Chapter 2: Overview of Floriculture sector

The purpose of this chapter is to present the latest trends and overview of the floriculture industry with special emphasis on India. The chapter starts with the history and definition of floriculture and then reviews the product, production process, market segmentation and peculiar characteristics of floriculture. Overview of Regulations, code of conduct and Standards in Floriculture is presented along with health and environmental hazards. This is followed by a brief overview of the world floriculture and Indian floriculture industry. Scope of exporting and its limitations are discussed in the end of the chapter.

2.1 Introduction:

Flowers have always remained an integral part of social fabric of human life. Man has traditionally used flowers for expressing or exhibiting his innermost feelings to God and deities or presenting to the beloved ones or complimenting any one or versifying any conceivable emotion. Floriculture is an ancient farm activity with immense potential for generating remunerative self-employment among small and marginal farmers. Flowers are being cultivated in India from time immemorial. Since ancient times ornamental plants have been an integral part of life with gardens, flowers, and ornamental horticulture being noted in most of our historical references. Garlands of olive leaves were wore by the roman soldiers and lotus blossoms decorated the Egyptian royalty. Backyard growing of flowers dates back to ancient times like the Ramayana and Mahabharata. Flowers were cultivated for aesthetic purposes as also for their fragrance, perfumes and medicines. Changing life style of people has led to the commercialization of flower cultivation. The huge demand for flowers coinciding with various occasions has led to growth of market for flowers.

There are various definitions of floriculture:

- **Floriculture is a branch of horticulture concerned with the propagation of ornamental plants with a focus on flowering plants specifically.**

- **Floriculture is the segment of horticulture concerned with commercial production, marketing, and sale of bedding plants, cut flowers, potted flowering plants, foliage plants, flower arrangements, and noncommercial home gardening.**
• **Floriculture**, or flower farming, is a discipline of horticulture concerned with the cultivation of flowering and ornamental plants for gardens and for floristry comprising the floral industry. The development plant breeding of new varieties is a major occupation of floriculturists.

• **Floriculture**, or flower farming, is a discipline of horticulture concerned with the cultivation of flowering and ornamental plants for gardens and for floristry, comprising the floral industry.

Floriculture crops include bedding plants, flowering plants, foliage plants or house plants, cut cultivated greens, and cut flowers. As distinguished from nursery crops, floriculture crops are generally herbaceous. Bedding and garden plants consist of young flowering plants (annuals and perennials) and vegetable plants. They are grown in cell packs (in flats or trays), in pots, or in hanging baskets, usually inside a controlled environment, and sold largely for gardens and landscaping. Geraniums, impatiens, and petunias are the best-selling bedding plants.

The floriculture industry comprises of

• The florist trade of traditional and contemporary cut flowers and cut foliage, both fresh and dried and value-added products like bouquets, floral baskets, flower arrangements and garlands.

• The plant nursery for propagation and supply of plant material including tissue culture plants, seeds, bulbs, corms and other propagated material.

• Plant rental service for supply of house plants on annual rent for a specific period.

• Flower based perfume and medicines.

Cut flowers are one of the most globally produced commercial mass production items (Kendirli and Cakmak, 2007). Cut flower production in the world gained importance in the early 20th century, especially after the Second World War II. As a result of this, rapid developments and changes have occurred in the cut flower production, storage, classification and marketing. By means of this change, new techniques and technologies are used in the cut flower industry from production to consumption (Ozkan et al., 1997; Sayin, 2003; Boron, 2008).
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.

2.2 The product:
Cut flowers are parts of plants, characteristically including the blooms or “inflorescences” and some attached plant materials, not including roots and soil. Fresh cut flowers are highly perishable as they maintain only limited life-supporting processes by absorbing water through their stems. Fresh cut flowers are used for decorative purposes such as vase arrangements and bouquets at formal events; designs for weddings and funerals; gifts on occasions, and in times of illness, and at holidays; corsages and boutonnieres; and informal displays to beautify homes and public places.
Preserved flowers are fresh cut flowers that have been dehydrated, preserved with a chemical solution and then air- or oven-dried. They may be used in boutonnieres, corsages, wreaths, formal and informal displays, and similar ornamental articles. Preserved flowers, known in the industry as “everlasting flowers” or “everlastings,” are not as perishable as fresh cut flowers.
Foliages include leaf, stems and parts of plants other than flowers used for decorative purposes in bouquets; in formal and informal displays; for plants aping and landscaping; ferns and mosses. Other plant materials that are traded include young plant material, which still has to be cultivated in the importing country, before it can be sold to the consumer, in vitro cultures prepared by micro propagation and tissue culture techniques, rooted and uprooted pot plant cuttings, bulbs, tubers, tuberous roots, corms, crowns and rhizomes. Finished plants are plants that are traded in the markets as sale able products and need only to be acclimatized before they can be sold.
2.3 Production process of cut flowers:
Commerically, flowers are cultivated in open fields or within a protective structure. The production method primarily depends on the environmental conditions of the area and quality considerations. The greenhouse structure may form a completely controlled environment, or just provide shade or protection from the wind, e.g., an overhead lattice work or a “poly-house” (an aluminum or steel framework covered with a double layer of polyethylene film). Glass greenhouse is considered to be the most durable structure; however, greenhouse panes made of fiberglass sheets are also used. A “poly-house,” is long lasting and uses low cost-high technology plastics. The latter requires significantly less capital investment than the other types of covered structures and accounts for the majority of protected growing areas.

Air temperature in the greenhouse is commonly controlled by central steam boilers or individual unit heaters fueled by natural gas or propane and are often combined with horizontal airflow fan systems to circulate air. Common heating systems for the root-zone of the plants are electrical-resistance heating strips or pads and small boiler systems that warm the water as it flows through an array of small tubes under the propagating units. Some greenhouses are equipped with computer systems that regulate environmental factors such as heating, cooling, irrigation, fertilization, carbon dioxide, and ceiling shade blackout for artificial night. Supplemental lighting is often used to control flowering and quality.

The propagation of flowering plants can be by means of seed, cuttings (either stem tips or rooted cuttings), bulbs, grafting, or by the process of division. In a covered setting, the propagative material is typically placed in a mixture of organic material in a raised greenhouse bench, a shallow concrete box usually 4 feet wide and raised 24 to 36 inches (dimensions may vary) for drainage. Before planting, the soil is prepared, either by sterilization with steam or the application of chemicals. Growers also use prepackaged soilless media (rice hulls, coir, sand, or composted bark), which have already been pasteurized to kill pathogens, weeds, and seeds. Soil preparation usually takes place between each harvest. Although seeds or cuttings are planted directly into the greenhouse bench, bulbs are generally stored and monitored in cool and dark rooting rooms until they sprout, then transferred to the organic material in the greenhouse.
Wire or plastic mesh is often used to support certain flowers (e.g. Roses and Chrysanthemums) as they grow, thereby encouraging a long straight stem. Drip irrigation lines are generally used to reduce spotting of the flower petals, soil splashing onto the foliage, and the spread of disease. Water is sometimes treated by reverse osmosis and injected with fertilizers before being applied to plants. During the production process, approximately 50 percent of all direct labor is used in harvest activities. Flowers are harvested when the proper stem length and inflorescence required for sale in the wholesale market are reached. Generally, the optimal stage of growth for harvesting is when the flower has just opened. Stems with more than one flower are usually harvested with less than one-third of the flowers fully opened. The flower stem is cut at the appropriate length by hand with a sharp knife or pruning shears. Since flower condition does not improve after picking, growers calculate the cutting precisely so that the flower does not past its prime when it reaches the consumer.

Many growers harvest by accumulating an armful of flowers as they move along an aisle, whereas others employ picking carts and/or conveyor systems. Some growers have automated systems that can strip leaves, trim stems, and uniformly bunch flowers that may then be transported on specially designed monorails suspended on tracks from the ceiling of the greenhouse. With automated systems, surfaces are padded to minimize damage to the flowers. In the packing warehouse, stems are cut for a second time while submerged in water to allow the water to move up the stems. They are immediately placed in tepid water (110 degrees) with added floral preservative for at least 2 to 3 hours to allow for a maximum amount of water uptake. They can be left temporarily in a cool (less than 60 degrees) location or stored in a 40 degrees cooler temperature overnight for subsequent grading. Flowers that do not retain water and are not kept at low temperatures losses water and wilt quickly.

Grading of cut flowers is done to ensure consistent standards. Stems are generally graded by stem length (18 to 24 inches for most flower types) and are downgraded for short or broken stems, poor flower condition, poor foliage condition, or old flowers. Sorting machines are able to grade flowers by length of stem; however, all other factors are still determined by human decision-making. Pompon Chrysanthemums are graded into 250- to 340-gram bunches containing several stems, while standard Chrysanthemums of equal sizes are graded in groups of 10 or 12. The flower buds are wrapped in cone-shaped plastic sleeves to prevent
damage. Carnations are usually separated into piles of 3 grades; each grade is then bunched into units of 25 stems. For Roses, 25 flowers from an individual grade are bunched with the heads on an even plane. Stems are then tied together with string and parchment, or waxed paper is wrapped around the heads for protection. Boxes are often packed using “wet packs” to allow the flowers to remain in water throughout their transport. Packed boxes are also pre-cooled by units that fill them with 98 percent humid, cool air for added protection. The boxes are then transported by refrigerated truck or by air to the sales units.

**Foliage**

Starting from cuttings, tissue cultured liners, or seeds, commercial foliage plants are generally produced in soilless media confined by containers in shaded greenhouses or shade houses. Some foliage plants used as interiors cape trees are grown in full sun for the first part of their production cycle, and then grown under shade. Regardless of their specific production protocols, all plants are managed under controlled conditions including light, temperature, water, fertilization, and pest control until they approach marketable sizes called finished plants. The plants are then acclimatized, graded, and shipped to destinations for interior and exterior scaping. Acclimatization is a seriate procedure in which light intensity, nutrient supply, and irrigation frequency are reduced to anatomically and physiologically alter the plant so that it can survive and thrive after shipping and placement in an interior or foreign environment. Small pot plants may require several weeks to acclimatize, while large interior trees may require a minimum of six months. Therefore, the complete foliage plant cycle comprises: (1) plant propagation via tissue culture, rooting of cuttings, or seed germination; (2) production of marketable plants from tissue cultured liners, rooted cuttings, or seedlings; and (3) postproduction plant care, including shipment, interiors cape installation, and maintenance.

**Dried and Preserved Flowers**

The production process for dried and preserved flowers is similar to that of cut flowers up to the point of harvesting. Flowers are cut, bunched, and then dehydrated in mechanical dryers or in the sun, or preserved chemically. Preserved flowers are placed in a solution of glycerin and water for a period of 3 to 7 days. As the solution is drawn up into the plant stem and into the flowers, the water in the plant tissue is replaced with glycerin, yielding a final product that
remains soft and pliable for several years. Since the flowers naturally turn brown as the tissues degrade, dye may be placed in the solution to be drawn up by the stem. The glycerin-preserved flowers are then placed in industrial dryers at a temperature of about 60o to 75o F while fans remove humidity from the air. Colors can also be applied to the flowers after drying by immersing the flower bundles in hot vegetable-based dyes. The dyed flowers are then returned to the dryer for a period of 3 to 4 days. When the drying process is complete, the flowers are arranged and packaged for sale.

2.4 Properties of Floriculture Marketing:
Being produced both by commercial and smallholder farmers flower marketing is influenced by a number of factors that can be attributed to production, product, and market characteristics. Kohl and Uhl (1985) identified these attributes as-

- **Perishability**-as flowers are highly perishable, they start to lose their quality right after harvest and continued throughout the process until it is consumed. For this purpose, elaborated and extensive marketing channels, facilities, and equipment are vital. This behavior of flowers exposed the commodity not to be held for long periods and fresh produce from one area is often sent to distant markets without a firm buyer or price. Prices may be negotiated while the commodities are en route, and they are frequently diverted from their original destination if a better price can be found. Sellers might have little market power in determining a price. As a result, a great deal of trust and informal agreements are involved in marketing fresh flowers.

- **Price /Quantity Risks**- Due to perishable nature and biological nature of production process there is a difficulty of scheduling the supply of flowers to market demand. The flowers are subjected to high price and quantity risks with changing consumer demands and production conditions. Unusual production or harvesting weather or a major disease can influence badly the marketing system. While food-marketing system demands stable price and supply, a number of marketing arrangements like contract farming provide stability.

- **Seasonality**- flowers have seasonal production directly influencing their marketing. Normally they have limited period of harvest and more or less a year round demand. In fact,
in some cases the cultural and religious set up of the society also matter demand to be seasonal. This seasonality also worsened by lack of facilities to store.

- **Product bulkiness**: Since water is the major components of the product, it makes them bulky and low value per unit that is expensive to transport in fresh form every time. This, therefore, exposed farmers to lose large amount of product in the farm unsold. These listed characteristics of the product require a special complex system of supportive inputs. It demands a regular marketing preparation process like washing, cooling, proper management from the time of harvest until the produce is put on display. It is frequently believed a flowers not only remain attractive to the consumer it must also have a shelf life of few days after having purchased by the consumer (Nonnecke, 1989)

- **Differentiation**: The retailers derive competitive advantage from selling non-standard products that are not generally available in the market, competing not only on price, but also on factors such as reliability, product variety, product quality and speed of innovation (Dolan and Humphrey, 2000). In the floriculture sector product differentiation is determined mainly by the number of varieties (Wijnands, van der Lans and Hoobbs, 2006). Hence, supermarkets and other retailers in the direct sales chain demand larger varieties of flowers. The auction market, however, can handle a large volume of one variety.

- **Size**: Producing large number of varieties has a consequence to the size of the farm. Producing large number of varieties require larger size of land. The increasing number of requirement in the chain has also effect on size of firms because it is too difficult for many small firms to meet them.

- **Vertical integration and innovation**: Involvement in direct sales market requires improved production capability and innovation. Increased competition in the supply chain through differentiation (for example, increasing number of varieties) and reliability of supply necessitates own capacity for propagation of varieties. Doland and Humphrey (2000) has found a tendency of vertical integration within the chain as several exporters that had bought most or all their products have began to acquire to own their growing capacity.
• **Knowledge and expertise:** governance requirement increases when developing country producers have difficulty in meeting the requirement for developed country market. This might be due to the fact that producers from developing countries have the characteristics of ‘latecomer’ firm (i.e. technologically behind) and the exported products frequently do not (yet) apply to their domestic markets (Humphrey and Schmitz, 2004; Kessing and Lall, 1992). There is a gap between the existing and required knowledge and capabilities for supplying the export market. This is pronounced in the direct sales chain given that the standards and product diversification and delivery requirements are higher in the direct markets chain than the auction chain. This means more technical knowledge and staff is required in farms engaged in direct sales than those in auction.

