CHAPTER I

Introduction
INTRODUCTION

"Everybody needs beauty as well as bread.
Places to play in and pray in.
Where nature may heal
And give strength to body and soul"

JOHN MUIR

Since time immemorial man has been expressing his interest on flowers and plants for various reasons. From old literature, curvatures, and sculptures, it is obvious that man has used plants and their flowers in multifarious ways such as decorations (hair, body, interior of houses, courts, stages etc.) worshiping god, expressing love and affection and as messages of peace and friendship; in various ceremonial occasions like births, marriages and other ceremonies, in addition to this commercial uses such as making food, scents and perfumes; drugs as well as other medicinal preparations. (Nimret Hunda)

Wild flowers are to be found in all kinds of unexplored places if you know how to look for them. While walking along the countryside or climbing hill you may come across some wild flowers which will make the outdoor experience especially rich. Even crowded cities have wild flowers growing in neglected corners of parks, ditches, verges of roads, cracks in pathways and in the corners of young garden. We tend to think of them as weeds if they come up unexpectedly in gardens and fields. Stop and look at the wild flowers carefully and you will discover that they have a disarming beauty of their own. Many of them are also ancestors of the familiar garden flowers.

One of the most interesting and pleasing facets of modern times is the increasing concern for ecotourism to see and engulf the original aesthetic beauty of flora and fauna of particular area especially undisturbed or little disturbed natural vegetations due to spreading of concrete jungle (urbanization and industrialization). These stimulations were due to television programmes especially National Geography, Animal planet and Discovery channels as well as articles in newspapers and magazines. Further, there is a growing awareness about extinction of wild and
threatened plants and animal species due to various environmental changes and other reasons. Now-a-days, people have realized that it is better to see and enjoy the beauty of flowers rather than to collect and preserve those rare plants and to put them under threatened or endangered conditions.

History of gardening – Importance of wild species as ornamental.

The history of gardening in India is as old as its civilization. The first recorded history of civilization in India dates back to 2500 B.C. before the Aryans. The civilization prospered in Punjab, Sind, Rajasthan, and Gujarat. They used to cultivate food crops such as wheat and barley, and fruits such as dates. The first evidence of an ornamental plant, the Pipal (Ficus religiosa), comes in the form of a seal from Mohen-jo-daro. Another seal from Harappa of the same period depicts a tree similar to that of a weeping willow (Salix babylonica).

The Aryan civilization dates back about 1600 B.C. The Aryans of the Vedic period were great lovers of trees and flowers. The lotus has been mentioned frequently in the Vedic times. In Atharvana Veda the Ashvatha (Pipal) Ficus religiosa. The epics of the Aryans, the Ramayana and the Mahabharata, mention about gardens, trees, and flowers. In the Ramayana it has been narrated that lakes were full of lotuses. Every Indian must know about the Ashokavana where Sita was held in captivity by Ravana, this grove was composed mostly of Asoka (Saraca indica) trees. In the Mahabharata the Sabha-pravara detailed descriptions has been given the pleasure gardens, parks, and lakes around the palaces in Indraprastha. Both the epics mention about the following trees and creepers, Ficus benghalensis, F. religiosa, Saraca indica, (Asoka) Michelia champaca, Terminalia arjuna (Arjuna) Butea monosperma, (Palaksha) Mesua ferrea, (Nagkcsara), Cassia fistula, Shorea robusta (Sal), Palmyra palm (Borassus flabellifer), Screwpine (Pandanus), Bignonia, and Oleander. Special mention can be made about the tree Kadamba (Anthocephalus cadamba; Syn. A. indicus) where it was closely associated with the life of Lord Krishna. The lotus was a popular flower and was regarded by both the Hindus and the Buddhists as a symbol of purity.

The association of different trees with the life of Lord-Buddha is well known as his birth took place under the Asoka (Saraca indica) tree, Sal (Shorea robusta) and
Palaksha (*Butea monosperma*). The Buddha attained his enlightenment, under a Pipal tree, spread his new preachings under shady banyan and mango trees, and breathed his last in a Sal grove.

The great Emperor Asoka (264-227 B.C.) adopted arboriculture as one of his state policies. He encouraged the planting of avenue trees. His son Prince Mahendra took a sapling of the great Bodhi tree (*Ficus religiosa*) and planted it at Anuradhapur in Sri Lanka (250 B.C.). Some other trees are identified as *Ficus religiosa*, *Ficus benghalensis*, *Ficus glomerata*, *Albizia lebbeck* (*Sirisa*), *Shorea robusta*, and *Saraca mica*. The pipal was regarded as a sacred tree even before the birth of the Buddha. The *Atharva Veda* says that the Gods of the Third Heaven used to sit under the Ashvatha tree. The sculptures of the Kushan period (78-200 A.D.) found at Mathura had many trees inscribed on them as *Saraca indica*, *Kadamhn*, and *Ixora parvisflora*, *Michelia champaca* and *Mesua ferrea*.

