
UNIT 13 FLOWER PRODUCTION

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13.0 OBJECTIVES

After studying this unit, you should be able to:

- discuss the magnitude of flower business in the world;
- appraise the present status of Indian floriculture; and
- explain the potential business opportunities in floriculture.

13.1 INTRODUCTION

In India, floriculture is very closely associated with our culture. If you recall your childhood, you must have noticed that the art and science of growing flowers were mostly restricted to the backyard of individual houses or in public or private gardens. However, with the liberalization of seed policy and the opening of the economy, floriculture became a commercial enterprise during the late eighties. The gradual shift from sustenance agriculture to self-

sufficiency in agriculture brought about a change in lifestyles and increased the per capita income which in turn fuelled the growth of the floriculture sector in recent years. In this unit, we will understand the meaning of floriculture, its importance, and the relevance of the floriculture industry in the agro-industry.

13.2 DEVELOPMENT OF FLORICULTURE

As mentioned earlier, the scope of floriculture expanded with the evolution of the product mix in the floriculture sector. The humble flowers and ornamental plants, which used to enliven our surroundings, have transformed into an astounding business proportion in today's competitive world. The myth that floriculture includes only the growing of flowers was dispelled with the diverse uses of flowers and their products in the domestic and international markets. *Floriculture the study of flowers* encompasses cut flowers, loose flowers, cut foliage, potted plants, plug plants, dry flowers, pot pourries, essential oils, pigments, and natural dyes.

13.2.1 History

Our rich history indicates that floriculture is in our culture. Indian mythology made a vivid description of the glorious gardens of India that existed during ancient times. In the Ramayana, mention is made of the Ashokavana comprising of 'Ashoka' trees (*Saraca indica*), in which Goddess Sita was held captive. Several trees, such as *Terminalia arjuna*, *Mesua ferrea*, *Ficus benghalensis*, *Ficus religiosa*, *Michelia champaka*, *Butea monosperma*, and *Casia fistula*, have been mentioned in the Ramayana. Similarly, in the Sabha-Parva of Mahabharata candid description of the layout of gardens parks and artificial lakes in the city of Indraprastha is given. The association of Lord Krishna with the Kadamba tree (*Anthocephalus indicus*) is well known. During the Buddhist period, gardens were laid out around the monasteries and stupas and there were beautiful gardens in Nalanda and Taxila. Legend says that Lord Buddha was born under a Pipal tree in a garden and similarly he attained wisdom under a tree.

Kalidasa (about 57 B.C.) in his play Shakuntala mentioned the pleasure garden having a bower of the Madhavi creeper (*Hiptage madablota*) and several beautiful trees like Ashoka (*Saraca indica*), Kadamba (*Anthocephalus indicus*), Arjuna (*Terminalia arjuna*), Vakula (*Mimusops elengi*), Palasha (*Butea monosperma*), Parijata (*Nyctanthes arboristis*) and Kavidara (*Bauhinia varieagata*).

We all recall our childhood lessons in which it was documented that the planting of roadside avenue trees was an important contribution of King Ashoka (233 B.C.). The art of gardening has been described by Saragadhara (A.D. 1300) in his *Upavana Vinoda*, and *Sarangadhara Paddhati*, wherein mention is also made of some trees. Vatsyayana (A.D. 300-400) has also rendered interesting accounts of four kinds of gardens, namely, *pramadodyan*, *udyan*, *vrikshavatika* and *nandanavana*. Classical Sanskrit literature, as mentioned above, as well as the flower and tree motifs delineated in old sculptures and the architecture of Mathura (Kanishka period

A.D.78-101), Bharhut, Sanchi, and several others and displayed in the Ajanta frescoes (A.D.100-600) bear testimony to the importance of gardening and flowers in Indian culture.

13.2.2 Commercial Floriculture

The large-scale cultivation of flowers for trade and commerce picked up during the 1980s and 1990s. Indian floriculture is predominantly dominated by loose flowers, which are used for worship, decorations, and personal adorning. In India, no religious ritual or function is complete without flowers. The flowers are entwined in the social fabric of the entire nation. The advent of state-of-the-art greenhouse technology during the early 90s paved the way for the commercial cultivation of cut flowers for export. Many corporate houses established intensive production centres across the country to produce international standard cut flowers. As the world ushered into the new millennium, for the first time in the history of Indian Floriculture, two chartered Boeing 707 flights airlifted 180 tonnes (6 million stems) of precious roses worth Rs. 25 crores from Bengaluru alone to global auction houses located in the Netherlands, to catch up with a single occasion, the Valentine's Day during 2000. The export of roses, which was almost nonexistent just six years ago, has assumed the distinction of being one of the fastest-growing industries in the history of India. Before we understand the intricacies of Indian floribusiness, we must understand the magnitude of bloom business across the world.