• **Marketing capability:** According to Wijnands et al. (2006) direct marketing requires more marketing personnel (resources) than the auction channel. This is because unlike to direct sales the auction accepts each volume of flowers and the price is determined by the clock thus fewer marketing personnel are required in comparison to direct sales which involves promotion and frequent interaction with each client.

• **Marketing information and IT:** In the auction market information is easily accessible, prices and quality requirements are transparent. However, the direct sales market involves dealing with a number of actual and potential suppliers. Gathering update marketing information is more vital for competency and survival, thus, firms in the direct sales market have to develop their own source of information and use information technology systems. The supermarkets coordination on logistics; such as, track ordering and sales, identify their customer base, and organize storage, delivery and transport also has implication on development of IT systems at the supply base.

• **Logistic:** Supermarkets require not only large range of varieties but also consistency in volume, quality and timing – just-in-time delivery. They demand both flexibility and reliability in supply. These requirements imply higher post-harvest activities, for example, the use of flexible and reliable transportation facilities between production site and international markets. However, in order to meet the supermarkets demands the exporters should secure cargo space and make flexible arrangement.
The cost for inputs, heating and cooling and delivery services continues to increase. This increases production costs for growers, distributors and exporters. At the same time, the average cut flower price in most international markets declined by 20% (Haw, 2008). A huge challenge is confronting chain members on how to stay in the business in the face of a rising consumer demands. Consumers want high quality products at affordable prices. This requires keeping production cost as low as possible without compromising quality. Considering the perishable nature of the products, huge logistics are needed to transport them and the high weight to the value ratio makes them costly to transport. Rao (2006) stated that producers in third world such as China and Kenya will incur huge international loss by failing to meet the timely delivery of flowers due to inefficient supply chain management.

Since cut flowers have a limited shelf life, pulsing polyethylene packaging, refrigerated storage and transportation contribute to extension of shelf life besides regulating market supply of quality material. The world cut flower industry is a highly dynamic industry. Product varieties, the origin of production, production techniques, markets and retailing arrangements are all undergoing continuous change, challenging the adaptive capacity of the actors involved. Despite considerable barriers to entry -- the need for capital, know-how and infrastructure, to name but a few -- the industry is continuously attracting new entrants. Kenya, Ecuador and Zimbabwe, the rapidly growing exporters of the last decade, are already "established" suppliers to their ambitious new competitors in China, India, the Republic of Korea, Malaysia, Malawi, Mexico, Palestine, Peru, South Africa and Zambia, and a host of other countries. Liemt, 1999

For few internationally traded goods is time-to-market as important as for the cut flower industry. Flowers are very sensitive to the treatment that they receive once they have been cut. Strict control of humidity, temperature and air quality are essential for delivering an attractive product to the market. Growers rely heavily on an efficient post-harvest chain of handlers, storage and transport. Indeed, in the absence of a "cold-chain" it is practically impossible for even the most efficient producers to sell their produce on the main "northern" markets.

Organization is thus the key to success in this industry. This was clear to the Dutch growers who nearly a century ago set up the first auction which allowed them to obtain a fair return on their efforts and enabled Holland to become a principal producer and the major cut flower trading nation in the world. It was also clear to growers in such countries as Colombia and
Kenya who, despite having no sizable domestic market of their own, managed to achieve spectacular production growth and now rank among the top five exporters in the world. Liemt, 1999 These characteristics play a major role in marketing, price formation and the economic behavior of the chain actors, and thus complicate the organization of an efficient demand-driven supply chain. The Figure 2.1. below shows the product and production characteristics of fresh products.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perishability</td>
<td>The quality begins to deteriorate at the moment of harvest and continues throughout the marketing chain; the product demands proper storage, climate conditioning and handling.</td>
</tr>
<tr>
<td>Price, quantity and quality variations</td>
<td>The biological nature of the production process makes it difficult to schedule the supply and quality to market demands. This hampers an effective supply control and can result in unstable prices. Price negotiation occurs frequently on spot markets while the products are en route. Trust and informal agreements are involved.</td>
</tr>
<tr>
<td>Seasonality</td>
<td>Most fresh products have seasonal production patterns and a decreasing seasonal demand pattern. Supermarkets provide a large assortment of fresh products year-round. Long-distance shipments are complementary to local production, but often also competitive supply resources.</td>
</tr>
<tr>
<td>Substitutes</td>
<td>Most products have varieties, which are slightly different, or other products can fulfill the same consumers’ wishes (different types of vegetables or meat). For most products, alternative forms exist: fresh, canned, frozen, dried, prepacked.</td>
</tr>
<tr>
<td>Bulkiness</td>
<td>Water is the major component: fresh products are bulky and have a low value per unit.</td>
</tr>
<tr>
<td>Geographic specialization of production</td>
<td>Regional specialization has altered marketing patterns, lengthened and complicated the market channel and increased transport costs. The production shifted to lower-cost areas and this speeded up the mechanization.</td>
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</tbody>
</table>

Figure 2.1. Product and production characteristics of fresh product

Source: Wijands, 2005

The fresh-product chain comprises a large number of specialized SMEs in several parts of the world. Therefore what is characteristic is not the economic activity spread across borders of countries (most common governance structure of multinationals), but the fact that international production and trade are increasingly organized by specialized firms involved in strategic decision-making and economic networks at a global level. According to Liemt (2000), successfully growing flowers requires:

1. Good physical conditions: high light intensity, abundant water, clean soil (or the use of hydroponics), good climate.
2. Appropriate seeds and planting material.
3. Capital for investments and working capital.
4. Productive and skilled labour.
5. Expertise in growing techniques.
6. Good management and organizations.
7. Pesticides and other chemicals.
8. Energy for heating.
9. Infrastructure.
10. Quality consciousness all along the production and post-harvest chain

Cut flowers have a highly perishable nature and the deterioration starts at the moment of harvesting. The above factors mainly concern the production environment. Within the context of Porter’s theory, the international competitive environment is as important as production knowledge. The brief overview of the international trade flows underlines that the flower business is a global business. Moreover, most developing countries in the flower business produce for export markets and the domestic market is irrelevant. Second, due to the trade flows the international trade regulations and standards need to be met. Therefore, Liemt’s list needs to be supplemented with some items Wijands, 2005:

- Adequate logistic structure for exporting.
- Adequate supply chain infrastructure, including post-harvest treatments and a network of supplying industry.
- Knowledge of the destination markets, especially the consumers’ preferences and their dynamics. Emotion is one of the main attributes of flowers. Fashion trends or crazes are of importance, for instance, the type and colour of flowers.
- Knowledge of strengths and weaknesses compared to the competitors.
- Knowledge infrastructure has to be innovative and responsive to the requirements of the destination markets.
- Meeting the international trade standards. For propagation inputs (nursery stocks or seeds) acceptance of the Union International pour la Protection des obtentions Végétales (UPOV) regulations is highly desirable. An adequate phytosanitary control system in the production country is necessary for exporting.
- Meeting the quality standards including triple P (planet, people, profit) codes of conducts in order to fulfill the consumers’ preferences. The supermarkets chains increasingly set the parameters for these standards. It can thus be concluded that not only the production circumstances are of importance but also the marketing and logistics.
2.5 Floriculture consumer behavior and market segmentation:

Throughout history flowers have been an instrument for celebrating special occasions of the moment and for expressing emotions. Flowers are unique in that their use is often a means for communicating in ways that word alone cannot convey. Expressions of empathy, sympathy, joy, sorry, recognition, happiness, care, love, and acknowledgment are but a few of the characteristics realized with giving flowers. Likewise, flowers purchased for self-use have for centuries had a special place for decorating and complements to special calendar and non-calendar occasions. Flowers have been used for sympathy, congratulations, and courtship and worship reasons as well as given as gifts and used for the interior decoration of homes. Subsequently, specific semiotic codes have been evolved concerning the giving and receiving of flowers (Oppenheim and Fly, 2000).

Flowers are commonly viewed as highly symbolic with little inherent value and they promote self esteem and satisfy the need of aesthetically pleasing surroundings, meeting higher order needs in Maslow’s hierarchy (Krech et al., 1969; in Behe, 1989). Every modern society demands floral products for specific occasions such as religious holidays, weddings, funerals and subsequently, the consumption of flowers and plants for personal use and for small gifts has increased (Krass, 1999).

Holidays and special occasions are other aspects of indulgence that influence the market for flowers and plants. Calendar holidays such as Christmas, Mother's Day and Valentine's Day represent key selling periods for the floral business (Mintel, flowers and potted plants, 2001). Flowers are also given for non-calendar special events in order to communicate feelings of love, sympathy, hope, joy, congratulations, solidarity or friendship. According to the floralmarketresearch.com and Floral Cuttings, 33% of U.S. consumers purchase cut flowers for holidays and special occasions. Flowers and plants are a fashion item, and are therefore susceptible to changing trends. Consumer behavior, lifestyle, colour choice and home décor may all impact on these trends and affect the consumer’s preferences and purchases.(Peter J. Batt)

Stressing the need for changes in the U.S. flower and plant marketing, Pohmer (2004) argued that floriculture is no longer in the plant and flower business. Rather it is in the fashion, decorating, lifestyle, well-being and emotion communication business.
According to Mintel (flowers and potted plants, 2001), often, color trends in flowers parallel color trends in the home décor and gift market. Decorating with fresh cut flowers from the garden and cooking with organic produce and exotic herbs are becoming increasingly popular pursuits, especially as part of the social trends that include voluntary simplicity, nesting and cocooning (Mintel, gardening products, 2001). The traditional markets are getting saturated and at the same time new markets are developing in the world. It is expected that per capita consumption and production will go up worldwide because flower products influence the human feelings more than words and gifts (Papadimitriou, 1998). However, a dilemma in obtaining clear insight into the prospects for the floriculture industry exists. In almost every country in the world there is some floriculture industry. However, in many countries the available figures are not accurate (Younis, 2009).

With the rapid growth of the flower industry, issues about the environment and health, the development of the home markets, high production and delivery costs and rising consumer demands among others have drawn the attention of environmentalists, consumer groups and chain members (Getu, 2009). In that aspect, consumer behavior for floral products is similar to food products (Baourakis et al., 2001; Huang, 1997) and can be also bought depending on the occasion or a specific reason (Lai, 1989). Zawadzki et al. (1960) noted that flowers were purchased for home decoration (40 percent) and gifts (27 percent). Garbarino (1963) mentioned that most floral products were bought as a gift to someone other than the purchaser with the majority (61 percent) given to friends or relatives. Imanishi et al. (1992) stressed that flowers are indispensable items and influence human feelings substantially. They also noted that consumers preferred cheap flowers or even wild type flowers aiming to get the colour, the sense of season and the feeling of nature. However, younger consumers tend to choose flowers by impulse whilst older generations considered the “value for money” aspect (Imanishi et al., 1992). The latter finding was confirmed by Alfords’ (1995; cited in Oppenheim, 1996) study including Japanese citizens residing in Australia.

Consumers can be divided into two types i) Individual households and ii) Institutional markets (include government institutions, hotels and other profit/non-profit businesses).
The segments according to the nature of cut flowers are:
1) Basic segment: Cut flowers and plants bought in memory of someone or for a festive event fall under this segment. The demand in this segment is fairly stable. Florists, street vendors and garden centers are particularly active in this segment.
2) Mass segment: Cut flowers and plants are supplied by supermarkets and street vendors at competitive prices fall under this segment. This includes standard mono-bunches and bouquets.
3) Speciality segments: Customized orders are central in this segment. Importance is paid to type of flowers, colors and shape that are crucial in the order. Garden centers and florists operate in this segment. The mass and speciality segments normally belong to the own use segment. For the consumer, the concept of quality usually means freshness, and other subjective aspects such as type of flower, color, leaf size and price. Quality is not a uniform concept and is applied flexibly. Many times, suggestions or advice by retailers also play an important role in a consumer's choice.

**Demographic segmentation**

**Women vs. men**

According to consumer surveys, the person most frequently buying flowers is typically a woman older than 45, living in an urban agglomeration where there are medium to high incomes. However, there are several special occasions, such as Valentine’s Day and Mothers’ Day, which cause a rise in purchases by men.

**Young people vs. older people**

Sales of cut flowers to young people under 30 years of age are relatively small for the following reasons:

- Young households often consist of couples who both work and therefore spend less time at home. As a consequence, they have less opportunity and time to purchase flowers. Furthermore, they buy fewer flowers, because they cannot enjoy the flowers since they are not often at home.
- Young people have less money available for cut flowers, as they have other priorities.
- Households with young children do not buy flowers, often due to practical reasons (for example vases being knocked over).
- Young people attach less emotional value to flowers than older people.
Recently, the Flower Council of Holland identified six consumer groups who purchase fresh flowers and potted plants. The three most significant groups are the ‘classical’, ‘modern’ and ‘trendy-ambience’.

The classical consumers like to spoil themselves, love luxury and attach a lot of attention to home decoration. This group’s love of flowers is average but their love of plants is above average. When buying flowers and plants, they focus on freshness and cheerfulness. They often buy flowers and plants for themselves and as gifts. These consumers like traditional pot plants, and most importantly, they must match their interior décor.

The modern groups have above average education and incomes. Members are young and predominantly females aged from 25 to 35. Consumers in this group like things to be neat, uncluttered and practical. When buying flowers and plants, they focus on freshness, affordability and vase/plant life but above all else the flowers must look natural and harmonies with the interior décor.

The trendy-ambience group prefers a cosy ‘dressed up’ interior and use lots of accessories and colour combinations. For this group, their love of flowers and plants is above average but expenditure is average at best. Flowers and plants need to appear natural and cheerful. If the bouquet suits the interior décor and the florist has added some creative touches, the consumer is satisfied.