In the works of Kalidasa several flowering trees were mentioned in most of his plays. The important tree is Ashoka and other trees are *Kadambo*, *Arjuna* (*Terminalia arjuna*), *Buta mono-sperma*, *Parijata* (*Nymphaea arbor-tristis*), *Bauhinia variegata*, *Mimosops elengi*, *Albizia Jebbek*, and screwpine. The creeper *Madhavi* (*Hiptage madublora*) occupied a prominent place in his play *Sakuntala*. He also mentions about women of Alakapuri he writes in *Meghduta*, “In the monsoon Kadambo flowers decorated the hairs of these charming women and they carried pink lotuses in their arms.”

During the Gupta era Vatsayana (about 300-400 A.D.) in *Kamasutra* narrates four kinds of gardens: *Pramododyan* meant for the enjoyment of the royal couples; *Udyan* where the kings played chess, enjoyed the dances of the maids and jokes of the court jesters; *Brikshavatika*, the garden where high-placed persons in the king's court enjoyed life with courtesans; and *Nandanavana* which was dedicated to Lord Krishna. Vatsayana also described the duties of a virtuous wife. It is said that a loyal and affectionate wife should lay out a garden around the house. Besides other plants the garden should be planted with jasmine, *Tabernaemontana coronaria*, China rose, etc. It was also advised that a good housewife should construct arbors and seats in the gardens.
Before the Mughals came to India there was a long blank in the gardening history of India, Firoz Tughlaq (1351-1388 A.D.) who developed about twelve hundred gardens around Delhi and more elsewhere. Babur laid the foundation of the Mughal Empire in India in the year 1526 A.D. He was a great lover of flowers and gardens. Immediately after his victory over Ibrahim Lodi at Panipat (1526 A.D.) he laid out a garden there. Thereafter he laid a garden at Agra, now known as Rambagh. Sher Shah Suri (1540-1544 A.D.), who ruled for a short period after defeating Babur, constructed the famous Grand Trunk Road and planted avenue trees on both sides.

Akbar (1556-1605 A.D.) built a new capital at Fatehpur Sikri, with full of gardens, trees, and flowers. He was the first Moghal to enter Kashmir and establish a garden, Nasim Bagh, close to the Dal Lake. The tomb garden of Akbar at Sikandra is an example of the gardening art during that period. Jehangir (1605-1627 A.D.) was also a great admirer of gardens and flowers, and so was his famous wife Nur-Jahan. The gardens at Shalimar, Achhabal, and Verinag in Kashmir were created by him. The tomb garden at Itimad-ud-Daulah in Agra, in memory of his father-in-law. Shah Jahan (1627-1658 A.D.) also established several beautiful gardens. He built the Red Fort in Delhi which had a beautiful garden. The gardens around Taj Mahal in Agra, in memory of his beloved queen Muntaz Mahal. The small but pretty garden at Chashma Shahi in Kashmir was laid by one of his governors. The best garden created by Shah Jahan was the Shalimar garden in Lahore (Pakistan).

The Rajput Rajas in India also established several gardens. The garden at Amber Fort near Jaipur was started by Man Singh (1590-1615 A.D.) and completed by Jai Singh II (1699-1743 A.D.). This beautiful garden is laid in three terraces, and has a lake. The Mandor garden near Jodhpur is a really beautiful garden still today, and was built by Raja Abhai Singh (1724-1749 A.D.). The city of Jaipur was founded by Jai Singh II (1727 A.D.) who built a palace in the heart of the city with beautiful gardens. The garden palace at Deeg in the erstwhile Bharatpur State was founded by Suraj Mal, with fountains, water courses, and other features, it is one of the most beautiful gardens ever created by any Rajput king. The gardens and the palaces in Chittor, the capital of Mewar rulers, were also famous. The Nawabs of Oudh also established a number of gardens in their empire, especially in Lucknow. One of these
was Sikandar Bagh which was established by the last Nawab Wajid Ali Shah (1847-1856 A.D.), which is now the National Botanical Research Institute.

The arrival of the Britishers in India changed the whole pattern of gardening. The Moghal gardens in India were laid out in symmetrical patterns, but the English changed the style into informal patterns by laying out parks and gardens. Until then Indian gardens had only scented trees, shrubs, climbers and bulbs, but had no flowering annuals. The English brought with them beautiful annuals and biennials such as Phlox, Carnation, Verbena, Dahlia, Larkspur, etc. Before the arrival of the English the Indians knew how to make garlands and Guldasta (bouquets), but had no idea of flower arrangements for interior decoration, which was taught by the British. But the greatest contribution by the British was the establishment of botanical gardens starting from the one established near Kolkatta.