13.3 GLOBAL BLOOM BUSINESS

When we observe critically, all over the world, the floricultural sector is experiencing rapid changes. Due to globalization and its effect on income generation in different parts of the world the per capita consumption of flowers in most countries is increasing. Besides the traditional centres of production (The Netherlands, Columbia, Israel, and Kenya), new production centres are developing in Latin America, Africa, and Asia and the production is increasing many times compared to a decade ago. Asian countries, like India, China, Korea, Vietnam, *etc.* are moving in the direction of more intensive floriculture. In the traditional centres, the total area under production will remain stable or increase slightly due to stringent environmental protection measures adopted by the respective countries.



Jasmine Flower



Golden Shower Flower

Do you know that the world's largest exporter of horticultural products is by far the Netherlands? Yes, it is interesting to note that it is responsible for about 60% of international exports. The international trade in cut flowers and potted plants is growing every year. From the total production of cut flowers and potted plants, only a small part is exported to the international market. About 75% of the international trade comes from within Europe. Germany alone accounts for 30% of the world's imports of cut flowers. Besides Germany, the United States, France, and the United Kingdom are big importers. The Netherlands, Columbia, Israel, Kenya, and Ecuador are the biggest exporting countries in the world. The position of the Netherlands is very dominant in the total exports (about 65%).

The world's largest flower auction located at Aalsmeer in the Netherlands sells more than 20 million flowers and plants every day. More than 7000 specialized growers from all over the world offer their flowers and plants via Bloemenveiling Aalsmeer every day. The auction has an essential 'break-bulk' function: large lots are sold within a couple of hours and divided into smaller lots. The customers who are situated at the auction (wholesalers and exporters) can be on their way to the consumer, anywhere in the world, within a few hours. You will be surprised to note that with about 1 million m² of floor space, the auction building is the largest commercial building in the world, according to the Guinness Book of Records. Bloemenveiling Aalsmeer turns over NLG 12.5 million (EUR 5.75 million) every day.

Sources: <http://www.icangarden.com/pix/gwaamsterdambelgium2006-3a.cfm>
<http://imi-inc.net/amsterdam.htm>

The Netherlands, Colombia, Ecuador, Kenya, and Israel are the main exporting countries. Relatively new to flower farming in Ethiopia. With the bulk of the flowers destined for sale through the American and European retail chains, the flower farms in new emerging countries will have to meet more demanding production standards.



Marigold Flower

Sunflower Flower

13.4 FLORICULTURE IN INDIA

Floriculture has been part of Indian culture and is entwined in the social fabric of our customs. A wide range of conducive agro-climatic conditions across the country enables India to cultivate many flowers, potted plants, foliage, and aromatic flowers almost throughout the year in one part or the other. There has been a tremendous growth in the floriculture sector in recent years.



Rose Flower



Lotus Flower

The floriculture industry in India is characterized by growing traditional flowers (loose flowers) and cut flowers under open field conditions and protected environment conditions respectively. India also has a strong dry flower industry, which provides a major contribution to the overall trade. Other segments like fillers, potted plants, seeds, planting material, turfgrass industry, and value-added products also contribute a share in the overall growth of the floriculture sector. Traditional flower cultivation, comprising of growing loose flowers mostly for worship, garland making, and decorations, forms the backbone of Indian floriculture, which is mostly in the hands of small and marginal farmers. The globalization of the Indian economy and subsequent liberalization of the Seed Act paved the way for the advent of protected cultivation in India during the early 1990s. Over the last 15 years, the organized sector of floriculture focusing on exports witnessed enormous growth.

13.4.1 Traditional Flowers

Growing traditional loose flowers for worship and decorations is the mainstay of Indian Floriculture, which occupied about 27000 ha area during 2019-20 with a production of 2.32 million tonnes. The flowers are grown in the open field and marketed through highly unorganized marketing channels. The area under loose flower crops is hardly 0.11% of the total area available for horticulture with a share of 0.07% in the overall production of horticultural crops.



Hibiscus Flower

Guldaudi Flower

The major flower-producing states include Tamil Nadu (17.33 %), Andhra Pradesh (15.40 %), Karnataka (11.63 %), Madhya Pradesh (10.15 %), and West Bengal (10.03 %) in the year 2017-18. The other major flower-producing states area are Chhattisgarh, Gujarat, Uttar Pradesh, Assam, and Maharashtra.