Oppenheim (1996) argued that in Western societies, flower purchasing tends to be occasion-based whilst the purchasing of flowers in oriental societies is driven by other forces. Baourakis et al. (2000) surveyed purchasers of floral products and noted that most respondents buy floral products at a constant rate but only on special occasions. Regarding floral products, Levitt’s (1998) theory suggests that in one situation a consumer would purchase a fresh flower (e.g. a boutonniere) and in another situation would purchase a blooming plant (e.g. as a centerpiece) with the intended use of flowers being the main variable encouraging consumer motivation to buy flowers frequently (Baourakis et al., 2001). Therefore, future marketing programmes should aim to create positive attitudes towards flowers and to illustrate the reasons, occasions and intended uses for these products (Huang, 2005).
Table 2.1: Segmentation by preferences Source: CBI

As the flower business expands, production increases, supply outweighs demand, and consumers response becomes more unpredictable demanding high standard products that offer diversity in colour, good texture, forms as well as better performance in interior environment (Hadiwigeno, 1998), long shelf life and sweet smell (Redfern and Riungu, 2007). For instance for many years, roses in Kenya dominated the EU market but now, consumers in the EU have expressed concerns about the scentless nature of the roses. Today, consumers want access to the season's hottest indoor and outdoor flowers and plants that are attractive, have more contemporary styles and unique floral patterns including those that are the rage in colors and sizes (Mintel, gardening products, 2001). The cut flower market constantly shifts as consumer preferences change. Growers must be willing to adjust their production to meet these demands.

The importance of the criteria varies considerably between countries. (CBI market surveys)

The market segment for high-quality flowers in individual countries is strongly related to consumer purchasing power. In countries with a high consumer purchasing power, the market segment for high-quality and exclusive flowers is bigger than in countries with a low consumer purchasing power. However, note that consumers with a high purchasing power generally also purchase more cheap types of flowers for own use. The share of the market segment of high-quality flowers in the total market is, therefore, not always bigger than in countries with a low consumer purchasing power. Also note that the definition of quality shows small differences between countries: • Breeders are constantly developing new varieties with brighter and more saturated colors.

These new varieties are generally more expensive. However, demand for these varieties is not directly related to consumer purchasing power. Instead, fashion and color preferences in individual countries determine demand for these new varieties. In general, North European and East European have a preference for bright colors, while UK consumers and South European consumers have a preference for pastel colors.
• Vase life has become a marketable quality aspect in the more developed markets, thanks to the vase life guarantee of supermarkets and other initiatives. In the less developed markets, consumers simply buy the flower species with a long vase life, such as Dendranthema.
• In most Northwest European countries, consumers prefer to purchase flowers with closed to half-open buds, while consumers in South and East European countries often prefer flowers with half-open to fully open buds. This consumer preference has a direct link with the cutting stage requirements for the grower. In some cases, flowers which have been cut too early (closed buds) do not open; this has a negative influence on the consumers’ perceived quality.

Consumer preferences and patterns can differ widely between countries. For example, French people often decorate graves with Dianthus and therefore often associate Dianthus with death, making it less popular for other purposes. Colour preferences also vary. Consumers in the UK, for example, often prefer sweet neutral colours, while East European consumers often prefer bright saturated colours.

2.6 Trends:
A survey done by CBI identified the following trends in consumer buying.

**Stronger segmentation**
Consumers have adopted a more unpredictable and demanding approach, forcing exporters to make a clearer market distinction between low-priced mass products and exclusive products. It is no longer sufficient to offer the consumer a fairly good product for a reasonable price.

**More diversity in assortments all-year round**
Consumers in the more developed markets have become used to wide assortments and year-round availability. Growers nowadays are able to maintain a far more continuous production, ensuring year-round availability of most products. This has added to increasing purchases of non-traditional flowers. Increased demand for new and exclusive flowers has partly substituted demand for more traditional flowers, such as Dianthus. Dianthus became a bit old-fashioned in the eyes of consumers. New popular varieties could help to raise interest in Dianthus in general.
Consumers want to express their personalities and individualism

Many wholesalers and retailers are combining bunches of flowers with other items and offering personalized packaging, to respond to the need of consumers for more variation in personal gifts. There is an increasing competition from other gift articles, resulting in a constant decrease in the relative importance of flowers as gifts.

Consumers demand environmentally friendly production

Consumers have become more concerned about the environment. Large groups of consumers have come to realize that future generations also have a right to a healthy environment. They are therefore making increasingly stringent demands with respect to the way in which products are produced. Consumers are now not only interested in the shape, colour or fragrance of flowers and plants, but also in the way in which they have been grown. They assume that the plants and flowers they buy have been cultivated using the smallest possible amounts of crop protection agents, energy and fertilisers and generating the least possible waste. This trend can particularly be seen in the Northwest EU countries, where several supermarket chains like Tesco, IKEA, Marks & Spencer, Sainsbury, Migros, Coop Schweiz, Carrefour and Botanic France have made participation in the environmental MPS scheme a purchasing criterion for their suppliers. Note that interest in organic certification is still limited.

Consumers demand fair labour conditions

Consumers are becoming increasingly aware of their influence on labour conditions for the employees at flower farms. Reports on low salaries for local standards, and dangerous working conditions have shocked consumers. Labels and certificates like Max Havelaar, ETI, FLO (Fair Trade) and MPS Socially Qualified have therefore become valuable instruments to guarantee a socially responsible product and compliance with Occupational Health and Safety (OHS) standards for the farm workers.

Increasing interest in scented flowers

One of the emerging niche markets within the trade in Rosa is the market for fragrant Rosa. A 2007 survey by UCFlor at the Sanremo Flower Market in Italy showed that 15% of the traders is handling perfumed cut Rosa in response to market demand. The main difficulty in this niche market is to develop Rosa with a long vase life and a strong and pleasing scent. Fragrant
Rosa are expected to be more price-competitive than perfumed Rosa.

Please note that CBI has also published the surveys “The EU market for summer flowers”, “The EU market for tropical flowers” and “The EU market for foliage”. These surveys highlight specific product trends.

Potential retail outlets include farmers markets, roadside stands, and U-Cut. Cut flowers may also be included as part of a community supported agriculture (CSA) share. Wholesale options include supermarkets, garden centers, and craft stores. Marketing difficult-to-find or novelty cut flowers to retail and wholesale florists is also a possibility. Hotels, restaurants, caterers, and the Internet may offer other marketing opportunities. Growers should develop several different marketing avenues. While it can be difficult to break into current markets, particularly wholesale florists, there is a niche for uncommon cut flowers grown in Kentucky. Local growers can have a marketing advantage if they are able to provide difficult-to-ship or otherwise hard-to-find specialty flowers.

In addition, locally produced flowers are fresher with a longer vase life than those shipped from distant markets. Organic certification may be a way to add value to your cut flowers if organic production is valued by your potential customers.

Where are flowers purchased?
Despite much of the initial enthusiasm in the mass market, 60 per cent of flowers purchased continue to be bought from florists. Retail florists continue to retain their position as the preferred place of purchase for both telephone sales and computer-based floral delivery services, and for providing the design element for weddings, funerals and special occasions. In the US, fresh flowers continue to be purchased primarily as gifts (67 per cent). About 14 per cent of sales are associated with calendar events such as Christmas (30 per cent), Mother’s Day (24 per cent), Valentine’s Day (20 per cent) and Easter (13 per cent) being the most significant events. However, non-calendar occasions now dominate the market (86 per cent), with purchases for home decoration the single most important motivation.
Who are the flowers for?
European consumers are primarily purchasing fresh flowers as gifts (50–60 per cent). About 20 per cent are purchased for their own use and 15 per cent are bought for funerals.

What do consumers look for?
Quality (36 per cent), price (13 per cent), the type of flowers used in the bouquet (13 per cent) and the colour of the flowers (10 per cent) remain the most important criteria in the consumer’s decision to purchase. While consumer studies continue to demonstrate the universal appeal of fresh flowers and their emotional and psychological impact, lack of freshness and short vase life is leading to increasing consumer dissatisfaction.

2.7 Regulations, code of conduct and Standards in Floriculture
Several codes of conduct are available in the flower business. Some of these codes are summarized in this Section. Also the protection of plant property rights by the Union International pour la Protection de Obtentions Végétales (UPOV) will be discussed. UPOV membership and having a code of conduct are requirement to entry the international cut-flower market. Both can be seen as a kind of codification.

Phytosanitary obligations
The plant protection service is responsible for excluding, combating and controlling pests and diseases in the plant sector. For instance, the Dutch Inspection Service, which is supervised by the Plantenziektenkundig Dienst (PD), carries out the inspections and can issue plant passports (sometimes required in the EU) and phytosanitary certificates valid for the EU. Comparable plant inspection services are rather common in most countries. A proficiency level in conducting the phytosanitary obligations is a condition for international market entry. Without a well-functioned plant protection service, products can deteriorate due to the time-consuming logistic handling at airports, or products will not be allowed into the importing countries by the quarantine authorities. In both cases the economic losses will be high.

The Dutch MPS code
The Dutch milieu programma sierteelt (MPS; Floriculture Environmental Project) has been running since 1995. It was initially aimed at reducing dependency on chemical crop protection. In the scheme, the use of pesticides, fertilizers and energy, and waste management are recorded. In recent years the focus has shifted towards certification activities. For the environmental issues, four levels of qualification schemes are provided. Due to the increasing
number of supermarkets that demand EurepGAP and a social code, MPS developed additional standards like ISO-9001, social codes or trade certifications. For instance, the social code covers health, safety and terms of employment. At the moment, 4000 growers in around 30 countries are members, and MPS is becoming an Internationally recognized world standard. Having a MPS certificate is important for trading through the Dutch auctions. Due to the advanced recording system, the information can be used for different goals and reduces the need to register the same data several times. However, taking part in the MPS certification system is not without its obligations and is not free. MPS have an environmental scorecard and also different scoring program such as MPS –Mind (a pesticide indicator), MPS-OEX an Area Efficiency Index, relevant only for heated, and greenhouse cultivation. www.my-mps.com.

The Kenya Flower Council code

The Kenya Flower Council code has two levels regarding labour and environmental standards. The Silver Standard is consistent with ILO (International Labour Organization) conventions. This first level certifies compliance with labour rights, health and safety standards and environmental legislation. The Gold Standard requires stricter standards and farms can achieve this standard after having gained the silver standard. The audits are external and repeated every six months. The Kenya Flower Council signed a partnership with MPS in 2002. MPS is involved with the international certification and auditing.

The Ecuadorian Flower Label Programme

The Flower Label Programme (FLP) started as a business-to-business code between a German importer and the Association of Flower producers and Exporters of Ecuador. The standards are focused on environmental conditions, social and labour conditions. The FLP has a low level of participation among Latin American producers. In Zimbabwe, some producers (nine in 1999) are accredited. In Tanzania, two farms were permitted to enter the programme; however, they were unable to show sufficient compliance with the standards (ILRF, 2003).

Max Havelaar

The Max Havelaar foundation certifies agricultural products that are produced and sold in accordance with the international criteria of fair trade. Exporters selling with the Max Havelaar label receive a higher price from Swiss consumers. Max Havelaar flowers account for approximately 5 % of the total Swiss cut-flower market (ILRF, 2003). It is not clear whether this standard is used for cut flowers in other countries.
Protection of new varieties: UPOV

Consumer preferences are continuously changing, which requires new plant varieties. Innovation in plant varieties is essential in a demand-driven cut-flower chain. But also in respect with cost effectiveness, quality and quantity improvements in new varieties are necessary in the highly competitive cut-flower supply chain. Breeding new varieties of plants requires substantial investments. Breeders must obtain profits to recover these costs to fund new research. UPOV ensures that members of the Union will grant the breeder the property rights on the basis of a set of clearly defined principles. To be eligible for protection, varieties have to be 1) distinct from existing commonly known varieties, 2) sufficiently uniform, 3) stable and 4) new in the sense that they must not have been commercialized prior to certain dates established by reference to the date of application for protection (UPOV, 2004). Being a member of UPOV enables access to new varieties and thus the innovation and market orientation of the supply chain. Not being a UPOV member can be a competitive disadvantage. Most developed countries are a UPOV member.

2.8 Environmental and health challenge

Environmental issues such as water quality, greenhouse emissions (Scott, 2003), chemicals and exotic pests have been implicated as factors that pose a great challenge to the future of the industry. Cut flowers have loose regulatory status in the importing countries because they are not edible crops and are exempted from regulations on pesticide residues, hence they are not inspected for residues (Tenenbaum, 2002) though they carry 50 times more the amount of pesticides allowed on foods (Donohoe, 2008). Research on the Kenyan cut flower industry exposes seasonal demand, economic uncertainty, low wages, cases of child labour, and risks to the health and safety of workers and the environment due to the use of pesticides on farms (Hughes 2001). Similarly, in Ecuador, low wages, low occupational health standards and long working hours mar the literature on the cut-flower sector (Korovkin 2003). The consequences of these chemicals are likely to be fairly significant although not exactly known in developing countries such as Kenya and China due to poor data documentation. Every year in China, 2,480,000 tons pesticide and fertilizer drain into the Zhu River This has seriously polluted the river and coastal waters in Guangdong Pro- Vince (Yang, 2007). This water is irrigated for flower production. This situation is likely to have negative effect on Chinese flower products in the international markets. Roses grown in the Netherlands emit 5.8 times carbon dioxide...
(CO2) than roses in Kenya (Williams, 2007). This suggests that production of roses in Kenya is more environmental friendly than in The Netherlands. Also the study of Williams (2007) revealed that the production and delivery of 12,000 cut stems of roses by air can emit 2,200 kg CO2. This shows that even when flowers are environmentally produced; moving them from one place to another by air can result to environmental pollution. Annually, 5% of Kenyan income goes to methyl bromide importation alone (Fedha, 2009). This Methyl bromide is so toxic that it kills all soil borne pests and developing countries have agreed to end its use by 2015 (FAO, 2002). Kenya imports around 95% of these pesticides. What is disturbing is that Kenya uses 5% of its foreign exchange earnings to import this harmful substance. Most of the pesticides sold in the Kenya market are not registered with the Kenyan government (PAN UK2006a) so many peoples’ health had been affected by the illegal trade.

2.9 World floriculture market

Floriculture as an industry began in the late 1800s in England, where flowers were grown on a large scale on the vast estates (Wikipedia, 2009.) The industry continues to advance since that period. It is a profitable agri-business throughout the world. The present day floriculture industry is very dynamic and fast growing. In the 1950s, the global flower trade was less than US $3 billion (The flower expert, 2008). Recently, the world production of floriculture products was valued at US $40 billion (Getu, 2009). The Netherlands, Japan, and United States of America (USA) account for nearly half of the world flower trade.