Importance and Scope of Floriculture and Landscape Gardening

Floriculture

It is not possible to define 'Floriculture' in the sense as one can define a triangle in the language of geometry. But possibly the closest definition is, "Floriculture is the art and knowledge of growing flowers to perfection." But this definition is also not complete as floriculture includes not only flowers but also many ornamental foliage plants, trees, shrubs, palms, ferns, bamboo, cacti and other succulents, landscape gardening and so on. The art of growing bonsai, the dwarfing of plants, also come under floriculture.

Significance and Importance

A devoted Hindu needs flowers every morning for religious offering to the family deity. It is estimated that about 30 per cent of the total cut flowers consumed in the city of Calcutta are used for worship (Anonymous, 1976). The aesthetic value of flowers in our daily life cannot be over-emphasized. In our society no social function is complete without the use of flowers. Floral garlands, gajras and venis, are needed for marriage ceremonies. These are also used as adornment for hair by our women of all ages, especially in the South, every morning, evening, or even all through the day. Floral ornaments, bouquets, or flower arrangements also find a pride of place in social gatherings, birthday parties, welcoming a home-coming friend or relative and
honoring dignitaries. The arrival of new-borns is rejoiced with flowers, the sick are wished speedy recovery by offering flowers along with tears of sorrow. Even those who dismiss floriculture as a luxury cannot afford to do without flowers when the occasion comes.

The potential of floriculture as an industry has not been exploited properly. Floriculture is an intensive type of agriculture and the income per unit area is much higher than any other branch of agriculture. In markets such as Delhi and Bombay a single spike of gladiolus may sell up to three rupees. Similarly, cut blooms of roses, jasmines, tubers, marigolds, some other flowering annuals and *Michelia champaca* have a very good market in the metropolitan cities of India. It is estimated (Anonymous, 1976) that 50 per cent of the flowers sold in the cities of Madras, Bangalore, and Bombay are utilized for making *gajra* and *veni* and up to 70 per cent of the flowers sold in Calcutta are for decoration purposes. Tuberose cut stems are sold in large numbers in the Calcutta market for decoration purposes and this flower is grown commercially in the neighboring district of Midnapur. The business is said to be quite profitable and the nationalized banks are giving advance loans to the cultivators to promote this cut flower industry. Rose is another important commercial flower the cut blooms of which are highly prized in the large cities.

**Role of Floriculture in a Developing Country**

Flowers also bring happiness to life and boost the sagging spirits. Our old cities and towns are shabby-looking. If the citizens and the municipalities encourage the growing of flowers, at least partly, the cities will look much more gay. This is more true for the new industrial townships that are coming up so frequently and which offer a much greater opportunity for growing flowers for beautification and usage.

Commercially, floriculture can open up great opportunities to our poor farmers. Our Country has diverse climatic conditions which offer the scope for growing several kinds of commercial flowers. The cultivators can deploy a part of their land for growing commercial and common flowers such as marigold, China aster, etc., which do not require much care and generally earn more profit than many other crops. Recently, quite a good number of plants are being exported to countries in the Middle East. One vital step in this direction will be to set up an organization for
certifying the seeds and standardizing the nursery stocks. At present there is no such organization and the customers are cheated with sub-standard products. Moreover, our growers lack the scientific knowledge about growing flowers. The consequence of this is that our yields are much lower compared to other countries.

Scope for Floriculture

In India, floriculture is only a developing subject and as such offers much scope for improvement. This problem can be tackled from several angles.

Conservation, Domestication and Introduction:

India is rich in its plant resources, many of which are of ornamental value and some are potentially ornamental. Much of this wealth is wasted as a result of rapid urbanization, industrialization, and unscrupulous collection. For example, some unscrupulous nurserymen are selling one beautiful *Paphiopedilum insigne* orchid plant for the price of a single flower of this species in foreign markets. As a result of such wanton collection many species of orchids are threatened with extinction. To conserve such rare orchids, the ICAR has now started some orchid sanctuaries, which is a correct step in this direction.

Domestication of wild plants with potential ornamental value is another way of improving garden wealth. In the process of domestication, possibly in an altogether different climate, the wild plants generally pass through many changes, which itself may cause some change in improvement. We have some very good plants in the wild with potential ornamental value, especially ferns, which can be acclimatized and domesticated under quite different climates. In this regard, the National Botanical Research Institute (formerly the National Botanic Gardens), Lucknow, has done some good work in acclimatizing the Himalayan ferns in the sub-tropical climate of Lucknow.

Introduction of plants either from the wild with potential ornamental value or from abroad offers a good scope for enriching ornamental plants. Initially we should introduce the wild plants with potential ornamental value, which can be improved upon by systematic breeding. Simultaneously, plants of proven quality can be introduced from abroad and acclimatized in our country. The process of introduction has improved our ornamental horticulture to a great extent. To cite a few examples,
we may quote the instance of the introduction of *Mussaenda philippica*, the double-bracted *mussaenda* with white, pink, and red colours, from Thailand, which have acclimatized very well in the humid and mild climates of Calcutta, Bangalore, and Kerala.