13.4.2 Cut Flowers under Protected Conditions

India produced about 676000 metric tonnes of cut flowers per annum (2019-20) for domestic and export markets. The cut flower production centres are located primarily in the southern and western parts of India owing to the favorable climatic conditions. States like Maharashtra, Karnataka, Andhra Pradesh, Haryana, Tamil Nadu, Rajasthan, and West Bengal have emerged as major flower producing states. North-Eastern states and other Himalayan states have in recent times become major hubs for growing quality cut flowers. The Anthuriums from Mizoram, the carnations from Himachal Pradesh, Orchids from Sikkim, and gerbera from Uttarakhand made a significant impact in recent times.

Cut flowers contribute about 60 per cent of the world's flower trade and the remaining are live plants, cut foliage, dry flowers, *etc.* Since India is situated comparatively closer to major flower consuming countries than its Asian counterparts, it has very good scope and potential in the flower trade. The severe winter in major flower producing European countries is also an advantageous factor to India, especially areas like Bengaluru, Pune, Hyderabad, Nasik, and North East (for Orchids and Anthuriums) which enjoy moderate climate all through the year. The prospect of an auction market for floricultural products coming up shortly in Singapore gives an added advantage to India.

The hi-tech floriculture industry is still in its infancy. The corporate sector started its entry into the floriculture sector in the early 1990s. Most of the floriculture projects have adopted technology from either the Netherlands or Israel. The average investment in each floriculture project ranges between Rs. 3-4 crores per hectare. Most units are around 3-4 hectares in size. One of the largest projects is CCL Flowers Ltd., Bengaluru, which has around 15 hectares of growing roses. The major producing states include West Bengal, Maharashtra, and Andhra Pradesh which contribute more than 50% of production in the country.

Check Your Progress Exercise 1

Note: a) Use the space given below for your answers.
b) Check your answers with those given at the end of the unit.

1) What is the produce/products included in the floriculture?

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2) Which factors led to commercial floriculture in India?

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3) Which are the major flowers producing states in India?

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13.5 EMERGING AVENUES FOR ENTREPRENEURSHIP

The emerging avenues for entrepreneurship in the floriculture sector are discussed as under:

13.5.1 Nursery Industry

1. **Production of quality planting material:** Satellite nurseries- it is an evolving concept in rural development which is based on the concept of developing small nurseries by individual families and networking them to a bigger nursery in the region. The development of satellite nurseries for the welfare of locals is a well-established fact in other States supported by the International Fund for Agricultural Development (IFAD). The scheme envisages the idea of mass multiplication of certain popular varieties of flower crops and channelizes them through a bigger local nursery.
2. **Pot Plant Production and Rentals:** Due to rapid urbanization and industrialization the land under agriculture and forestry is fast depleting. In a quest to bring nature to drawing rooms, the urban populace is more

inclined to purchase and grow plants in their houses, which has opened the avenue for the large-scale production of potted plants and their marketing. It has also opened a newer avenue of plant rentals for interior decoration in corporate houses.

3. **Plug plant Production:** Many bedding and annual flowers are produced in highly automated greenhouses in the West to produce billions of plants for corporate and public landscaping. Due to increasing fuel costs and labour costs in the West, there is little scope for further expansion of these hi-tech industries in the developed world. Due to the availability of congenial environments across our country, we have the unique advantage of diversifying into large-scale production of seedlings of annual flower crops as well as vegetable crops.
4. **Corporate Landscaping:** The avenues for corporate landscaping are fast expanding due to increasing industrialization and environment regulation and the quest to beautify the surroundings. Progress in corporate landscaping has synergized the growth of the conventional nursery industry, which now specializes in specific items like turf grass, succulents, cacti, aquatic plants, *etc.*
5. **Plant tissue culture:** Plant tissue culture activities in India are at present confined to the production of ornamental and flowering plants, which have a large global export market. Cheap labour and incentives provided by the Government are likely to give a further boost to setting up more units for commercial production. Demand for flowers is increasing globally. India is expected to emerge as a strong player in the consumer market of biotechnology products in the coming years. In India, many tissue culture units are producing mostly foliage and flowering potted plants. The Global biotechnology business is about 150 US \$ billion and about one-tenth of it is contributed by plant biotechnology alone.

The global demand for tissue culture products is constantly increasing at a rate of 10% per annum. The present installed production capacity is about 100 million plants per annum but only fifty percent of the capacity is being utilized. The R&D efforts in Indian organizations resulted in the development of reproducible, high-frequency regeneration protocols for most of the ornamental crops, which are tailor-made for Indian conditions and are available for implementation by the Indian centres.

6. **Seed Production:** Certain location-specific pockets have been developed for seed production of hybrids of annual flowers like petunia, pansy, and viola at high altitudes and plains. The state of Punjab leads in seed production of annuals followed by Karnataka. The Concept of Seed Villages needs to be encouraged to produce large quantities of seeds of Hybrid Flowers with technical input and incentives from the state government.

