orchid plants was made due to the stringent
measures adopted in the Indian Import and Export Policy. He also observes that under the favourable export policy of 1992, the export of Orchid has been showing a reviving trend.

Samuel et al. (1996)\(^{119}\) shows that once Orchid plants start flowering, it gives an annual rate of return of over 100 per cent with an initial investment of Rs.35,000 in an area extending to 14 square meters.

Rajeevan, et al. (1997)\(^{120}\) has estimated the cost of production of Orchids in a commercial basis as Rs.10 million per hectare in the first year as initial investment and thereafter to Rs.0.4 million annually. They have estimated a net profit of Rs.2.4 million in the first year, Rs.7.2 million in the second year, Rs.9.6 million in the third year and 14.4 million annually, thereafter from 1 hectare of land.

Shegade M.N., and Borude S.G., (1992)\(^{121}\) concerning the economics of flower production in Thane District of Maharashtra reveals that 60 per cent of the cultivators are from marginal, small and medium sized groups. The capital cost for establishing flower gardens, in this study, is worked out to Rs.36,894 for Jasmine, Rs.35,632 for Lilly and Rs.45,547 for Kagda. The net income per hectare for these flower crops are also calculated as Rs.76,513 for Jasmine, Rs.37,554 for Lilly and Rs.83,563 for Kagda.

Shukla S. and Jain N. (1996)\(^{122}\) carried out a study to estimate the breakup of the costs and the net revenue of the export-oriented flower producing companies, which are involved mainly in the export of rose flowers. The study indicates that on an average, the net revenues of these companies are about 30 per cent.
Sudha M. and Subramanyam (1992) have conducted a study by comparing the costs and returns of Aster cultivation with other compatible intercrops in the coconut orchards, in the Tumkur district of Karnataka during 1991. They found that the cost of cultivation of Aster alone in coconut groves comes to Rs.23,223 per hectare, with a net profit margin of Rs.11,773.

Rao, et al. (1992), examining the economics of Jasmine cultivation in Andhra Pradesh, with a sample size of 120 jasmine gardens at different stages indicates that the average variable costs of cultivation of Jasmine flowers per hectare come to Rs.35,484. This represents 73.4 per cent of the total costs of cultivation. They have also calculated the net return realised per hectare of Jasmine garden as Rs.10,735.

Kumari H., (1992) in a study on Chrysanthemum cultivation in Andhra Pradesh has estimated the cost of cultivation of Chrysanthemum per hectare as Rs.55,633 and annual net returns per hectare as Rs.14,807. The study further identifies that lack of alternative marketing channels and wide fluctuations in prices in flower markets are the major problems in the case of Chrysanthemum cultivation.

Bhattacharjee S, et al., (1993) carried out a study to estimate the cost of cultivation, farm business income and annual net profit per acre from Rose cultivation. They have also analysed the variations in the cost of cultivation and farm business income on the basis of different size groups, volume of business and the scale of operation.

Misra J.P., (1997) conducted a study in which the investment requirement of capital intensive floriculture units has been estimated. In his view the capital cost for the cultivation of roses ranges from Rs.64.7 lakh to Rs.157.5 lakh per hectare depending on
the methods of cultivation. In the case of Carnation, it is estimated to vary between Rs.56.78 lakh and Rs.157.5 lakh and for Orchids the same works out at Rs.69.42 lakh per hectare.

Ganguly T., (1998)\(^{128}\) emphasises the importance of flori-business by citing a case of Deulia bazaar. In Midnapure district in West Bengal, where various flowers are traded. According to him this market supports livelihood for 12,000 families in the district. He also has found in his study that the daily average turnover of the market often exceeds Rs.10 lakh but in lean month it comes down to Rs.1 to Rs.1.5 lakh and the price also varies from Rs.7 per flower during June to November (peak period) to even Rs.3 per flower during lean periods.

Salvi B.R., (1997)\(^{129}\) carried out an experimental study on Anthurium cultivation in an area of 400 square meters with 1,975 plants and has estimated the total cost of cultivation as Rs.3,37,972 of which Rs.1,93,950 constituted the fixed expenses. The net inflow in this case was worked out at Rs.4,38,200. It is also observed that about 6 suckers per plant were produced during this period. It is also mentioned in this study that as the age of the plant advances expenditure incurred on plant will comparatively be reduced and the margin of profit will increase to a considerable extent due to the higher number of flowers and suckers.

Singh F., (1987)\(^{130}\) in a study has observed that on an average 61,750 Anthurium plants can be grown per hectare and each plant, on an average, produces 5 spikes annually. Thus altogether 3,08,750 spikes can be produced annually from 1 hectare of land, which yields an annual gross income of Rs.3,08,750.
Kaur J., (1999)\textsuperscript{131} has observed that the Indian floriculture industry has suffered a setback, which has been estimated at 30 per cent due to the dwindling trends in production. The declining trends in production due to cloudy weather have resulted in missing the 4 auction days in Holland by the Indian exporters. This has led to a loss of Rs.1 crore to the industry. He has also concluded that even though the industry is facing severe threats in the international market, chances are bright for the cut-flower industry in the domestic market.

2.14. RESEARCH GAP

The present study is on the production and marketing of flowers in Kanyakumari District. The study is unique and differs from the earlier studies in the following aspects:

1. Most of the studies conducted earlier relate to horticulture aspects and have given less importance to marketing. The present study deals with the marketing aspects and analyses the problems and prospects from the marketing angle.

2. The study area selected is Kanyakumari district in the State of Tamil Nadu

3. The marketing strategies may differ among the growers and intermediaries and hence separate analysis is made to find out the effectiveness of marketing strategies followed.

Thus the study is unique in many respects from the previous studies.

In this chapter, an attempt is made to review the previous studies done in relation to horticulture products, fertilizer use, land holding and marketing aspects.
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