**Prospects for Improvement**

(a) **Hybridization:** One of the best ways to improve through hybridization between varieties of species, or interspecific hybridization within a genus or even intergeneric hybridization. The hybridization work in India, especially on orchids and roses, has enriched our floriculture to a greater extent. Similarly, new hibiscus cultivars released by the Indian Institute of Horticultural Research, Bangalore, and others also enriched our collection of ornamental plants. Our efforts in this regard should be directed towards developing new hybrids suiting the different agro-climatic conditions prevailing in the country.

(b) **Mutation:** Another important way of developing ornamental wealth is by mutation breeding. The natural mutant bougainvillea 'Mary Palmer' evolved spontaneously in a Calcutta garden has been acclaimed all over the world. But since natural mutants develop only by chance, other physical and chemical mutagens could also be employed to get new attractive mutants. Again, mutation can also be combined with hybridization to further enrich the floricultural wealth.

(c) **Polyploidy:** Polyploidy is another method of plant improvement. Polyploidy can be induced by colchicine and other chemicals. Polyploids generally have larger flowers and intense-coloured petals sometimes with ruffling at the edges. Polyploidy combined with hybridization may result in remarkable improvement.

(d) **Propagation:** Easy and rapid propagation of ornamentals will go a long way in spreading the cult of floriculture in India. The use of mist propagation units along with the application of root-promoting hormones has enabled many hitherto difficult-to-root trees and shrubs to root from cuttings. This method has improved the scope of supplying rare plants to garden lovers at comparatively cheaper rates. Another field where not much work has been done is the production of disease-free plants. The tissue culture method offers the production of virus-free plant material. This method should be employed increasingly in ornamental plants not only for getting disease-
free stocks but also to have rapid multiplication. For example, the process of multiplying orchids and Anthuriums through vegetative methods is very slow and once a mother plant is divided for propagation it takes some time to flower again. Moreover, only a limited number of plants can be raised by this method. If the technique of tissue culture is employed, rapid multiplication is possible.

Scope and Prospect for Domestic and Export Market

Some of the horticultural by-products are of immense commercial value. The essential oils from jasmine, rose, and tuberose sell at prohibitive prices. At present, most of our essential oil requirements for the perfume and soap industry are being met by import. With a little help this industry can develop not only to meet the internal demand but also to feed the export market. It will also bring substantial income to the farmers.

(a) Domestic market: The dried fruit of Vanilla planifolia (Syn. V. fragrans) yields the vanilla of commerce which is now produced synthetically. In Kenya, this orchid is grown commercially for the extraction of this commercial product which is used to flavour desserts and other products. With our favourable climatic conditions it is possible to grow this orchid commercially in some regions of the country.

Some of the ornamental plant parts which are eaten as vegetable or otherwise. There is ample scope to popularize these products and consequently increase their cultivation. For example, the underground stem of Nelumbium (lotus), commonly called bha-sinda, is a popular vegetable in North India. The same product is also used to make pickles. The stems of water lilies are also eaten as vegetable by many Bengalees, especially those from Bangladesh. The prickly aquatic plant resembling lotus, Euryale ferox, and commonly found to grow in the tanks of Bangladesh and parts of India, yields seed the size of a pea which when parched or roasted over hot sand gives a puffed-up product, commonly called makhana, and is a delicacy for the table. The fresh seed of lotus fruit is popularly eaten in Bengal after removing the green plantlet from inside which is bitter, but the seed itself is tasty. With so many water tanks in the Eastern part of the country and elsewhere it is possible to extend the cultivation of these products commercially.
(b) Export market: The possibility of exporting cut flowers, plants, bulbs, etc., has not been explored properly though there is a very good potential. Unfortunately, among the exporting countries the name of India was absent, although we have got favourable and diverse climatic conditions ideal for growing varied types of flowers required by the westerners. In 1972, India exported about 15,000 rose blooms to Europe and the quality of our flowers was much appreciated. But, at present, export of flowers is negligible. The European countries need cut blooms mostly during November to March when these countries remain largely under snow and hence field production of flowers is not possible. In fact, during the winter, flowers are produced under glass which increases the total production cost, adding to the already high cost of labour there. In most parts of India the winter is the best period for producing most of the commercial flowers. Therefore, with our abundance of cheap labour we are in an available position to build our cut flower trade with these countries. (Anonymous, 1969)

The sale of cut blooms of orchids is a multimillion dollar business in the U.S.A. alone. India being so rich in its natural orchid resources and with its favourable climatic conditions should be able to capture a portion of this market. At present though small countries, such as Thailand and Singapore are doing good business in this line, unfortunately India is not exporting cut blooms of orchids. Our export effort should be concentrated on sub-tropical and tropical bulbous plants such as Amaryllis, Eudxris, tuberose, gerbera, Crinum, lilies, canna, football lily, etc.