13.5.2 Essential Oil Extraction

You must have observed that anyone who comes across a flower tries to smell it before they admire its beauty. Flowers are synonymous with

fragrances. Therefore, another great opportunity exists for floral extracts, which have a high potential market in domestic and export trade. Floral extracts like essential oils, alkaloids, sapogenins, pigments, dyes, *etc.* have tremendous demand in both domestic and international markets. Damask rose is widely cultivated particularly for extraction of essential oil, rose water, attar and for preparation of Gulkand, *etc.* Jasmine and tuberose concrete find major use in the perfumery and cosmetic industry. The individuals can be trained in steam distillation techniques and can be encouraged to grow or collect the required raw material from the wild to evolve a low-cost extraction industry.

The major flower crops important for essential oil extraction include rose, jasmine, tuberose, vanilla, *etc.* The major producers of essential oils are Brazil, China, the USA, Egypt, India, Mexico, Guatemala, and Indonesia. All of them except the USA are developing countries with low-cost, peasant-type economies. The major consumers are the USA (40%), Western Europe (30%), and Japan (7%). The demand for essential oils progresses at a rate of 7-9% per annum and offers unique scope for large-scale cultivation of essential oil-bearing crops and their processing using both conventional and ultra-modern vacuum distillation/ solvent extraction/ liquid CO₂ methods.

13.5.3 Aromatherapy

Since the beginning of civilization, humankind has been aware of the effects of scent on the body, mind, and emotion. Flowers were used to attract love, food, and protection. Fragrant plants were worn to heal the body. Not only flowers are fun to grow, lovely to look at, and wonderful to smell, but their essential oils provide us with a variety of therapeutic benefits. Following are some of the most used essential oils from flowers, their uses, and their healing properties are summarized in Table 13.1.

Table 13.1: Important essential oils from flowers and their uses

{PRIVATE} Oil Name	Used Primarily for and Effects
Geranium	Skin disorders, menopause, depression, acne, PMS, calming, balancing, very uplifting
Jasmine	Cramps, back pain, joint and muscle pain, dermatitis, emotional suffering, fear, depression
Rose	Antiseptic, nervous heart, fever, migraine, disappointment, sadness encouragement, patience, and love

With the increasing emphasis on natural therapy for common ailments, the concept of aromatherapy is widely practised in the West. This increasing demand for natural fragrances from flowers offers a unique scope for India to produce these oils and export them. The concept of aromatherapy is also gaining importance in India as well and scope exists for diversifying into cultivation, and extraction of aromatic principles with known therapeutic values.

It can also soothe away moderate anxiety and depression, sleeping problems,

digestive disorders, headaches, and muscular aches and pains. Many essential oils are also superb skincare agents. They help to balance sebum (the skin's natural oil secretion) and to tone the complexion by supporting capillary function. Similarly, plant essences can be used in hair and scalp formulas to improve the circulation of the scalp, prevent dandruff and promote healthy hair growth. Applied without massage, essential oils can heal skin problems such as athlete's foot, cold sores, ringworm, and scabies. Used in steam inhalations, they can alleviate cold and flu symptoms. They are also efficacious for problems such as coughs, tonsillitis, sore throats, sinusitis, and acute bronchitis.

13.5.4 Dry Flowers

You will be surprised to note that nearly 70% of floriculture exports comprise dry flowers. Tuticorin in the south and Kolkata in the east are the major centres of production in the country. Dry flowers and plants are becoming more popular due to longer indoor life because of the non-perishability of the produce. Theoretically, any kind of plant and flowers can be dried and used in making bouquets, flower arrangements, greeting cards, pot-pourries, *etc.* This dry flower industry though operational on a small scale, contributes a major share to the floriculture exports from our country. The scientific survey of the flora and fauna in India can help in the identification of useful materials for making dry flowers. The rural population especially women folk can be trained in processing and making dry flowers. To begin with, the women and children can be encouraged to collect the plant parts and flowers from the wild and can be trained to process and preserve them. Alternatively, they can be encouraged to grow flower crops like dahlias, marigolds, jute flowers, wood roses, wild lilies, helichrysum, lotus pods, *etc.* which can be easily processed and preserved as dry flowers. They can also be trained to make value-added products utilizing such processed dried flowers to generate employment and evolve a cooperative cottage industry.

One can enjoy the freshness of a flower garden throughout the year by cutting and drying the favourite flowers. Sand-drying and air-drying are the two easiest and least expensive methods of drying a wide variety of flowers, such as roses, tulips, dahlias, marigolds, and snapdragons. Few flowers like daylilies last only one day and do not dry well. Some flowers such as asters, azaleas, chrysanthemums, geraniums, petunias, phlox, pinks, poppies, or violets should not be dried.