In the 1990s, a niche market was developing for field-grown cut flowers, perhaps because many specialty cut flowers can be field-grown (Armitage and Laushman, 2003; Starman et al., 1995). The increasing interest in the production of specialty, field-grown cut flowers (Kelly, 1991) and their developing market (Starman et al., 1995) helped create the new niche for U.S. growers. Niches are specialized markets. Starman et al. (1995) identified specialty cut flower species that can be field-grown and profitable, provided a niche market exists. Floriculture is a lucrative industry in many parts of the world. The advancement of scientific techniques in flower cultivation has given a tremendous impetus to the growth of this industry. India has yet to cash-in on the production, marketing and export potentials in this field. Both domestic market and export potentials are prodigious. Floriculture sector, all over the world is experiencing rapid changes. Growing of flowers and ornamental crops is a
Floriculture, a $40 billion global business, is engaged in the struggle to transform something “natural and unspoiled” into a mass produced, transportable product, says Amy Stewart, bestselling author of Flower Confidential: The Good, the Bad, and the Beautiful in the Business of Flowers. This transformation relies on an extensive network of breeders, field workers, auction houses, sales representatives, shippers, and florists to offer consumers a variety of choices well beyond those found in backyard gardens. Flower growers don’t wait for nature to introduce the genetic mutation that will make them millionaires; in the lab, they painstakingly cross-pollinate promising varieties to develop new plants with marketable characteristics, creating hundreds of new varieties every year.

2.9.1 Evolution of the World Cut Flower Market Place
Forty years ago, demand for cut flower by consumers around the world was satisfied by local cut flower production. In Europe, per capita consumption was significant, and consumer culture required a large supply of cut flowers for gifts, occasions, and everyday use. As a result, cut flower production in Europe was sizable. Gradually as transportation systems developed throughout this region, it became possible to distribute cut flowers grown in southern areas of Europe to northern areas of Europe. Consequently, the European flower industry began to extend its boundaries for cut flower production and along with this expansion grew the influence of the European flower industry. This background history could be considered the beginning of commercial floriculture as we know it today.

When the world energy crisis occurred in 1973, the marketing plan for distributing cut flowers grown in different European countries to Holland for sale through the Dutch flower auction and back to markets throughout Europe became a significant production opportunity for southern European cut flower growers. Increasingly larger quantities of cut flowers were grown in southern Europe to meet the demand for cut flower sales through Holland. Flower growers in the southern regions had a price advantage over growers located in northern regions because cut flower production was more expensive for northern growers during the winter season due to increased energy costs required to obtain quality flowers in controlled temperature greenhouses.
Then, competition for southern European cut flower growers intensified when Israeli cut flower growers, who were located further south entered the market with product to be sold through the Dutch flower auction. Israeli growers had the production advantage of being further south where they could produce cut flowers in open fields or plastic tunnels year round, eliminating most of the overhead expenses for greenhouses and heating systems. But in order to develop a potentially lucrative export cut flower industry for themselves, the Israelis needed to address limiting factors to their success. The two main limiting factors were transportation costs to Europe and a water shortage if production were to expand.

Solutions to these limiting factors were found for Israeli growers. In the case of transportation costs which offset growers cost advantage in terms of energy compared to growers in southern Europe, the government provided transportation subsidies which have reduced the costs to the growers to ship their cut flower product to Europe, thereby maintaining a competitive cost advantage over European growers. As for the water shortage, research on irrigation systems that would conserve water usage was applied to production systems for cut flowers. Through the 1970’s, the activities of the European flower industry had begun to influence cut flower production and sales beyond the borders of Europe. Cut flower sales through the Dutch flower auctions had gained a share of the United States market. This was achieved by promotion activities in the USA supported by the Holland Flower Council which encouraged Americans to purchase more cut flowers for gifts, occasions and everyday use, similar to consumer habits in Europe. Most of the flowers sold to the USA through the Dutch flower auctions are shipped to the USA by air through New York.

Simultaneously, Miami, USA, was being developed as a key import distribution base for cut flowers being grown in Columbia, South America and shipped north. This caused considerable competition for local cut flower growers in the USA. Manufacturers and suppliers from the European flower industry were quick to find opportunity in this situation. Not only were South American cut flower growers purchasing varieties from Europe but flower growers from the USA were persuaded to invest in production systems and equipment from Europe in hopes of becoming more efficient producers like the Dutch growers who had once faced competition from southern European growers. As a result, the United States flower industry owes a significant share of its growth in terms of promotion and sales and improved production systems to the influence of the European flower industry.
It is worthwhile to mention that the Israeli flower industry has become a formidable competitor of the European flower industry. Israeli cut flower producers ship significant quantities of product into the USA market via both New York and Miami. This compensates Israeli producers for the reduction in cut flower sales to the European market which is increasingly being supplied by flower growers from regions in Africa, especially Kenya. Also, Israelis have been successful in selling their production equipment and varieties to flower growers in other countries.

Continuing to advance in the 1980’s, the European flower industry began seeking further opportunity and expansion in Asia by 1985. Japan’s bubble economy was starting to inflate and discretionary income spending by the Japanese was rising. European flower imports made headway into the lucrative market in Japan. Within a few years, as economies in Korea, Taiwan, and Hongkong strengthened, the European flower industry moved into these markets with their cut flower exports as well.

Since the early 1990’s, the European flower industry, as a worldwide leader in commercial floriculture, has been impacting the rest of Asia with cut flower imports from Holland and sales of flower varieties, production equipment, and technology for new production operations in Asia. Israeli cut flower producers, manufacturers, and suppliers have followed but, one step behind. The main difference between the European flower industry and the Israeli flower industry is that the European flower industry enters their new markets by launching aggressive marketing campaigns which call attention to the quality and image of Dutch flowers. These campaigns stimulate demand by new consumers for their cut flower products. So far, the Israelis have not particularly created an image for end consumers of Israeli flowers. This difference is one of the factors which contributes to why the European flower industry is the world wide leader in commercial floriculture.

Initially, commercial floriculture production in southeast Asia was developed because of increasing need for low cost flowers by the European cut flower market place. European flower traders identified commercial floriculture production in southeast Asian countries as a source of supply. Ironically, Dutch auctions often served to re-distribute this product to the
Japanese market. By the mid to late 1980’s, Dutch importers/exporters had begun selling floriculture product in Japan. With economies expanding, the “little tigers”, i.e. Taiwan, Korea and Hongkong were the next Asian targets with market needs for floriculture products from Europe and potentially from other Asian countries which could produce floriculture products less expensively.

The development of the commercial cut flower industry in Asia has been unlike that of Israel, African countries, south and central American countries. In the latter regions, cut flowers have been a product produced mainly for export with no thought of a potential domestic market. On the other hand, in Asia, whereas cut flowers were initially produced for export, the market potential has rapidly changed to include opportunities for supplying the local market as well. This unique development is on account of the rapid strengthening of economies in the region, high population densities, and the consumer perception which has been promoted heavily by the European flower industry that the use of fresh flowers in one’s every day life represents an improved, quality lifestyle.

Today and in the future, the potential for commercial floriculture expansion in Asia, including production for domestic and export sales of cut flowers, is greater than ever before. The elements for success needed to transform the Asian flower industry into the worldwide leader of commercial floriculture have been implied by reviewing the evolution of the world cut flower market place.

2.9.2 PRODUCTION AND CONSUMPTION

The world production of floriculture is growing at a rate of 10 percent per year. There are currently, over 50 countries that are active in floriculture production on a large scale. The total area under floriculture in the world, both under protected area and open, is presently estimated to be around 628,972 hectares. In terms of production value, the Netherlands (Euro 3901 million), the United States (Euro 2992 million), Japan (Euro 2987 million), Italy (Euro 1627 million), Germany (Euro 1289 million) and Canada (Euro 1067 million) are the largest producers of cut flowers and plants. However, due to stagnation in production in these traditionally recognized centers, developing countries have emerged as large production centers in the past few decades. This is further supported by low production cost and seasonal
advantages in the developing countries, which ensures supply of floriculture products throughout the year. Some of the major developing country producers and exporters of cut flowers and plants are Colombia, South Korea, Kenya, Israel, Ecuador, Poland, Ethiopia, Costa Rica, Thailand, India, China, Zimbabwe, and Mexico. The economies of some of these countries are even dependent on floriculture industry, such as Colombia and Kenya. With China (286,068 ha) and India (161,000 ha) having the majority of the world acreage under cut flowers and plants production, the Asia-Pacific region has the major share (75 percent) of the total world area under floriculture production. Europe has a 10 percent share in the world area under floriculture. The acreage under flower cultivation in Africa is very small (1.5 percent). With around 2200 ha, Kenya is the largest producer of flowers and plants in Africa, followed by South Africa and Zimbabwe both growing over 1000 ha of flowers. Latin America has an 8 percent share in the world area under floriculture, with Mexico having the largest area under flower production (21,129 ha).

<table>
<thead>
<tr>
<th>Area (in ha)</th>
<th>Production Value (mn Euro)</th>
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<tbody>
<tr>
<td>Europe</td>
<td></td>
</tr>
<tr>
<td>Austria</td>
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<th>Middle East</th>
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</tr>
<tr>
<td>Turkey</td>
<td>1273</td>
</tr>
<tr>
<td>Total</td>
<td>3973</td>
</tr>
</tbody>
</table>

Table 2.2 : World area under production and production values of flowers and pot plant
2.9.3 PROFILE OF SELECT COUNTRIES

The Netherlands

The Netherlands is the largest cut flower producer in Europe. In the years 2003-2007, the production value of flowers and pot plants in the Netherlands increased by 10 percent annually, amounting to Euro 3,901 million in 2007. The profitability of the Dutch floriculture sector is higher than that of any other Dutch agriculture sector. Dutch flower firms are also characterized by hi-tech production techniques and high quality of planting materials. Auction is the main distribution channel of floricultural products in the Netherlands. The Dutch auctions play a dominant role in the distribution of flowers, not only in Europe, but in the world in general. It is the home to the largest flower auction in the world (FloraHolland). Around 60-70 percent of imports of floricultural products in the Europe go to the Dutch auctions. The Netherlands is the most important player in the trade of cut flowers and foliage in the Europe as well as in the world. It is the largest exporter and importer of cut flowers and foliage in the world.

USA

Due to increase in imports, production area under floriculture products in the USA is significantly decreasing. The total production area under floriculture crops declined by 2.5 percent in 2007 compared to 2006. The flower industry in the United States is undergoing a period of consolidation. The large operations account for 96 percent of the total value of floriculture crops. Annuals and perennials are the largest selling items accounting for 32 percent of the total floricultural sales in the USA in 2007. The wholesale value of sales of floricultural products in 2007 was estimated at US$ 3.9 billion, registering an increase of 2 percent over the year 2006.

Canada

In Canada, flowers are cultivated by both commercial growers and hobbyists. Most of the commercial production of flowers in the country is carried out under glass and plastic covers. Commercial greenhouse production is a year-round enterprise with flowers such as Carnation, Rose and Chrysanthemum, but is seasonally oriented with flowers such as Poinsettia and Bermuda lily. Houseplants such as Cyclamen, Cineraria, Pelargonium, and African violet are also produced in commercial greenhouses, but in a lesser volume compared to the cut flowers.

The total area under floriculture production has been increasing in Canada. However, total
operations have been reducing. The area under cultivation increased by 10 percent over the five years between 2001 to 2006. Total number of operations, both farms and nurseries, declined to 11 percent and 16 percent respectively, between 1981 to 2006. The flower industry in Canada is generally concentrated in Ontario, British Columbia, and Quebec, which together account for about 85 percent of total production.

**Japan**

Japan is one of the largest flower growing countries in the world. Around 47 percent of land area under flower cultivation is currently, under protected cultivation such us greenhouses and covered structures. Chrysanthemums are the most important flowers cultivated in Japan. Japan is one of the largest consumers of cut flowers and potted plants. Japanese cut flower retail market is estimated to be worth US$ 9.3 billion. Japan is the tenth largest flower importer in the world. Only 7 percent of the cut flower consumption in volume terms is imported by Japan.

**Ecuador**

Ecuador is an important player in the world floriculture trade. The country has around 3,500 ha under floriculture, of which, 2,500 ha is under rose cultivation. Other flowers grown in Ecuador are Chrysanthemum and Carnation. The sector employs around 60,000 people directly and over 100,000 people indirectly.

**Israel**

Israel’s cut-flower industry is regarded as one of the most advanced flower industries in the world by virtue of the technologies used in production of large varieties of flowers in the desert-like conditions. Flowers and ornamental plants account for 8.0 percent of Israel’s total agricultural production. Israel’s flower sector is relatively small by international standards, but is highly profitable. Flowers are Israel’s leading agricultural export item (29 percent). Israel ranked 12th amongst world exporters of floriculture products and its share in world exports was around 1.5 percent (US$ 259 million) in 2007.

**Kenya**

Kenya is the largest producer of flowers in Africa. Floriculture industry in Kenya is the second major foreign exchange earner, after coffee. The industry employs around 100,000 people directly and around 2 million people indirectly. Kenya is currently, the world’s seventh largest exporters of flowers accounting for 2.6 percent share in world exports. It has exhibited the fastest growth among the top cut flower exporters in the last decade. Kenya’s cut flowers
cluster is dominant among other sub-Saharan Africa flower exporters. Kenya has the largest market share in European flower imports (51 percent) compared to other Sub Saharan African country exporters.

Kenyan flower industry is a mature industry in terms of technical learning, market information and supply of equipment, advisory services and logistics, and is characterized by large scale foreign investment. The industry is regarded as one of the most codified flower industries in the world, which also meets the international environmental standards of Good Agricultural Practices.

**Ethiopia**

The floriculture industry of Ethiopia is one of the fastest growing flower industries in the sub-Saharan Africa. The Ethiopian flower industry took-off in 2005, and currently, ranks 22nd amongst world exporters of floriculture products, with a share in world exports of around 0.51 percent. There are over 70 flower farms in Ethiopia. Ethiopia grows Roses, Carnations, Carthamus and Satice. The sector generated employment for over 50,000 persons (permanent and temporary), and has become one of top five foreign exchange earning products of the country. The Ethiopian flower industry is an export-oriented industry and has been benefiting from Government support at large. About 40 percent of the farms are fully foreign owned, 23 percent are joint ventures, and 36 percent are fully domestic owned.