Landscape Gardening

The importance of gardening is also not understood, in India. The people should be educated to realize the importance of gardening, by providing good parks and gardens in cities for a large population to relax and enjoy the beauty of nature. Bio-aesthetic planning means the proper utilization of the available flora and fauna in the beautification of the surroundings. In India, the theme of bio-aesthetic planning was propagated by Rundhewri who gave a practical shape to it in planning Chandigarh along with the famous architects Le Corbusier and Pierre Jeanneret. The aim behind this concept is to plant ornamental flowering trees along roads, in parks, house compounds, public places, and also to develop national parks where non-carnivorous animals and beautiful birds will find along with beautiful flora. This term
also includes landscape gardening though in a wider sense. Bio-aesthetic planning can be extended to the entire country. The bio-aesthetic planner can be described as a master artist who uses the whole country as his canvas and his paints are the rich colours of red, blue, orange, and white of the different flowers. It is said that the untouched nature is quite monotonous. It is only with a touch of bio-aesthetic planning that the countryside and other places will look not only natural but pleasing too to the eye.

Bio-aesthetic planning should run hand-in-hand with town planning. Our new townships should not be allowed to grow as mushrooms in dung-heaps as our older towns are. The roads in towns and cities should be broad, planted with flowering and shade trees, and there should be spacious parks along with conservatories for harmless animals and birds. The older congested cities and towns also should be retrieved from their present state by bio-aesthetic planning. One way of doing this is to acquire by compulsion the ugly areas of the towns in some centrally located pockets and to convert them into parks. The displaced persons may be accommodated in multi-storied buildings which occupy less land. But many planners are against vertical growth in our towns; a compromise must be found somewhere. In some of the most congested cities such as Calcutta, Kanpur, Bombay, etc., it may be really impossible to get land in the city proper for bio-aesthetic planning. In such cases 'garden suburbs' should be developed on the outskirts of the city easily approachable by vehicles or even bicycles.

**Human Welfare**

The role of landscape gardening in human welfare cannot be overlooked. Even in an underdeveloped country as India, people do not live by bread alone. They also need some finer things of life it is a great tragedy that most of our children in big cities do not have any open space to play and to see colourful flowers, birds, and butterflies. It is the moral duty of our government, through the municipalities, corporations, and such other bodies, to provide the citizens with spacious parks having beautiful trees and flowers where they can relax, find peace of mind, and breathe fresh air after a day's hard work.
Indoor Gardening:

Man has made himself different from all other living things on this earth. Life does not mean only a cyclic process of some organic activities. Human are the worshipers of Beauty. And they have taken it to the highest possible range, in every aspect of life. We spend the major part of our life in our home hence to make our homes as our dreams to make it as beautiful as possible. There comes Indoor gardening. In the cities where space is concerned house plants can transform a stale room into a vibrant. It is not only does it clean and clear the atmosphere but also freshen it up by generating Oxygen from Carbon dioxide.

Indoor gardening is a good alternative for outdoor gardening. Houseplants also increase the beauty of a room thousand fold by inserting greenery and colour. Many of them require no attention at all. The advanced hybrid species of present day’s do not need much watering. Some of them are Scindapsus aureus (Money plant) Dypsis lutescens (Areca palm) Araucaria cookii (Christmas tree) Livistoma chinensis (Chinese Fan palm) Dieffenbachia amoena (Tropic show) Anthurium, Dracaena, Alocasia scanderana etc. (Randhwa and Mukhopadhyay, 1996)

Shrub is a low woody or semi woody perennial plant which occupies a very limited space with a wide choice of colours, shapes, and sizes of flowers and leaves and fragrance too. They are in bloom all through the year. Some of the shrubs start flowering within a year and they can fill up a garden fast, with much less labour, they can also be easily transferred from one location to another for remodeling the garden or even shift to another place. They can be brought inside the house by growing them in the pots and it can be bring the garden in to the home. They also require less maintenance labour than the annuals or the climbers. (Trivedi, 1990)

Gilman (1997) given a detail account on “Plant the tree in the right place” on evaluating the crucial size, site modifications, maintenance, and special planting situations etc for many of the trees and classified them based on their ornamental significance with their specific adaptable conditions.