13.5.5 Waxing of Flowers

Just melt some paraffin wax and plunge each flower into the wax. Remove and shake the excess wax off each flower. Put it into the refrigerator to set and harden. Having dried, preserved flowers in your home year-round can brighten it up. You may want to give dried flower arrangements as Christmas gifts. It is a wonderful, satisfying hobby to preserve your flowers. You can also make lovely cards by pressing your flowers and covering them with clear mac-tac on a piece of construction paper.

Source: <https://pioneerthinking.com/how-you-can-dry-flowers-wax-fresh-flowers/>

13.5.6 Pot Pourri

Flowers, herbs, and spices have been used for thousands of years to add fragrance to our lives. From the earliest writings, we have found evidence of the importance various scents have played in our history. Potpourri is a mixture of dried, sweet-scented plant parts including flowers, leaves, seeds, stems, and roots. The basis of a potpourri is the aromatic oils found within the plant.

13.5.7 Nutraceutical and Pharmaceutical Pigments

The anthocyanins, flavonols, carotenoids, and Xanthophylls are common plant pigments that are responsible for a variety of hues we normally observe. At present, the technology for the isolation of xanthophyll pigments present in Marigold has been perfected and large-scale cultivation of Marigold is being attempted in parts of India in association with the extraction Industries. The marigold pigment is widely used in the poultry industry to enhance the colour of the meat as well as the yolk of the eggs besides its usage in the food and textile industry. Similarly, many native flowers possess valuable pigments, which can be isolated and used for varied applications including pharmaceuticals.

Lutein and zeaxanthin are xanthophylls, which belong to carotenoid pigments consisting of more than 600 members. Lutein is a yellowish pigment found in kale, spinach, broccoli, and marigold and gives yellow colours to corn and egg yolk, and various fruits, vegetables, and flowers. Zeaxanthin is chemically very close to lutein and occurs in most lutein preparations (extracts) as a minor constituent. Zeaxanthin shares health benefits with lutein and can be either taken from food or produced in our body from lutein by biochemical conversion. Lutein of commerce in dietary supplement products are isolated from marigold flower petals and include about 5% of zeaxanthin as a "contaminant", which, in this case, is a desirable one.

Dried marigold petals and concentrates are used as feed additives to improve the pigmentation of the poultry skin and the eggs of laying hens. The pigment prepared from dried and ground flower petals of *Tagetes* is mixed in the feed at levels of 0.125-0.250%. The pigment index of egg yolk is 14-16 when the feed is mixed with *Tagetes* additives as compared to 2 for a pigment-free diet. The use of *Tagetes* meal from dried, ground petals mixed with not more than 0.3% ethoxyquin is permitted in chicken feed under the United States Federal Food Drug and Cosmetic Act.

In addition to anti-oxidant actions, beta-carotene converts in our body to Vitamin A, which is essential for our body functions including vision. Like beta-carotene, lutein is a carotenoid found commonly in diets. Studies indicate lutein and zeaxanthin are essential nutrients for healthy eyes and vision.

Lutein found in flower petals is chemically bound to various types of fatty acids. In these cases, it is said that Lutein is esterified and is commonly known as lutein ester. Lutein can be obtained from extracts of marigold flowers (*Tagetes erecta*) that contain a high concentration of lutein ester.

Lutein ester extracted from marigold flowers is a rich, safe, and natural source of lutein. Naturally, zeaxanthin esters add to the carotenoid profile of natural lutein esters. Lutein diester provides a source of lutein and zeaxanthin preserved in the natural form of lutein ester and zeaxanthin ester from marigold flowers. Many carotenes and carotenoids such as lutein esters/lutein are effective in preventing/controlling the free radical generation, preventing free radical / oxidation damage associated with cancer, coronary heart disease, cataracts, and age-related macular degeneration.

Carotenoids as chain-breaking antioxidants protect cells and other body components from free radical attacks. Lutein Esters and zeaxanthin esters extracted from the marigold flower are rich, safe, and natural sources of lutein. Lutein and zeaxanthin esters are readily broken down (hydrolyzed) in the digestive tract so that lutein and zeaxanthin can be absorbed. A Hyderabad-based company Naturnutra utilizes a patent-pending extraction procedure in a fully computerized state-of-the-art Super Critical Fluid Extraction (SCFE) facility (without the use of harsh and harmful organic solvents) to produce Lutein esters along with zeaxanthin esters, as they exist in the marigold flower without any chemical structural change.

13.5.8 Natural Dyes and Pigments

The indigenous technical knowledge (ITK) possessed by the locals in extracting and isolating natural dyes from flowers can be encouraged to grow such crops to evolve ancillary cottage industries. Similarly, their knowledge of the medicinal value of the ornamental plants available in the wild can be used to encourage them to cultivate such plants for supplying the raw material to the traditional ayurvedic drug industry. Launching a cooperative movement among the locals would ensure organized cultivation and collection of plant products for the needy industry.