**China**

China is reportedly the world’s largest ornamental producing country in terms of land area, constituting one-third of world’s total growing area. According to the national statistics, China’s ornamental plants growing area was only about 3,000 ha in 1985; which has currently crossed over 700,000 ha. In 2007, China ranked 17th amongst world exporters of floriculture products with a share in world exports of around 0.76 percent. It is the third largest supplier of floriculture products to Japan. Yunnan is the most important province in China in flower growing, accounting for 50 percent of the nation’s total cut flower production. Yunnan is the home to one of the growing auction centers in Asian region - the Kunming International Flora Auction (KIFA), which started its operation with support from erstwhile Aalsmeer Flower Auction (VBA), Netherlands.

**Thailand**

Thailand is one of the leading producers of tropical floriculture crops. The development of ornamental industry in the country has been initiated by the private sector with little support
from the government. Dendrobium orchid, which has been developed solely from introduced species, is the most commercially important floriculture crop of the country. It is a home of diverse ornamental plant genera; such as Aglaonema, Curcuma, Dracaena, Homalomena, Impatient, Ixora and many Orchid genera. The core competency of the industry is rapid propagation as well as breeding a new cultivar. Currently, the country is known to be the world center for breeding Aglaonema, Curcuma and tropical Orchids.

The Orchid planting area in Thailand covers about 6,000 acres, mainly in Bangkok and nearby provinces, namely Nakhon Pathom, Samut Sakhon, Ratchaburi, Pathum Thani, Ayutthaya, Suphan Buri, and Chon Buri. The flowering season in Thailand usually takes place during the rainy season, from July to October. There are more than 1,000 species of Orchids in the country. Besides Orchids; over 30 types of flowers are commercially cultivated in the country, which include Roses, Carnations and Chrysanthemums.

2.9.4 CONSUMPTION
Europe, USA and Japan are the major consumers of floriculture products. Flower consumption in the United States is relatively low as compared to Western Europe; however, the industry has been consistently growing. The consumption in the developed markets in the Europe and Japan has been showing stagnancy or declining trends, in the recent years. In case of cut flowers, per capita consumption in Japan is the highest, followed by Europe and USA.

The European Union (EU) consumes over 50 percent of the world’s flowers, and includes many countries, which have a relatively high per capita consumption of cut flowers. Germany is the major consumer, followed by the UK, France and Italy, in the order of importance.

The markets in the EU are generally divided into three categories:

- Mature markets such as Germany, The Netherlands, France, Belgium, and the Scandinavian countries. These markets are characterized by relatively high levels of per capita expenditure on flowers. The size of these markets tends to be stable and sometimes even declining. Consumers tend to spend a relatively high share of flower expenditure on personal use. They are familiar with flowers and are interested in new and appealing products.
Growth markets such as Spain and the UK are generally of considerable size. The UK for instance is already one of the largest consumer markets, and is expected to continue to grow. In some of the growth markets, the per capita spending is still relatively low compared to the mature markets.

Markets in development such as the East-European countries and Greece are the expanding economies. As the purchasing power of consumers in these countries is increasing, they tend to buy more flowers. Nevertheless, flowers are still considered a luxury item and are bought mainly as gifts.

In 2006, per capita consumption of floricultural products was highest in Switzerland followed by Norway, Denmark, The Netherlands, Sweden, Germany and Austria. Currently, the per capita expenditure in East European countries on flowers and plants amounts to approximately Euro 7 to Euro 8 per person per year. Flowers in EU are sold mostly in auctions at the Netherlands and also some through direct sales. The Netherlands auctions are generally considered as indicator for the best sold cut flower species in the EU. Rosa is the most important cut flower traded at the Netherlands auctions, followed by Dendranthema, Tulipa, Lilium and Gerbera.

![Table 2.3 Per capita flower consumption in 2006](image-url)
2.9.5 WORLD FLORICULTURE TRADE

The global exports of floriculture products stood at about US$ 17 billion in the year 2007. Fresh cut flowers and foliage accounted for around 49.1 percent (US$ 8.31 billion), and live plants, bulbs and cuttings accounted for 50.9 percent (US$ 8.60 billion) of total floriculture products exported in 2007. Developed countries in Europe, America and Asia account for more than 90 percent of the total world trade in floriculture products. Roses contribute around 70 percent of the total cut flower industry trade. The Netherlands continues to dominate the world floriculture industry, accounting for 49.6 percent (US$ 8.56 billion) of world floriculture exports in 2007. Colombia is the second largest exporter of floricultural products in the world with a share of around 6.5 percent (US$ 1.12 billion). With an annual average growth rate of around 10 percent, world exports are expected to reach US$ 25 billion by 2011.

Germany (US$ 2.59 billion) was the largest importer, followed by the United Kingdom (US$ 1.89 billion), USA (US$ 1.81 billion), the Netherlands (US$ 1.55 billion), and France (US$ 1.43 billion). Europe as a region is the world’s leading importer of flowers and foliage. Roses are the most popular flowers imported by Europe. Other flowers imported by Europe include tropical flowers, summer flowers and Orchids. Japan is the largest importer of floricultural products in the Asian region. India was ranked 16th amongst world exporters of floricultural products, and its share in world exports was negligible at around 0.82 percent (US$ 141 million), in 2007.

The world floriculture trade is characterized by a high degree of concentration by product and sources. Developed countries in Europe, America and Asia account for more than 90 percent of the total world trade in floriculture products. Roses are the main traded product.

International trade in floriculture, to a large extent is organized along regional lines. Asia-Pacific countries are the main suppliers to Japan and Hong Kong. African and other European countries are the principal suppliers to Europe’s main markets, and the supply to the United States is mainly catered by Colombia and Ecuador.

The global exports of floriculture products stood at US$ 17 billion in the year 2007. With an annual average growth rate of 10.3 percent, world exports are expected to reach US$ 25
billion by 2012. Fresh cut flowers and foliage accounted for around 49.1 percent (US$ 8.41 billion), and live plants, bulbs and cuttings accounted for 50.9 percent (US$ 8.58 billion) of total floriculture products exported in 2007. Roses, Chrysanthemums, Carnations and Orchids are the most traded products. Of these, Roses contribute around 70 percent of the total cut flower industry trade.

Figure 2.2 Exports of Floriculture Products in the World.

Europe is the largest consumer as well as exporter of floricultural products in the world. Five European countries, viz., the Netherlands, Italy, Belgium, Denmark and Germany, account for over 66 percent of total exports by value of floricultural products in the world.

World imports are highly concentrated geographically. Europe by far is the largest importer of floricultural products in the world, followed by America and Asia. Seven European countries viz., Germany, United Kingdom, Netherlands, France, Italy, Belgium, and Switzerland account for more than 46 percent of total imports by value of floricultural products in the world.

2.9.6 EXPORTS

Top ten countries, viz., the Netherlands, Colombia, Italy, Belgium, Denmark, Germany, Kenya, USA, Ecuador and Canada, account for over 80 percent of the total export value of the world’s floricultural crops. Europe, especially the Netherlands, continues to dominate the world floriculture industry; it has been the epicenter for world flower trading. It was estimated that in 2007 over 50 percent (US$ 8.56 billion) of world floriculture exports came from the Netherlands; this figure includes crops that are grown domestically, and crops that are imported, brokered, and then resold.
Table 2.4 Top Exporting countries in the world by value.

The European exports of floricultural products are largely intra-European in nature. Intra-Europe exports of floricultural products accounted for over 90 percent of total European exports in 2005, and only 10 percent of exports were to other countries. However, in the recent years, share of other countries in European exports of floricultural products have been increasing. In 2007, intra-Europe exports accounted for around 85 percent of total exports of floricultural products from Europe, and the share of other countries in its exports increased to 15 percent. Germany was the major market, accounting for US$ 2.63 billion (21 percent) of total European exports. Other major destinations for European exports were the United Kingdom (14 percent), France (12 percent), and to a lesser extent Italy (6 percent). The most important export destinations for Europe outside European Union were Switzerland (4 percent), Russia (3 percent), and the USA (3 percent).
Among the product categories, live plants, bulbs and tubers and cuttings had the larger share (50.5 percent) in the total floricultural product exports, in 2007, while cut flowers and foliage made up to 49.5 percent of the total exports.
Cut Flowers and Foliage

The worldwide export value of cut flowers and foliage amounted to US$ 8.41 billion in 2007. Europe still maintains its position as the leading exporter in the world with a share of over 60 percent of total exports of cut flowers and foliage. However, European exports of cut flowers and foliage (US$ 5.06 billion) are largely intra-European in nature with only about 11 percent exported to other non-European countries. The share of non-European countries in the worldwide export value of cut flowers was about 25 percent in 1994, which has gone up to around 30 percent in 2007. Re-exports are very common from some of the leading European exporting countries such as the Netherlands and Italy.

Live Plants, Bulbs and Cuttings

The world exports of live plants, bulbs and cuttings are estimated to be about US$ 8.58 billion in 2007. This is more than the three times the value of flowers exported in 1994 (US$ 2.8 billion).

As in the case of cut flowers, Europe is the leading exporter of live plants, bulbs and cuttings, supplying predominantly to the European countries.
TRADE MEASURES

In the last decade, there has been a shift in export shares for cut flowers and plants from traditional leading producing countries (Europe, Japan and the USA) to many Asian, African and Latin American countries. However, many of these emerging economies have not been able to reap the benefits of their potential due to a number of trade restrictions imposed on their products in the form of tariff and non-tariff barriers by the EU countries, USA, as well as Japan.

2.9.7 Tariff and Quotas

European Union (EU) Import duties

Approximately 80 percent of cut flowers imported into the EU from developing countries is free from tariffs or enjoys a preferential tariff. The conventional import duty set by the EU on cut flowers and plants is 10.9 / 12 percent. In order to support exports from the developing countries, the EU operates the Generalized System of Preferences (GSP), where distinctions are made in terms of lower tariffs (0-8.5 percent) for countries depending upon the group they fall as classified below:

SPGA: Countries included in the special arrangements for Least Developed Countries (LDC), following the Everything But Arms (EBA) initiative.
SPGE: Countries included in the special arrangements to combat drug and trafficking: Andean Group (Colombia, Venezuela, Ecuador, Peru, Bolivia), the Central American Common Market (Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama), and Pakistan.
SPGL: Countries benefiting from GSP minus the countries of the SPGA and SPGE groups.

All SPGA and SPGE countries excluding Belarus and Myanmar can export to EU countries without any import duty imposed on it. However, relaxations are not absolute. They are subject to a volume restriction. Under the GSP + scheme, 14 beneficiary countries (Bolivia, Columbia, Costa Rica, Ecuador, El Salvador, Georgia, Guatemala, Honduras, Mongolia, Nicaragua, Panama, Peru, Sri Lanka and Venezuela) are qualified to receive additional preferences on tariffs and quotas.

Bilateral / Multilateral Agreements

Economic Partnership Agreement (EPA) - A new trade regime between the EU and the ACP countries, which was agreed in December 2007, after the WTO ruling on the Cotonou Agreement causing unfair competition, allows the ACP1 and the CARIFORUM2 countries to
export to EU without any import duties. A tariff contingent applies to a number of fresh cut flowers from Algeria, Egypt, Mexico, Jordan, Tunisia, Palestinian Administrative Areas, South Africa and Israel, which allows them to export to the EU duty free or in terms of lower tariff. However, quotas and a minimum price level restriction limit their exports.

Others
The non-EU European countries like Norway impose protectionist measures like tariff quotas in the summer period (June – October). Import license is a must for importers in Switzerland and Norway.

USA
The cut flowers and plants imported into the USA are also subject to import duties. There are a number of preference programmes outlining tariff and quotas for imports into the USA. In addition to the Most Favored Nation (MFN) tariff rate, there is the GSP rate applied to imports from developing countries and others (e.g. a number of near East and north African countries); there are also further concessional rate for the Least Developed Countries (LDCs) and special rates for certain Latin American countries under Free Trade Agreements. For instance:

- North American Free Trade Agreement (NAFTA) provides free trade between Mexico, Canada and the USA.
- The African Growth and Opportunity Act (AGOA) allows duty-free entry of goods from 40 countries in Sub-Saharan Africa in the USA.
- The Caribbean Basin Initiative (CBI) Program and the Andean Trade Preference Act (ATPA) program allow free trade among the countries in the Central America, Caribbean and the USA, and among the Andean countries (Bolivia, Colombia, Ecuador, and Peru) and the USA, respectively.

Furthermore, plant quarantine regulations also apply on imports. Among other things, it also applies on import of soil. Phytosanitary certification is required for most cut flowers and plants imported into the USA. Imports into the USA are allowed only through airports having plant inspection services (Los Angeles, Seattle, Washington, Orlando, New York, Newark, Miami and San Francisco).
Japan
Japan offers relatively few tariff concessions to developing countries under its GSP system. For the most part, GSP rates and MFN rates are the same. There is no import duty on cut flowers (HS0603) imports. For plant leaves and branches (HS0604), tariff rates are 5 percent in general tariff, 3 percent in WTO tariff, and zero percent in preferential tariff. However, imports of cut flowers and plants are subjected to a stringent Plant Quarantine Law, which is time consuming and poses challenges in retaining quality/freshness of flowers. A consumption tax of 5 percent is charged at each handling stage (5 percent of the CIF price at the importing stage). To obtain a quarantine certificate, the importer needs to request for an import inspection.

Plant Quarantine Law prohibits the importation of the following items:

- Harmful animals and plants (quarantine pests, as defined by the Ministry of Agriculture Forestry and Fishery - MAFF), Japan;
- Soil or plants in soil;
- Plants determined as illegal by MAFF, Japan;
- Containers and wrappings made from illegal items.

If any disease or vermin is detected during import inspection, the consignment is fumigated.

Other Regulations

- Some items are registered under the species registration system of the Seeds and Seedlings Law, and permission is required to import from species registration agents who may charge royalties depending upon the item.
- Importing endangered species is prohibited by the Convention on International Trade in Endangered Species of Wild Fauna and Flora, while some flowers require export permits from the exporting country.

Non-tariff Barriers

- Phytosanitary regulations on country of origin;
- Product and packaging requirements set by the Vereeniging van Bloemenvailingen (VBN), the Dutch Flower Auctions Association, the umbrella organization of the Dutch auctions;
- Environmental requirements with regard to packaging and waste.
2.10 Floriculture in India

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 liberalization 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.