Yunnan province with some rare and endangered species among 354 state protected plant species listed in Red Data book of plants in China 154 are from Yunnan and majority of them are trees and of this region with much plant biological
diversity of the world. The reason for the diversity of Yunnan presents a very unique vertical climate phenomenon as the local people say that the existence of the four seasons at one time on the mountain and different weather is found within five kilometers. The glacier impact on the region was minimum and thus a "biological refuge" took place which has preserved many ancient plants from various geological periods. These relic plants are living fossils. (Feng zhi zhou yung shao zhang Wang Daming 1998)

China’s Mountains are the home for alpine forests with a wide range of grasses and various plants. The alpine flowering plants dominating the vast canvas of natures aesthetic montage, whenever the seasons arrive an infinite array of alpine flowers bursts in to bloom, transforming the plateau in to a ravishing floral universe. Thus there are those who say: "the variety of flowers you see on the plateau in a day outstrips what you see in city parks in a life time”

Among many alpine flowering plants the most famous are Rhododendron, Primula and Gentiana. There are over 900 different kinds of Rhododendron on the globe, more than 650 kinds of which grow in China when they came in to bloom; the mountains became a riot of colour, a vast sea of flowers stretching several dozen, square kilometers. The Yunnan province draws countries tourists to enjoy the sea of flowers. Facing the azaleas on the mountains they exclaim “Ah so this is paradise”. Primula is a perennial herb about 1500 different kinds have been identified with 300 species of them growing in China, Primula has aroused great interest in botanists and horticulturists with its brilliant colourful inflorescence who has introduced some species from the high mountains in to gardens. Some species have been planted in pots and entered people’s homes. Gentian is an annual or perennial herb about 500 species are found in the world, more than 230 of which grow in China are very beautiful with bell-shaped blue flowers of ornamental interest. All alpine plants are small nearly stem less or thick stems, its flower cluster together with well developed root systems and have exceptionally colourfull flowers. These plants also grow on the plateaus. These wild mountain flowers are more colourful than cultivated flowers in city gardens.
Among the 204 endemic spermatophytes genera Yunnan has 108, with more than 1000 endemic species such as Ginkgoaceae members and some trees of Dipterocarpaceae, Annonaceae. Many wild plants and their coenospecies in Yunnan are of great importance for the study on the origin of plant cultivation and the improvement of strains as wild tea, mango and also the germplasm source. Yunnan provincial government protect every old tree for creating good conditions for human kind to tap biological and germplasm resources in the best way and provide good natural environment for animals and plants to flourish. (Lang Kuiyong et al, 1997)

Seed bank of wild plants germplasm resources effectively conserved full range of variation, including their ecotypes and phenological geographical variants. Experts suggested that the number of individuals required for the adequate conservation of a representative sample of a species is 10 - 20 for trees, 40 - 50 for shrubs and 100 - 200 for herbs.

According to the gardens policy for ex-situ conservation is as

1) Collection and conservation of rare and endangered species, economically important plants based on our wild fruit tree resources, landscape and ornamental plants.

2) More emphasis on shrubs, climbers and perennial herbs which can be accommodated in the shade of tall trees.

3) To collect and conserve different geographical or ecological races within species. The number of individuals of each race is usually not less than 5 (trees) 10 (shrubs) or 20 (herbs).

4) Although the current genetic erosion of wild plants demand urgent measures to conserve both in-situ and ex-situ as many diverse plants as possible in large areas. It is impractical to conserve all the genes of every plant species. Even under natural conditions plant species, populations and individuals are undergoing changes, under the pressure of environmental shifts. The plants that do not adopt will die out and the fittest can survive and gain chance of evolving further.

5) The unit of the plant species and quantity of individuals that can be practically conserved in any one area can be supplemented through the coordination of botanic gardens and their efforts situated in various climatic zones by forming cooperative conservation networks.
6) Establishment of seed banks of wild plants, as well as the conservation collection of other propagules such as spores, *in vitro* cells, tissues and plantlets has to certain in the limited areas of Botanical gardens. (Zhang Zhiming, 1993).

**Xeriscaping**

Xeriscaping means “Zero scape” was equated with severe minimalist drought resistant tolerant plantings. The terms was first coined in 1981, as “suitable landscapes” and “appropriate horticulture” better convey the full intent of “Xeriscape”. Native plant materials are a vital and viable element of the future of Xeriscape landscapes and gardens. As more gardens and landscapes are designed and installed true to their local conditions, will continue to expand for the use and development of new native plants for ornamental horticulture. There are a number of ways in home landscapes and gardens which will influence the ornamental plant industry. Among the most important are:

1) The decrease in the amount of time, money and expertise to invest in proper planting and maintaining gardens.
2) Shrinking in average size of new gardens
3) Increase use of gardens as living spaces and outdoor rooms.
4) Increasing cost of water, labour, fertilizers, and chemicals.
5) Restricting or limiting of water use for gardens and landscaping purposes.