Check Your Progress Exercise 2

- Note:** a) Use the space given below for your answers.
 b) Check your answers with those given at the end of the unit.

1) What is Aromatherapy?

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2) Why dry flowers and plants are becoming more popular?

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13.6 MARKETING

Flori-business in National Capital: Delhi is Asia's largest flower market. There are three flower markets in Delhi

- i) Market near Hanuman Mandir, Connaught Place for the sale of cut flowers, cut foliage, and dried flowers
 - ii) Wholesale flower market at Mehrauli.
 - iii) Fatehpuri/ Chandani Chowk market for loose flowers trade
- i) **Market near Hanuman Mandir, Connaught Place:** Hanuman Mandir market is a temporary market that starts at 4 AM and disappears by 9 PM. Traders display their offerings during this time for retailers, decorators, and consumers. Mostly traded flowers in this market are Rose, Chrysanthemum, Gerbera, Lilium, Carnation, tuberose, Gladiolus, orchids, and some of the speciality cut flowers like Bird of Paradise, Anthuriums, Heliconia, *etc.* Cut foliage trade is worth Rs. 20 crores in the Delhi market and these cut greens come from various states of the country like Karnataka, Uttar Pradesh, Uttarakhand, Himachal Pradesh, *etc.* The most important cut foliage species are Thuja, Palms, Ferns, Cycads, Dracaena, Ficus, Asparagus, Gypsophila, Bottlebrush, Eucalyptus, *etc.* There is a significant amount of dried flower trade in the Delhi market and most of the dried flower products sold in this market come from West Bengal and about 20-25 % comes from South Indian states. Pot pourris also have a major contribution to the dried flower market. There are other ancillary industries business which include bamboo baskets, floral bricks, flower dyes, small instruments like scissors, secateurs, mesh wire, and other related items that are used for either making flower arrangements, bunches, bouquets or used during decorations with flowers.

In the Delhi market, Roses are available throughout the year. However, arrival is more during April and May from local sources. Marigold is received between October to December, Chrysanthemum from December- January. Motia is being received from May to June. Gladiolus is available in two seasons *i.e.*, December to March and July to August. Rajnigandha is received mainly from August to September. In addition to local produce in the Delhi market, produce comes from different parts of the country like Bengaluru, Pune, Kerala, Maharashtra, Uttarakhand, Himachal Pradesh, Sikkim, Haryana, Delhi NCR, Kolkata, *etc.* Marigold and chrysanthemum are received from Uttar Pradesh, Haryana, and Delhi NCR. Roses arrive from local sources as well as imported from Pune, Nasik, Ajmer, and Madhya Pradesh. Gladiolus is received from Himachal Pradesh, Sikkim, and Uttar Pradesh. Motia mainly comes from Haryana. Carnation and Lilium come from Himachal Pradesh and Uttarakhand. Gerbera comes from Himachal, Pune, Nasik, Uttaranchal, and Uttar Pradesh. Rajnigandha comes from Hapur, Khatauli, and Kolkatta. Orchids come from Sikkim and are also imported from Thailand and Singapore. Some speciality flowers like Anthuriums, Bird of Paradise, and Heliconia arrive in the market from Bengaluru and

Kerala. The flowers grown in neighbouring states are transported by roads. The railway is being used from places where it is well connected with fast trains. Flowers from Bengaluru, Kolkata, Kerala, and Sikkim are generally transported by air.

In Delhi, the common marketing Channel is Producer to Commission agent/Trader to Retailers and then finally to the Consumer. Usually, the products are brought to market for sale through commission agents. For Flowers from outstations, the traders get the supplies on receipt of the consignments to arrange for sale. In the Hanuman Mandir market, there are approximately 800 sellers out of which 500 are traders/commission agents. In this market method of sale is either negotiation or auction. The rate of commission varies from 7-10 per cent. It is collected from the seller and there are no other charges.

The flowers that are required for bouquets and arrangements like carnations, Liliun, and gerberas are wrapped in cellophane bags. Flowers like roses are packed in corrugated paper/ cardboard. The produce that is brought from nearby areas like tuberose and gladiolus are packed in Hessian clothes, gunny bags, *etc.* The flowers are wrapped in newspaper, packed in Hessian cloth and placed in cardboard cartons.