2.10.1 Production

The growth in Indian floriculture cultivation has been phenomenal in the last decade. The area under flower cultivation has more than doubled from 53,000 hectares (1993-94) to 1,61,000 hectares (2007-08) and has been growing at a CAGR of 8.26 percent.
Table 2.5 Area and Production of flowers in India (2000-2008)

Of this, 500 ha of production is in greenhouse; around 5 percent of greenhouse production is domestically consumed and the remainder is exported. In 2007-08, flower production in the country was estimated at 870,000 MT of loose flowers and 4,342 million (numbers) of cut flowers.

Figure 2.6 : Production Trend of Flowers in India

The estimated area under flower cultivation is 106,000 hectares and the major flower producing states are Karnataka, Tamil Nadu, Bengal, Andhra Pradesh and Maharashtra. Traditional flowers such as marigold, jasmine, chrysanthemum, china aster, crossandra and tuberose (usually marketed loose in the domestic market), occupy nearly two-thirds of the area, with the balance including contemporary flowers such as rose, gladiolus, carnation, tuberose and orchids (used in bouquets and decorations). Production of cut flowers saw an
increase of 219 per cent in a single year to 2,565 million during 2001-02 from around 803 million during the preceding year. About 99 per cent of the flowers are cultivated in open condition and only 1 per cent under greenhouse condition. Postharvest management and value addition to cut flowers can enhance prices up to 5-10 times. Gladiolus and tuberose, two very popular cut flower crops in India are grown mainly in the temperate parts country. (Adoption of Commercial Cut Flower Production Technology in Meerut
Though all states in India have a tradition of growing flowers, the commercial growing of flowers is more prominent in the states of Karnataka, Tamil Nadu, Andhra Pradesh, West Bengal, Maharashtra, Uttarakhand, Uttar Pradesh, Delhi, Haryana, Kerala, Himachal Pradesh and North Eastern states.

Figure 2.7 Major loose flower producing states (2007-08)
Figure 2.8 Major loose flower producing states (2007-08)

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.

2.10.2 Major Floriculture Crops in India

Rose is the principal cut flower grown all over the country, even though in terms of total area, it may not appear so. The larger percentage of the area in many states is used for growing scented rose, mainly to be sold as loose flowers. These are used for offerings at places of worship, for the extraction of essential oils and also used in garlands. For cut flower use, the old rose varieties, such as Queen Elizabeth, Super Star, Montezuma, Papa Meilland, Christian Dior, Eiffel Tower, Kiss of Fire, Golden Giant, Garde Henkel, and First Prize are still popular. In recent times, with production for export gaining ground in the country, the latest varieties like First Red, Grand Gala, Konfitti, Ravel, Tineke, Sacha, Prophyta, Pareo, Noblesse, Virsilia, and Vivaldi are also being grown commercially.
Gladiolus is the next most important cut flower crop in the country. Earlier it was considered a crop for temperate regions and its growing was restricted to the hilly areas, particularly in the north eastern region, which still continues to supply the planting material to most parts of the country. However, with improved agronomic techniques and better management, the northern plains of Delhi, Haryana, Punjab, Uttar Pradesh, as well as Maharashtra and Karnataka have emerged as the major areas for production of Gladiolus. Tuberose, a very popular cut flower crop in India is grown mainly in the eastern part of the country i.e. West Bengal, and also in northern plains and parts of southern India. Both single and double flower varieties are equally popular. Tuberose flowers are also sold loose in some areas for preparing garlands and wreaths.

The other main cut flowers include Asters, Gerbera, Carnation, Anthodium, Lilium, and Orchid. Production of Orchids is restricted mainly in the northeastern hill regions, besides parts of the southern states of Kerala and Karnataka. The main species grown are Dendrobiums, Vanda, Paphiopedilums, Oncidiums, Phalaenopsis and Cymbidiums. Among the traditional crops grown for loose flowers, the largest area is under Marigold, grown all over the country. In most parts of the country only local varieties are grown for generations. African Marigolds occupy more area as compared to the small flowered French types. Jasmine flowers in view of its fragrance are also very popular as loose flowers, and find a very important place both in the perfume industry and flower market. The major areas under this crop are in Tamil Nadu and Karnataka in South, and West Bengal in East.

The varieties are mainly improved clones of Jasminum grandiflorum, J. auriculatum and J. sambac. Chrysanthemum is recognized as a potent flower crop in India. It is used as a cut flower for interior decoration and as loose flowers for making garlands. The Chrysanthemum, particularly the white varieties are much in demand as loose flowers during the autumn period of October- December when other flowers like Jasmine, Tuberose are not available for use in garlands and other similar purposes. Bougainvillea is an important and popular flowering plant grown widely throughout the country. The dwarf and bushy ones are mainly grown as pot plants. Among other traditional flowers grown in large areas are Crossandra in southern states of Tamil Nadu, Karnataka and Andhra Pradesh, and Aster in Maharashtra.
Marigold, Aster, Roses, Tuberose, Gladiolus, Jasmine, Crossendra are grown generally in the open fields, while Gerbera, Carnation, Roses, Anthurium, Lilium, and Orchids are cultivated under green house conditions.

Major flowering plants largely produced and sold in pots for indoor use are Poinsettas, Orchids, florist Chrysanthemums, and finished florist Azaleas. Foliage plants such as ferns, crotons, bamboos, and palms are also produced and sold in pots and hanging baskets for indoor and patio use, including larger specimens for office, hotel, and restaurant interiors.

Table 2.6 State wise production of flowers in India

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SOURCE: National Horticulture Board 2009

Table 2.6 State wise production of flowers in India
Consumption and Domestic Trade

While exports remain the prime motivator for Indian flower cultivators, the demand in the domestic market is also enormous and is on the rise. Modernisation and growing western cultural influences has resulted in consumers, especially the young population in the country buying flowers on occasions like Valentine’s Day, Friendship Day, Mother’s Day, Father’s Day and so on. There is also a huge spurt in demand for flowers during religious festivities.

Flower retailing is also undergoing a sea change in the country. Besides the small vendors selling flowers from buckets on roadsides, there has been an emergence of many up market shops and flower boutiques in major metros, in the recent years that witness demand round the year. The large supermarket/hypermarket retail chains that are mushrooming across the country are expected to further stimulate this growth.

The major markets for flowers are situated in the states, which produce significant quantities of flowers. Kerala is one state that has a fairly large market without any significant production of flowers. Some states, particularly those in the Southern India, have more than one large market in the state as the area under flower production is fairly widely distributed. The major markets in terms of number of traders involved and the quantity traded are in the peninsular region and east India.

The major markets in peninsular India are Chennai, Coimbatore and Madurai in Tamil Nadu; Bangalore, Mysore and Dharwad in Karnataka; Hyderabad and Vijayawada in Andhra Pradesh; Trivandrum and Cochin in Kerala; and Mumbai and Pune in Maharashtra. The city of Mumbai itself has three large markets. Kolkata is the biggest market in the eastern India. In addition to the market in the city of Kolkata, there are several fairly large regional markets in West Bengal. In the north, Lucknow/Kannauj and Delhi are the major markets for flowers besides locations in Rajasthan.

2.10.3 Exports

Floriculture has been identified as a thrust export sector in India in the post-liberalization era. The global markets offer a vast potential and advantages for India. However, India’s share in the international markets for floricultural products is still negligible at less than one percent. India’s exports of floricultural products in the year 2007-08 decreased by 48 percent to US$
84.5 million (Rs. 340 crores), from US$ 144 million (Rs. 653 crores) in 2006-07, which further decreased by 5.18 percent in the year 2008-09 to US$ 80.31 million. However, in rupee terms there was a marginal increase of 8.4 percent from Rs. 340 crores in 2007-08 to Rs. 368.8 crores in 2008-09.

Figure 2.9 Floriculture exports from India

Commercial floriculture in India is going through a paradigm shift, where traditional flower cultivation is giving way to modern hi-tech flower cultivation, which is evident from India's rising production and exports. Exports of floricultural products have been growing at a CAGR of 15 percent over the past decade. However, the growth of the industry has been significantly affected by the recent global recession largely due to decline in demand in all major markets. India’s exports of floricultural products in the year 2007-08 decreased by 41 percent to US$ 84.5 million (Rs. 340 crores), from US$ 144 million (Rs. 653 crores) in 2006-07, which further decreased by 5.18 percent in the year 2008-09 to US$ 80.19 million. However, in 2008-09, in rupee terms, export of floriculture from India increased marginally. In the recent years, dried flowers and foliage have been forming a large part of floricultural product exports from India. During 2008-09, dried flowers constituted over 60 percent of cut flowers exports, and dried foliage constituted over 95 per cent of total foliage exports from India. Fresh cut flowers are mainly exported from Tamil Nadu, Karnataka and Maharashtra. Dried flowers are exported mainly from Tamil Nadu and West Bengal, with the later accounting for around 70 per cent of the dried flower exports from the country. Europe continues to be the largest destination for Indian floriculture exports. However, in the recent years Indian exports of floriculture products have also been to the Japanese and Australian markets. India’s distinctive
advantages for development of the floriculture sector.

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.

Over 95% of Indian cut flower exports are different varieties of Rose. India is, thus at present, a negligible player in the international trade in fresh cut international destinations. Although Indian export of fresh cut flowers has been increasing in recent years, the volume as well as share in international trade is negligible compared to its competitors. India faces a major challenge in terms of infrastructure and awareness among small producers. The main feature of Indian floriculture is that the producers are small and fragmented.

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During 2007-08, exports of cut flowers and foliage were valued at US$ 70.4 million (Rs. 283.4 crores), while exports of live plants, bulbs and tubers stood at US$ 14.1 million (Rs. 56.7 crores). In the year 2008-09 upto February 2009, exports of cut flowers and foliage were valued at US$ 60.17 million (Rs. 272.3 crores) and exports of live plants, bulbs and tubers were valued at US$ 11.04 million (Rs. 49.4 crores).
Important cut flowers exported from India include Roses, Lilies, Carnations, and Orchids. In the recent years, dried flowers and foliage have been forming a large part of floricultural product exports from India. During 2007-08, dried flowers constituted around 65 percent of cut flowers exports, and dried foliage constituted around 97 percent of total foliage exports from India, which were 64 percent and 99 percent respectively in the year 2008-09 (upto February 2009).

**Figure 2.10** Composition of Floriculture exports from India

**Figure 2.11** Composition of cut flower and foliage exports from India
2.10.4 Markets for Exports of Floriculture Products

Over the years, Europe has been the largest destination for Indian floriculture exports, and EU auctions have been the preferred channel for the Indian flower exporters. However, in the recent years, Indian exporting units have been developing and increasing their concentration in the Japanese and Australian markets, which are reflected in the increase in the export realizations from Japan, Australia and New Zealand, over the past 5 years. Though the focus is slowly shifting to different markets, EU yet remains an important destination for India’s cut flowers, which is evident in the fact that Europe, accounted for over 50 percent of the total cut flower export realizations during 2008-09.

![Region-wise export of Indian floricultural products](image)

**Figure 2.12** Region wise exports of Indian floriculture products

In the two key export markets, viz. Europe and Japan, India faces intense competition from East African countries like Kenya, Ethiopia and Tanzania (in the EU market), and from South Korea, Thailand, and Australia and New Zealand (in the Japanese market). These countries have immense production capacities, and provide the varieties with quality of flowers, which match the international standards.
Table 2.7 Top ten importing countries of floricultural products from India

Majority of the floricultural units are based in Southern part of the country mainly in Karnataka, Andhra Pradesh and Tamil Nadu. About 125 hi-tech units are concentrated in Karnataka covering 200 hectares; Maharashtra has 39 units covering 150 hectares, Tamil Nadu has 17 units covering 152 hectares and 153. Delhi has 12 units covering 50 hectares. There are around 70 high tech floriculture units in the country. These units are mostly concentrated in Bangalore and Pune belt.

Foreign Collaboration and Investments

Most of the EOUs in the country are largely dependent on foreign collaborations for technological support as the cultivation of cut flowers for export purposes under protected environment is relatively a recent phenomenon. Majority of the foreign collaboration in the sector have taken place with units from the Netherlands, Israel and France with many of them having their offices in India.

Most of the foreign collaborators are primarily suppliers of one of the inputs of the floriculture industry, e.g., planting material, greenhouses, or they are specialized in marketing. Some collaborators such as the Dutch floriculture companies also have their production bases in India, especially growing summer and tropical flowers.

Most of the Indian companies are family owned, medium sized businesses. For these Indian entrepreneurs, the joint ventures are more like a turn-key collaborations. They are largely dependent on the foreign companies for setting up of the projects, and supply of inputs with buy back arrangements. However, in the recent years, a number of large corporate houses
such as ESSAR group, TATA group, Reliance, ITC, Bharti Group/Field Fresh, RPG group and Thapar Group have also invested in the flower sector.

2.10.5 Employment in Floricultural Crops Cultivation:

Floriculture is a capital-intensive industry with long gestation period. According to a report on floriculture by the Parliamentary Standing Committee on Commerce, Government of India, investment worth over Rs.500 crores has been made in the floriculture industry in the country during the last decade. There are wide variations in the cost of establishing the export-oriented floriculture units in the country. However, according to the report, the cost of flower production under controlled condition is estimated at around Rs.1.75 crores to Rs.2.25 crores per hectare.

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 2000:120) 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 (Alagumani 1997:670) per hectare of land. ((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 (Alagumani 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.

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 the urban areas. Estimates across different states in India indicate that the employment generation of flower crops cultivation is higher than other horticulture crops, food crops and commercial crops. A study conducted by University of Agricultural Sciences (UAS) Bangalore, in Chitradurga district of Karnataka showed that the employment generation of one hectare of Crossandra was 1,461 man-days per year. Of this, 65 percent accounted for female workforce. It was also estimated that conventional (traditional) floriculture provided 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 in 2002 (Prakash 2002:240). In contrast to the traditional floriculture, the modern floriculture generated more employment. The range of employment per hectare was 7,121 man-days (Thippaiah 2001:120) to 7,468 man-days / hectare including technical labour (Prakash 2002:247), whereas the food crops, generated employment of 860 man- days per hectare per annum.

Hi-tech floriculture employs more labour. There are no definite estimates on total labour required in hi-tech/modern floriculture, which largely depends on the capacity of the units. However, the UAS study estimates the proportion of permanent labour at 8 percent in the hi-
tech floriculture units in Bangalore in 2002, and that they were given industrial benefits. In tandem with employment generation, the flower crops have the inherent advantage of providing higher productivity per unit of land resulting in higher income. Studies reveal that income obtained from floriculture is 4, 5, 10, and 20 times higher than sugarcane, fruits and vegetables, paddy, and ragi, respectively.