Under current conditions native plants which fall into perennials, sub shrubs, shrubs and trees of dwarf or compact forms of small stature of all season performers, low maintenance, long or continuous seasons of color, be it foliage, fruits, stems or bark good looking, water thirsty plants and plants that attract wild life. Native plants which fall into any of the above categories will be particularly desirable as they have the additional benefit of fitting into the local and regional conditions both visually and ecologically. This opportunity creates a new, relatively exploited regional niche market for the nursery industry, and should eventually lead to a more striking regionalism in the landscape. There are a number of people and institutions throughout the world looking at the native plants as a direct or secondary source of new introductions for nursery industry, and also they are up to sophisticated as plant breeding including even genetic engineering. The development of new native plant
crops for use in Xeriscape landscapes and gardens is still wide open within numerable opportunities waiting for the interested or inspired investigators as more work is done to select and develop the native flora for use in gardens.

A wild flower meadow provides a sea of diverse colours, shapes and textures an area functional as well as beautiful. They prevent soil erosion, improve the soil and provide habitat for types of wild life. Majority of the experts recommend incorporating native grasses into large scale wild flower plantings. They add structure and stability, provide support for tall flowers and fill in areas that would otherwise fill with weeds. Precaution in weeding out of the area with wild flower plantations is the only method of removing them by hand. (Bart and Brien, 1996).

This high number of endemic species reflects the diverse environment and taxonomic significance of northwestern Yunnan. Encouraging the use of natural ornamental plants in these regions can make considerable contributions to the economy and the culture of these rural regions. Therefore, the taxonomic investigation of these plants and the use of them by gardeners should be encouraged. These wild ornamental plants in northwest Yunnan not only are the ancestors for existing cultivated plants but also are the rare basis for the cultivation of various new breeds in the future, as well as they are very important genetic resources, which could be used for introducing and conserving plants from the wild status.

The special significance of the conservation of rare and endangered plants in China over 1200 species of endemic in 1985. In 1989 Botanical garden work commission of the Chinese Academy of Sciences specified that the conservation, utilization and study of wild plant germplasm resources of China. Through these expeditions 79 species of endemic were studied for their geographical distribution, ecological environment, biological characteristics, and cultivation and propagation techniques. Species like Taihengia rupestris (Rosaceae) was first discovered in Taiheng Mountains of Yunnan province named by late Prof. Yu the taxonomist and the first director of the Beijing Botanical Garden. This genus is monotypic with a limited number of plants left on cliffs. After several years of work the factors for threatening of its survival have become known and now prepared to reintroduced back to their natural habitat. (Xiao-Xian Li and Zhe-Kuen Zhou, 2005)
With its varied climate, and wide range of physical features, India is the home of an amazing array of species. The Himalayas are a treasure trove of flowers many of which grow all over the northern temperate zone too. Some of them are unique to the Himalayas while others are very alpine in character. The lower hills have a mixture of temperate and subtropical flora. The plains and the scrub deserts have distinctly different flowers, while hot and humid areas have flora that is specific to their condition. The flower spectrum, if one can call it that is as wide as it is wonderful. However, here some flowers that is common to most parts of the country. The wild species should be first introduction on Indian wild-flowers and can lead from here to wider pastures. (Chin and Tay, 2006)

Invasive Plants

There are so many cultivated flowering plants, which are commonly available in the market or in backyards of the houses, campuses and industries. However, there are some uncommon and hidden beauties in the nature are not at one place, but from various spots. As native habitat is replaced by exotic plants, many species of birds, insects, fish and other wildlife are displaced or lost. People are affected too. Pest plants that invade riparian areas often along our waterways so that water cannot move down the river or stream. Others use much more water than native species use to grow. Riparian pest plants are essentially robbing water from people and wildlife. Pest plants that invade ravines, foothills and chaparral areas often pose a greater life threat than native species because it is estimated that to eradicate the invasive pest plants cost in California hundreds of millions of dollars annually in California.

The California Invasive Plant Council (Cal- IPC pronounced Calipsy), whose member include land managers, consultants, scientists, planners, non-profit organization volunteers and others is an authoritative source of information on all aspects of wild land weed management. Gardener’s don not plant invasive species intentionally. Invasive plants are by nature, regional or local problem. A plant that jumps out of the garden in one climate may behave perfectly in another. The Council has developed a categorized list of invasive exotic plants, which includes many of them commonly grown in our own gardens. They also suggest safe non-invasive alternatives to plant instead. The list gives the common and botanical names, (Latin) the habitats of concern and the geographical distribution of each plant. The list is
An invasive plant is a species non-native to the eco-system under consideration, and whose introduction, whether accidental or intentional, causes or is likely to cause harm to the environment, economy or human health. Invasive plants are so successful because they often (1) grow and mature rapidly (2) spread quickly (3) can flower and set seed over a long period of time (4) have few known diseases or insect pests to control (5) thrive in many habitats and (6) are difficult to control.