- ii) **Flower market at Mehrauli:** The flower market is located on the main road of Mehrauli near Qutub Minar; the flower market is 20 years old and remains open throughout the day. This market is famous for its collection of exotic flowers. Here a large variety of roses, marigolds, chrysanthemums, sunflowers, carnations, Rajnigandha, gladiolus, gerbera, orchids, tulips, and daisies are available. Here one can get a range of dry flowers, bamboo sticks, and Ashok tree leaves that are generally used with marigold flowers for decoration.
- iii) **Fathehpuri flower market:** The flower market at Fatehpuri Masjid, Chandani Chowk is open until 9 AM, after which it is replaced by the spice market. This market is famous for marigolds in bulk as it sells only marigold flowers in loose form.

13.7 EXPORT POTENTIAL OF FLORICULTURAL PRODUCTS

India is endowed with proximity to markets in Japan, Russia, South-East Asia, and Middle-East countries. The Government allows subsidies on air freight for the export of cut flowers and tissue-cultured plants. Freight rates are subsidized for export to Europe and West Asia, South East Asia. Import duties have been reduced on cut flowers, flower seeds, and tissue-cultured plants. Floricultural exports from India comprise fresh cut flowers (to Europe, Japan, Australia, Middle East, and USA), loose flowers (for expatriate Indians in the Gulf), cut foliage (to Europe), dry flowers (to USA, Europe, Japan, Australia, far East, and Russia) and potted plants (limited to very few countries). The dry flowers contribute a major share to the total export. The country made significant strides in the production of cut flowers which were either exported or consumed in the domestic markets. The

floricultural exports registered phenomenal growth during the last two decades.

India's total export of floriculture was Rs. 575.98 Crores/77.84 USD Million in 2020-21. The major importing countries were the USA, Netherlands, United Arab Emirates (UAE), the United Kingdom (UK), and Germany. There are more than 300 export-oriented units in India. More than 50% of the floriculture units are based in Karnataka, Andhra Pradesh, and Tamil Nadu. With the technical collaborations from foreign companies, the Indian floriculture industry is poised to increase its share in world trade.

(http://apeda.gov.in/apedawebsite/six_head_product/floriculture.htm)

Table 13.2: India's Export Statement on Floriculture

Country	2018-19			2020-21			% age share in 2020-21
	Qty in MT	Rs. Lacs	US\$ Mill	Qty in MT	Rs. Lacs	US\$ Mill	
USA	4,038.07	14,692.43	21.09	3,139.19	15,895.51	21.51	27.6
Netherland	1,518.92	7,789.14	11.23	1,603.87	10,930.30	14.74	18.98
UAE	1,871.24	3,434.08	4.89	1,659.88	3,443.22	4.67	5.98
UK	1,530.01	4,470.63	6.36	860.91	3,312.10	4.51	5.75
Germany	1,251.71	3,938.55	5.69	1,054.69	3,213.11	4.32	5.58
Japan	310.37	1,574.58	2.26	114.16	2,614.74	3.48	4.54
Canada	878.99	2,341.81	3.37	485.65	2,301.48	3.1	4
Italy	403.24	1,578.90	2.25	235.31	1,767.47	2.4	3.07
Other countries	7,924.02	17,321.16	24.80	6,541.66	14,120.52	19.13	24.52
Total	19,726.57	57,141.28	81.94	15,695.32	57,598.45	77.86	100

Source: http://agriexchange.apeda.gov.in/indexp/Product_description_32headChart.aspx?gcode=0101

Indian exports mostly target major floricultural dominant events like Christmas Day (December) New Year's Eve, Valentine's Day, and Mother's Day (May). The major factors are the unfavourable weather conditions during winter in major production centres in the Northern Hemisphere that limit production. Therefore, markets are open to producing that comes from more favourable climates in the Southern Hemisphere. India, therefore, finds itself competing with other equally favourable countries like Kenya, Ecuador, Morocco, *etc.* during such events.

Major Export Destinations included the United States, Germany, Netherlands, United Kingdom, and Japan. The major produce that is exported is summarized in Table 13.3.

Table 13.3: Floriculture produce exported from India

Bulbs, Tubers, Tuberous Roots	Plants For Tissue Culture
Bulbs Horticultural	Flowering Plants
Other Live Plants	Cut Flowers for Bouquet / Fresh
Unrooted Cuttings	Moosses & Lichens for Bouquet Fresh
Cactus	Rhododendrons (Grafted or Not)

Other Foliages / Buds for Bouquet Fresh	Roses Grafted or Not
Foliages/ Branch / Buds Not Fresh	Dry flowers

• **Initiatives to promote exports**

Six Agri Export Zones on floriculture have been set up in Sikkim, Tamil Nadu, Uttarakhand, Karnataka, and Maharashtra. The APEDA has also taken several measures to facilitate floriculture exports. Some key Indian airports like New Delhi, Mumbai, Hyderabad, Bengaluru, Chennai, Thiruvananthapuram, and Cochin now have cold storage and cargo handling facilities. More airports will have these facilities in the future. Among other things, flower auction centres have come up in Bengaluru, Mumbai, Noida (near Delhi), and Kolkata. These are readymade market facilities for trading and price discovery for a variety of flowers, both for export and domestic markets. India must achieve the ambitious export target of Rs.1000 crore per annum over the next 5 years, a paradigm shift is required. The key issues that need to be addressed in the Indian context are; economics of scale, product range/latest varieties, year-round exports, quality control and certification, and cold chain management. The APEDA has been addressing these issues through various forums on a concerted basis given its mandate to promote floricultural exports from India.