The cut flower industry makes an important contribution to economy. These are briefly summarized here. Cut flower industry provides important contributions to fertiliser and agricultural chemical industry since it is an intensive agricultural production activity by having short-term production, requiring intensive fertiliser and plant protection techniques. Packaging is one of the most important elements in post harvest processes for cut flower products. During supplying of products to market and for transport, lots of packaging material originated from cellulose and plastic is used, by this way cut flower industry also provides an important contribution to this industry.

2.10.6 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 Alagumani 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.

In addition, existence of cold chain in the cut flower export firms requires different techniques and application that creates employment opportunities. On the other hand, chemical usage in the post harvest processes constitutes a market for chemical substance producers and

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distributors. Transportation of cut flowers products needs special techniques and applications. Transportation of flowers to importer countries creates an important source of income for transportation industry also (Anonymous, 2001).

In past decades, a number of developing countries experienced a rapid growth in their exports of highly perishable horticultural products to developed high-income countries. In general, this growth can be explained by comparative advantage. Batt (2000) concludes that ‘the basic factors of production are a great deal more important in the evolution than the literature would suggest’. Labor-intensive cut flowers are grown in low cost countries. Especially African countries have become very competitive for specific labor-intensive rose varieties and partly pushed European growers out of the market (Wijnands, 2005). In most developing countries a well-developed domestic flower market is absent, making production fully export oriented.

Given the continuous growth of the flower industries in many developing countries, we assume that the resource allocation and employment conditions meet the requirements. Moreover, the world demand for flowers is still increasing (Wijnands, 2005, p66). At level 3 we find the governance structures, which are efficient organizational solutions to the problems of transaction costs. For the flower industry, governance structure choice is directly linked to marketing channel choice (Van der Lans, 2005). As producers target export markets they simultaneously have to decide on the governance structure and the market channel. It is a choice between the spot market of the Dutch auction or a contract with large retail companies. It is generally believed that small farm agriculture plays a central role in economic development, both in supplying a significant portion of the domestic food crop supplies and in generating income for low-income families, (Minot, 1986). Najeeb Ahmed, president of the South Indian Floriculture Association, says India's share of the world rose market is still tiny. But the country is making its presence felt in several countries including Australia, Japan, Britain and Germany. “The quality of Indian roses is good and there is substantial demand in competitive markets around the world,” he explains. “We can grow roses round the year without artificial heating, lighting and cooling systems, and there is abundant availability of manpower.”

While international markets offer a lot of opportunities for Indian exporters, they also face substantial challenges. Indian exports of cut-flowers face import tariffs of up to 17 per cent
(calculated on a free on board+freight basis) in Europe between May and October, considered non-peak months. It’s only when Europe requires imported flowers during the peak season that import tariff is reduced by five to six per cent. The huge potential for growth for the floriculture sector has attracted top Indian corporates. They include Reliance, ITC, Tata Tea, Bharti Group and the Thapar Group. Their plans are being driven by demand from overseas retailers like TESCO, Sainsbury, Wal-Mart, Asda, Sears, Carrefour, Metro and K-Mart.

International retailers buy in large volumes, so scale of operations and quality control will be of paramount importance. This is encouraging domestic corporates to enter the sector. “Floriculture in India is becoming an attractive, commercially viable diversification option,” says industry expert S. Jafar Naqvi. “Several companies involved in agro business are set to venture into this sector.” Some of the smaller players are looking for innovative methods to take advantage of benefits that scale and size provides, by forming cooperative societies. By doing so, they hope to collectively buy farming materials, fertilisers and other supplies as a single entity helping them drive down costs through bulk purchases. With corporate players getting in on the action, and smaller players consolidating their efforts, India’s floriculture sector can expect to blossom over the coming year. The organized floriculture industry in India is of nascent origin (slightly over a decade old) and is primarily export oriented. India mainly exports roses grown in greenhouses in Maharashtra (mainly in the Pune- Talegaon and Nasik belt) and around Bangalore in Karnataka and Hosur in Tamil Nadu. The exports are primarily from Mumbai and Bangalore airports to various countries.

The Indian floriculture market is also forecasted to grow significantly in the next five years. According to a study conducted by Media Today group in collaboration with Indian Flowers and Ornamental Plants Welfare Association (iFlora), India’s flower and plant market currently valued at INR 10 billion (1,000 crores) has the potentiality to grow to ten fold in the next five years. The Indian floriculture industry, growing at a compound annual growth rate (CAGR) of 25 per cent over the past decade, has blossomed into a $230 million business. India’s flower exports have been growing by a robust 25 per cent CAGR. It added up to $90 million in 2006-07 and is projected to touch $160 million by 2010. Fresh flowers from India have already gained entry into nearly 90 countries including Australia, Japan, the UK, the Netherlands and the UAE. The world’s biggest flower markets include USA ($12.5 billion), Japan ($5.46 billion) and Italy ($4.27 billion), while the highest per capita consumption of flowers is in Norway ($146) followed by Switzerland ($126) and Germany ($88).
2.10.7 The domestic floriculture industry

The domestic floriculture industry has been witnessing an unprecedented growth during the past years and has also been getting increased acceptability in world markets, currently estimated at US$ 50 billion. The floriculture industry has been growing at an annual rate of 17 per cent, which has also seen a number of corporate houses entering the fray during the past three to five years. Higher standards of living and the growing desire to live in an environment-friendly atmosphere have led to a boom in the domestic market as well. The most important flower traded in the international market is still Rose. However, Dendranthema, Dianthus, Chrysanthemum, Carnation, Gerbera, Dahlia, Poinsettia, Orchids, Lily, Tulip are the flowers emerging as close competitors to Rose.

India is also the second largest consumer base and has unlimited opportunities for growth in flower retailing. India's flower trade is attracting a large demand from an estimated 300 million middle class people. Flower consumption in the cities and major towns is reportedly growing at 40 per cent per annum. Flower retail shops and boutiques have mushroomed all over the cities and towns. The demand will get further impetus with the growth of modern retailing concepts. Alongside, India has become world's attractive tourism destination, creating a new boom in flower consumption in Hospitality industry. Cover Story Flower designing is a centuries old art, craft and skill in India by way of displaying flower arrangements in temples of worship, marriages and many religious and social functions. A surging per capita income and progressive lifestyles have led to a phenomenal increase in florist & floral designing market in this country. With the ever-growing gift-lovers' interest in flowers, the floral industry is growing at a very good pace.

While exports remain the prime motivator for cultivators, local demand is also growing by leaps and bounds, especially in cities. Modernization and growing western cultural influences has resulted in consumers – especially the young – buying flowers on occasions like Valentine’s Day, Friendship day, Mother’s day, Father’s day and so on. Of course, there is a huge spurt in demand for flowers during religious festivities. Flower retailing is also undergoing a change. Many of the new shopping malls and large format retailers have exclusive flower shops that witness demand round- the-year.
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.

Floriculture has tremendous potential in India. The different types of climatic conditions provide for the possibility of growing almost all the major cut flowers. Species of the world, whether of tropical, sub-tropical or temperate climate origin. However, flowers in India are produced in open field conditions, mostly during the mild winter months without use of any advanced technology. As a result, the quality and quantity available for marketing are heterogeneous and vary according to the prevailing weather conditions.

India has relatively better opportunities for development of the floriculture sector for the following reasons:

- Diverse agro-climatic conditions and geographical locations suited for growing various types of flowers
- Skilled manpower to absorb the technology and implement the same at a relatively low cost
- Soil and water supply at most locations
- Good radiation/sunlight leading to healthier plant growth and better quality flowers
- Light rains and salubrious climate during winter, the prime export season, leading to sustained high yields
- Good period of sunlight even during the heavy rains leading to continued plant growth and proper yield
- India is located centrally for catering to European and Far Eastern markets, as well as being close to the South East Asian and Middle East Asian markets that have high consumption requirement of flowers India has a conducive environment for floriculture exports due to:
- increasing labour cost that is putting pressure on the cost of cultivation of major flower producing countries like The Netherlands, Japan, Taiwan and Israel
environment degradation and cost of land which impede further expansion of cut-flowers production in EU countries

increasing demand in the nearer markets of West Asia and South East Asia, where the rising standards of living are pushing-up demand for floriculture products

dependence of Europe, which is one of the biggest markets on flowers imports during winter months

better prices expected to be offered by the other potential markets viz. West Asia, South East Asia, Japan, Hong Kong, Singapore and Korea throughout the year than European market, provided they are supplied with good quality flowers on continuous basis.

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2.10.8 Role of government

Numerous examples of countries, particularly in Asia, show significant and sustained growth without following the conventional recommendations of liberal markets and a restricted role for government (Rodrik, 2003). Government of India acknowledges the potential of the floriculture industry and has conferred 100% export oriented industry status. The Government is offering various incentives, which have enabled the setting up of a number of floriculture units for producing and exporting flowers. Most of these are located near Mumbai, Bangalore and Delhi. These units have obtained technical know-how from Dutch and Israeli consultants. According to sources in the trade, much of the credit for growth of the industry should go the government. Post liberalization, the government identified it as a priority sector and accorded it 100 per cent ‘export oriented unit’ (EOU) status. This meant tax exemptions to new EOUs and tax holidays on income from floriculture. Tax benefits are offered to new export oriented floriculture companies in the form of income-tax holidays and exemption from certain import duties.

Additionally, there were substantial duty exemptions for imports including cut flowers, flower seeds and tissue-cultured plants. Also, allowing 100 per cent FDI (foreign direct investment) in the industry has facilitated joint ventures, ensuring a steady inflow of capital and modern technology.
Further subsidies have been offered for air-freight for export of cut-flowers and tissue-cultured plants, and direct subsidy of up to 50 per cent has been offered for establishing cold storage, pre-cooling units, refrigerated vans and green houses. The Government of India has a transport assistance scheme for Indian flower exporters, but the quantum of airfreight subsidy is limited to 20% of airfreight or 20% of FOB value at a specific rate per kg. of flowers. The rates vary from country to country, between Rs. 7/- per kg. to Rs. 25/- per kg. However, the assistance provided does not fully make the Indian flower exporters cost competitive vis-a-vis some of the African exporters. High capital costs for re-plantation is one of the major hurdles, which may be tackled with appropriate re-plantation support.

Subsidy is also given by the Agricultural and Processed Food Products Export Development Authority (APEDA), for using improved packaging material. Refinance assistance is available from the National Bank for Agriculture and Rural Development (NABARD) to a number of hi-tech units at reasonable interest rates. The Union Ministry of Agriculture has also set up 11 model floriculture centre units, two large centers and 20 tissue culture units. Government of India promotes, assists and facilitates the setting up of Agri Export Zones (AEZ), in association with State Governments for the purpose of providing access to international markets for agricultural produce/products from the country. The objective is to provide remunerative returns to farming community in a sustained manner and to increase their competitiveness. Six agri-export zones have also been set up for floriculture where large flower farms share common infrastructural facilities, thus bringing into effect the benefits of scale.

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**Table 2.8** LIST OF OPERATIONAL AGRI EXPORT ZONES FOR FLORICULTURE DEVELOPMENT
Walk-in cold storages have been allowed at international airports like Delhi, Mumbai, Hyderabad, Chennai and Thiruvananthpuram and similar facilities are expected at other airports soon. Auction centers are also being set up at major cities, helping in price discovery and trading. In fact, APEDA has even set up a Market Facilitation Centre at Aalsmeer, in the Netherlands, the world’s largest flower auction centre. The authority aims to set up similar centers in the Middle East and the Far East in due course, to help Indian flower exporters.

2.10.9 Recent export promotion measures

Ever since the setting up of an Expert Group on Floricultural Development by the Government of India in 1989, several steps have been initiated for the speedy development of the sector. Some of the major steps taken in this direction are as under:

**Recent initiatives taken by APEDA to boost export of floriculture:** The Agriculture and Processed Food Export Development Authority (APEDA) has been designated as the nodal agency for export promotion and development activities relating to floriculture. It has recently taken several steps to boost export of floriculture products so as to achieve an export target of Rs. 1,000 crores within five years

**Liberalized Govt. policies to promote floriculture products:** The liberalized policies of the government both at the center and state level have resulted in a mushroom growth of floricultural units in the country over the years. Some of the recent policy initiatives taken include: (i) Setting up of an exclusive agri- export zone for floricultural units in Bangalore, and (ii) According approval for setting up of 100% export oriented units by the Govt. of India

**New Foreign Trade Policy (FTP):** Under the new FTP (2004-09) announced by the Ministry of Commerce & Industry, Government of India, a host of incentives have been given to boost agri-exports. These *inter alia* include (i) duty-free import of capital goods under the Export Promotion Capital Goods (EPCG) scheme, (ii) Duty credit scrip equivalent to 5 per cent of the f.o.b. value of exports, and (iii) Launching of *Vishesh Krishi Upaj Yojana* which is aimed at promoting agri-exports, viz. , flowers, vegetables, fruits, minor forest produce, etc.

**Exemption from Import Duty:** The Govt. has fully exempted import duty on ornamental plants, tubers and bulbs of flowers, cutting of saplings of flower plants used for the purpose of sowing and planting.
**Entry of Large Units:** To meet the burgeoning demand for floricultural products both in the domestic and overseas markets, a host of major Indian companies have entered this sector. Prominent among them comprise RPG Group, Harrison Malayalam, Oriental Floriculture, a Tata company. These companies have started commercial production of roses with technical and marketing tie-ups mainly with most of the Dutch companies.

**Air freight subsidy:** In a move to make export of floricultural products more competitive in the international market, the Government has decided to grant air freight subsidy on cut flowers (HS Code: 06.03.1000). The scheme is being implemented by APEDA.

### 2.10 Prospects of diversification in floriculture

#### Traditional flower cultivation

The domestic consumption of loose flowers, especially of marigold, China aster, jasmine, crossandra, barleria, etc. has been increased tremendously. It is clear that area under traditional flowers has increased significantly (>90% of total flower crops). This sector, inspite of its potential, is still an unorganized and often does not get proper importance. Research is required on developing high yielding varieties, year round production of chrysanthemum, China aster, marigold etc. and in promotion of crops like annual chrysanthemum, desi rose, etc.