Check Your Progress Exercise 3

Note: a) Use the space given below for your answers.

b) Check your answers with those given at the end of the unit.

1) Name the major flower market in Delhi.

.....

2) Name the major importing countries of floriculture produce.

.....

13.8 LET US SUM UP

The demand for floricultural produce is expected to increase continuously. Due to stringent environmental regulations, increased energy costs, ever-increasing wages, shrinking agricultural lands, and worsening climates during winter, the floricultural developed nations would not be able to expand their

production and hence the demand must be met from the developing nations. India holds a fair chance in such a scenario. Due to rich diversity in agro-climatic conditions, we have the distinction of producing a cacophony of floricultural crops both tropical and temperate. Besides the export growth, the domestic demand for cut flowers is expanding at an impressive rate of 7-8% which opens new avenues for greater investment in this sector. Hitherto the floriculture industry in India is over-dependent on the cultivation of roses and it's time for us to diversify into other crops like orchids, anthuriums (for far-off markets), gladiolus, and tuberose for destinations in proximity.

13.9 KEYWORDS

Aromatherapy: Aromatherapy is a form of alternative medicine that uses volatile plant materials, known as essential oils, and other aromatic compounds to alter a person's mind, mood, cognitive functions, or health.

Entrepreneurship: Entrepreneurship is the act of being an entrepreneur, which can be defined as "one who undertakes innovations, finance, and business acumen to transform innovations into economic goods".

Essential oils: An essential oil is a concentrated hydrophobic liquid containing volatile aromatic compounds from plants.

Floribusiness: The business is associated with floricultural produce.

Floriculture: The study of flowers encompasses cut flowers, loose flowers, cut foliage, potted plants, plug plants, dry flowers, pot pourries, essential oils, pigments, and natural dyes.

Nursery: A nursery is a place where plants are propagated and grown to usable size.

Nutraceuticals: Nutraceutical is a combination of two words nutrition and pharmaceutical, and is a food or food product that reportedly provides health and medical benefits, including the prevention and treatment of disease.

Pharmaceutical: A pharmaceutical compound is any product that reportedly provides health and medical benefits, including the prevention and treatment of disease.

Plug plants: A plug plant is any developing plant whose growth cycle is initiated well in advance of its actual planting in a plug tray. Plug plants are designed to be introduced to your garden or landscape with substantial growth already established. Once assimilated, the plant can begin to produce flowers, fruit, or vegetables much sooner than traditional seed planting.

Pot plants: A potted plant is a plant that is grown in pots mostly indoors in places such as residences and offices. Houseplants are commonly grown for decorative purposes, positive psychological effects, or health reasons such as indoor air purification.

13.10 SUGGESTED READINGS/ REFERENCES

- Randhawa G. S., A. N. Mukhopadhyay, and A. Mukhopadhyay, 1998.

- Desh Raj. 2017. Floriculture at a Glance, Kalyani Publishers.

You may refer to the following databases for updated information on trade and exports.

- a. Indian Horticulture Database
- b. DGCIS Export Annual
- c. APEDA database
- d. UNCTAD database

13.11 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

- 1) Cut flowers, loose flowers, cut foliage, potted plants, plug plants, dry flowers, pot pourries, essential oils, pigments, and natural dyes.
- 2) Growing demand for flowers for various purposes, development of greenhouse technology, export avenues, *etc.*
- 3) Tamil Nadu, Andhra Pradesh, Karnataka, Madhya Pradesh, and West Bengal are the major flowers producing states in India.

Check Your Progress Exercise 2

- 1) Not only flowers are fun to grow, lovely to look at, and wonderful to smell, but their essential oils provide us with a variety of therapeutic benefits.
- 2) Dry flowers and plants are becoming more popular due to longer indoor life because of the non-perishability of the produce.

Check Your Progress Exercise 3

- 1) There are three major markets in Delhi:
 - i) Market near Hanuman Mandir, Connaught Place for the sale of cut flowers, cut foliage, and dried flowers
 - ii) Wholesale flower market at Mehrauli.
 - iii) Fatehpuri/ Chandani Chowk market for loose flowers trade
- 2) The USA, Netherland, the United Arab Emirates (UAE), the United Kingdom (UK), and Germany are major importing countries.



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