#### Hi-tech/Protected Cultivation

The cut flowers, which are being exported from India, are from these hi-tech floricultural units. Protected cultivation, although is in limited area (5% of total flower crop area), its contribution to total floricultural exports is significant. At present, there are about 110 export-oriented floricultural units (EOUs) in operation, covering an area of 500 ha. These units are growing mostly roses, but can be diversified into orchids, Anthurium, gladiolus and tuberose as the demand for tropical flowers is increasing worldwide. India has several advantages and great potential to increase the acreage under intensive production and ultimately to increase the floricultural exports provided the units should be opened in ideal locations with sound technological back-up.
Dry Flowers

Dry flowers constitute more than two-thirds of total floricultural exports. For making dry flowers and plant parts can be collected from wild sources or some flower crops like Dahlias, marigold, jute flowers, wood roses, wild lilies, helichrysum, lotus pods, etc. some flowers that are air-dried and used include Dahlias (*Dahlia hortensis*), poppy seed heads (*Papaver somniferum*), roses (*Rosa*), Delphinium, larkspur (*Consolida ambigua*), lavender (*Lavendula augustifolia*), African marigold (*Tagetes erecta*), strawflower (*Helichrysum bracteatum*), globe amaranth (*Gomphrena globosa*), lotus pod etc. dry flowers constitute nearly 15% of the global floriculture business and form the major share in Indian floricultural exports as well. At present, the industry is not well organized and depends on plant material available in forests and no systematic growing of specialized flowers exists anywhere in the country. The demand for dry flowers is increasing at an impressive rate of 8-10% and therefore there is a great scope for the Indian entrepreneurs.

Flower Seed Production

Seed production of seasonal flower crops is a lucrative business and practiced in considerable area in Punjab and Haryana. This offers higher returns from unit area. Of late, demand is increasing in domestic market also. Research work is required to develop high-yielding varieties including F1 hybrids, agro-techniques for producing uniform seed with higher certification standards.

Nursery Industry

Lack of quality planting material is the major hindrance for not realizing the full potential of floriculture in India. Plant material of various kinds (seedlings, budded plants, rooted cuttings, bulbs, tubers, corms, annual seed, etc.) is required for commercial flower production, pot plant production for adding to home garden and for landscaping (corporate landscaping, bioaesthetic planting etc.).

Pot Pourri

Pot pourri is mixture of dried, sweet-scented plant parts including flowers, leaves, seeds, stems and roots. The basis of a pot pourri is the aromatic oils found within the plant. A significant component of dry flower export comprises pot pourries. In the recent past, floriculture has been considered as a viable option of diversification in agriculture. But now within floriculture itself, there are in a number of options a flower or a floriculturist can take.
Essential Oils

Essential oils and perfumery from natural sources are in great demand. In India, flower crops grown for essential oil production are limited and include mainly rose, jasmine, tuberose etc. Rosa damascene is exclusively cultivated for extraction of essential oils, rose water, attar, gulkhand, etc. in certain pockets of Rajasthan and Uttar Pradesh. Research should be focused on development of varieties with higher oil content and standardizing distillation methods for higher oil recovery. Further, identification of more crops and standardization of production technology needs to be included in the research agenda. Promotion of this sector encourages ancillary industries like steam distillation and use of indigenous technical knowledge (ITK) for making value-added products.

Natural Dyes

Marigold pigments are widely used in the poultry industry to enhance the colour of the meat and yolk of the eggs and also used in food and textile industry. So far, isolation of xanthophylls from marigold has been standardized. More crops can be identified and procedures can be standardized for full exploitation. Technology development in all the areas mentioned above not only improves the situation of respective sub-sector of floriculture, but these become important avenues for diversification of floriculture, sources of income generation and means of employment to the youth.

Positive signal

The global downtrend has delivered a positive signal to Indian floriculture industry by underlying the industry's inherent strengths. The overall situation, in fact, offers new opportunities for the Indian floriculture sector. This is the right time for the government departments trying to promote floriculture and the Indian industry to seize the opportunity to prepare a long term plan to strengthen this sector and facilitate domestic suppliers to gain a stronger foothold in the developed markets. To attain this objective, the domestic industry should not only have access to technology and good quality planting material at reasonable prices but also proper marketing support. The need of the hour is good cooperation among all segments that would include big growers engaged in high tech production, small growers, input suppliers, cooperatives and government departments. Policy makers would do well to organise the domestic flower market and provide at least minimum infrastructure facilities
like sheltered market yards to enable the growers to sell their produce, unspoiled by the harshness of summer sun or pouring rain. Basic facilities to handle perishables like flowers are needed in all major cities and towns, along with adequate support from the state marketing departments. Needless to say, such facilities are now woefully lacking.

"Surprisingly the Indian growers have responded positively to floriculture plantations this year which is very unlike in this recession worldwide, says Kishore Rajhans, Vice-President of KF Bioplants. We have lot of booking for Gerbera and other plants for green house plantation. "We have overwhelming response mainly from Uttarakhand, Himachal Pradesh, Sikkim and Assam from North East. We also have fantastic response from Tamil Nadu and Karnataka," says Rajhans. He feels the company, which is a leading biotech plants supplier, has been quite fortunate in not having faced any setback of the current meltdown till today. However, we have kept our fingers crossed, said Rajhans. Although the company's principals are playing it safe, as they have been hit directly by the economic meltdown worldwide, the response in India not being negative is quite encouraging, says Rajhans. According to him, the biggest strength of India is its manpower which can sustain any kind of adverse conditions, while being tolerant. "We can also control the cost of production to a certain extent, to become the most competitive player in the market." This is unlike other countries where the standard of living is quite high (of course not in Asian and African countries) and they are the ones who crumble first in this kind of adversity.

2.10.11 Floriculture in Maharashtra

Favorable conditions in Pune, Nashik and Sangli have made the regions one of the major flower producing zones in Maharashtra. These districts have the maximum concentration of floriculture units. There are around 20 hi-tech units in these regions, with over 70 ha area under hi-tech cultivation. There are about 400-450 medium-tech units, with over 50-60 ha area. A floriculture village has been set up in Talegaon in the Pune district, with around 150 ha area. A wholesale flower market-cum-auction centre with a handling capacity of 30 tones flowers has also been set up in Mumbai, which is yet to be operational.

The major traditional flowers grown in the State are Rose, Marigold, Gladiolous, Gerbera and Carnation. Anthurium is among its non-traditional flower production. The State has many poly-houses, growing Roses, Gerbera, Carnation and Anthurium and the quality of the flowers is matching with international standards. The growers of Maharashtra are one of the most
established exporters of flowers from India. According to the Western India Floriculture Association (WIFA), Pune accounts for around 30 percent of floricultural products exports from India annually.

*Floriculture Today,* in a special article presented the State Scenario of Floriculture Industry and gave a brief write-up on the units present in Maharashtra. It was estimated that an investment of Rs. 1,000 crores would touch by the year 2000. Maharashtra is blessed with ample nature resources, technically more advanced and respective farmers and very good international connections due to Mumbai. It has about 100 to 120 Ha, under hi-tech farming and 4000 Ha. Under different flowers. The writer opines, with this kind of background this state could really prosper in the coming years. It has large number of companies, that are doing well and prospering in this field though there were slight itches initially. The first hi-tech floriculture project was set up by the Tatas and named as ‘Oriental Floratech’. Soon after, in the years that followed, many new companies and their performance the varieties they grow, production details, etc.

Maharashtra, a leading Indian state is highly progressive in the field of capital market, trade industry and infrastructure. Already Maharashtra is ahead of many states in the production of grapes, plantation, orange, etc. In the area of floriculture too, the state has been progressing by leaps and bounds. With a total area under floriculture of 7,071 Ha., productivity of 4.30 MT/Ha., and production of 30,376 MT, Maharashtra’s achievement is enviable. The State is highest producer of roses (5,464 MT) with a productivity of 7.02 MT/Ha. in rose cultivation. Now, the state leads in export of fruits, flowers and vegetables in fresh and processed form.

Mr. D. Rajgopalan, in his article has put fourth the marketing potentiality of flowers in Maharashtra. The flowers in India have been classified into two categories i.e. small flowers and large flowers. He has categorically stated that the problem which exists are:

a. Unorganized domestic method.

b. Lack of quality consciousness.

c. Unorganised channels of marketing
The solution for the above problems has been analyzed:

a. Tackling the problems at the project level.

b. Market forces will change through expansion both, by volume and quality.

c. Emergence of auction houses.

The Government is trying to facilitate with basic amenities for setting up flower markets and is in the process of systemizing the market for an efficient role. The article has stressed on various topics and issues related to agriculture and the export potential of the State’s agro-based produce especially floriculture. The report also provides the destinations, where the produce is being set and APEDA’s support, in promoting floriculture in India, and the loan it provides for cold storage and the various studies that have been conducted under the guidance of APEDA for giving a facelift to this industry. Its constant efforts for bringing better prospects for this infant industry, that requires to be nurtured and for which a united effort amongst the Association and the Government has to come.

Mr. A.K. Misra, J.S, Negi and S.K. Kaul presented a report on integrated development of floriculture. The writers strongly express their desire to develop the MFC’s (Model Floriculture Centers) set up by the Government in different states. The article has been very brief and has mentioned the constraints, strategies, precautions to be taken for the perishable commodities and the Central Government’s support in these issues. The pattern of assistance being provided by the Government to MFC’s has also been presented.

Mr. Syed M. Kausar and Frozen Haider presented a report on floriculture sector in Maharashtra, in this article they have stressed on geographical conditions prevalent in Pune. It is estimated, that over 5,000 Ha. Areas is under cultivation. This report stresses on the climatic conditions in Pune, Nasik, Satara, and Kolhapur. It refers to the geographical location of these places and the varieties grow in these areas. The writers have dealt with the varieties of flower grown and greenhouse cultivation. The article has not been very elaborative on other fronts nor have they expressed the climatic condition in detail, they have given a brief write-up.

Ms. K. Vidyavathi and Dr. R. G. Desai have presented a comparative study on cost benefit analysis of the floriculture industry by comparing the Pune and Bangalore regions. The study
has been on financial analysis. From the computations done, it is seen that the establishment costs in the Pune region are higher in comparison to the Bangalore region, it work out to be Rs. 91.56 lakh and Rs. 89.71 lakh respectively. This study has been conducted by having a field survey. Floriculture units in the Bangalore region indicate that an investment of one rupee would yield a gross return of Rs. 1.60 as against Rs. 1.5 in the Pune region. The returns generally indicate the economic viability and profitability of floriculture units, which exists in both the regions. The writers go on to justify, by comparing the climatic condition of both regions. It is strongly felt and assumed that floriculture is a viable and profitable business proposition

2.10.12 Floriculture in Pune:

Pune is an industrial hub of Maharashtra, situated approximately 180 km South-east of Mumbai. Pune lies at the border of Deccan Plateau at an altitude of 559 m above the sea level. The city is well connected by road, train and by air to Mumbai, which has a large international airport and sea port. Endowed with good natural resources, technical and skilled manpower in horticulture, Pune emerged as a congenial location for floriculture units. Situated with the insitions of higher learning and known as the “Oxford of India”, the city of Pune is resourceful with scientists and experts in horticulture from the Agriculture University which is very much here, to provide consultancy services for floriculture units.

The geographic and climatic conditions further facilitate the development of the floriculture industry. The soil in Pune its surroundings is of good quality, which is sandy clay with good draining characteristics and the pH is mostly neutral, that is required for the cultivation of hybrid roses. The main flowers grown are roses, chrysanthemums, jasmine, asters, marigold, etc.

As Pune is situated at a high situated and due to the proximity of the Arabian Sea, it has a temperate climate. Thus, Pune does not have winter season nor a high temperature for a long period. Usually the minimum temperature does not go below 6°C during winter. In summer the temperature reaches a maximum of 41°C for a week.

district has witnessed an increase in land under floriculture in the last couple of years and will slowly emerge as one of the top exporters in the country, said Navneesh Sharma, deputy General Manager, Agriculture and Processed Food Products Export Development Authority
(APEDA). He was speaking to the media on the sidelines of an international floriculture exhibition, ‘Florex India 2007’ at the College of Agriculture grounds here on Friday. “Despite shortage of land, the demand is increasing. In the past two three years, the hectares under floriculture in Pune has increased,” said Sharma, calling it an achievement. Sharma said that one of the reasons was the export potential of the city, with Pune slowly emerging among the top exporters in floriculture.

“Pune accounts for nearly 30 per cent of the exports annually and the share is growing,” said Ramesh Lalwani, president of the Western India Floriculture Association (WIFA) and chief coordinator of Florex India 2007. In 1996-97, the Tata group had conducted studies on the potential production areas for floriculture. Pune came fourth after Munnar, Kodaikanal, and Bangalore. However, the city was the first to start with the production and explore export potentials, said Sharma. Currently, APEDA is pushing for MPS-GAP certification to improve quality and to ensure that the export schedule is maintained. “We are forcing farmers to go in for this certification of good agricultural practices. Some farmers in Pune have already done so,” said Sharma.

It is estimated that there are 16 floriculture units around Pune operating with greenhouse farming. These units are established by entrepreneurs of different background. Some are established industrialized industrialists who have diversified into floriculture business with a diversification of their profits, lured by the lucrative image of floriculture business. The second categories of the entrepreneurs who are already operating in floriculture trade are amateurs. The third category of floriculture entrepreneurs in Pune belong to the technocrats and experts in the field of horticulture. The oldest floriculture project in Pune is about eight years, which was started by Oriental Floratech by the TATA’s and the units are only five to six years old.

In Pune, roses lead the floriculture exports followed by other flowers like carnations, gerbera, and birds of paradise. This year there has been a push by APEDA towards traditional varieties like marigold and tuberose — which grows best in West Bengal. “These flowers are attractive abroad and have excellent export potential, besides roses — which are quite common in European countries,” said R K Mondol, western regional head, APEDA. The total area under organized floriculture is estimated to be around 500 hectares with the two largest clusters in Bangalore and Pune accounting for about 40 units. Floriculture exports have grown from Rs 18.83 in 1993-94 to Rs 305 crores in 2005-06 to around Rs 500 crores in 2006-07.
2.10 Summary

This chapter has presented an overview of the floriculture sector. The product, its characteristics, production process, properties consumer behavior and trends are presented in detail. The chapter has also presented a detailed overview of the world and Indian floriculture industry. Floriculture in Pune is presented in the last section of the chapter.