Many of beautiful ornamental plants and the majority of our fruits and vegetables are not native. A small number of non-native plant species have become invasive. In natural areas, they establish themselves at the expense of native plants. They also destruct from the aesthetic appearance of managed landscapes and hamper the growth and harvest of crop in cultivated agricultural areas. Typically invasive species are extremely difficult to control once established.

Some conservations biologists recommend not planting species that are listed as endangered, threatened, of special concern etc in an area. The concern with planting rare species is the potential for plants form non-local seed sources to bring in pests or diseases. (Jean Rose, 2009)

To date only a few plants are problem in the San Joaquin Valley. Tree-of-haven (Ailanthus altissima) should be renamed as the tree-of-hell because its root system is very invasive and the tree is very difficult to get rid of where it is not wanted. It is very tolerant of valley climate and is a familiar site along roadways on the valley floor and through the foot hills. It invades riparian areas, grasslands and oak woodlands. Its leaves are similar in shape to the Raywood ash, Chinese, pistach or black walnut tree. Other invasive trees as the Chinese tallow tree (Sapium sebiferum) and Saltcedar (Tamarix sp)

Gaint reed (Arundo donax) is an extremely fast-growing plant, similar looking to bamboo, that grows in areas along creeks and streams and can easily takeover the
entire waterway. Crimson fountain grass (*Pennisetum setaceum*) and pampagrass (*Crotalaria selloana*) though beautiful to watch them move in the wind are easily spread by it too. Russian olive (*Elaeagnus angustifolia*) spreads by seed and is a problem in some of the riparian areas. Yellow water iris (*Iris pseudacorus*) is also a problem in riparian and wetland areas. Wolly or common mullein (*Verbascum thapsus*) is considered a problem throughout California. The scarlet wisteria tree (*Sesbania punica*) invades riparian areas including the San Joaquin River Parkway.

Even the Periwinkle ground cover (*Vinca major*) and English ivy (*Hedera helix*) can take over a yard and damage buildings and fences. When birds drop seeds from these species near a stream the plants can take over, displacing native vegetation and degrading wildlife habitat. In 2004 another group called Cal-HIP (Horticultural Invasive Prevention) was formed and developed Plant Right.org. They work with the horticulture industry of California to find practical and collaborative solutions to protect the wild lands. Together they decide if invasive plants should be removed from the nursery and not sold in California or be tagged as invasive.

Ireland (Eire) has 850 native species of wild flowers. The most beloved are gorse (pink) and heather (purple) is diminishing because of environmental threats caused by human activity and introduction of invasive (introduced) flowering species. Ireland has lost 90 percent of its forests, but wild flowers grow in the remaining woodlands.

The selection of an individual plant for possible introduction is generally accomplished by a desirable feature or set of features that are deemed desirable, and represent extremes of natural variations in compact growth habit, different foliage, albinos, and unusual colour forms. Additional factors such as mutations including Witch’s brooms, variegated foliage and natural hybrids.

Consulting with focus groups from the nursery industry, the gardening public, native plant enthusiasts, realtors, horticultural groups and others should provide the researcher with plenty of input on a variety of desirable plant traits. As progress is made in the selection process, the new plant should be planted out in a number of test sites. Plants surviving through the testing and evaluation process are then ready to be introduced and marketed to potential user groups. *Arctostaphylos uvaursik-vancouver*
(Jade) an introduction by the University of British Columbia under a well known plant introduction program.

While the conservation of genetic resources everyone involved with the selection, use and promotion of new native plant species and cultivars or any of their close relatives must be fully aware of the potential negative consequences of their use in gardens and landscapes. Navin’s Barberry (*Mahonia beevii* (Berberis)) is an extremely rare plant in nature is found widely distributed and ecologically varied small populations in Southern California. Molecular study of these plants showed that there is little to no variation present in the gene pool. There will be no adverse consequences to the gene pool.

California Dandelion (*Taraxacum californicum*) of San Bernardino Mountains is a rare plant whose continued existence is threatened by ongoing hybridization with common European dandelin (*Taraxacum officinale*). The Monterey pine (*Pinus radiata*) is known from five geographically isolated populations grown together on a massive scale in New Zealand. But the Monterey pines of New Zealand mixed origin will genetically pollute the pure native strain of the California the unique genetic character of the populations will be lost due to homogenization of the gene pool over a time.

Wild Lupine grows from seed in sandy soil according to Northwest Ohio need plenty of sunlight to survive and they are commonly found growing on the open prairie. (According to Texas, US Forest service). But the populations of Karner Blue butterfly an endangered species dropped by 99 percent between 1995 - 2010 (according to US fish & wildlife) because of the destruction of the habitat of wild blue lupine (is feed for butter flies) which itself is a threatened species in many states. Now the nature conservancy, are undertaking efforts to restore the population of both butterfly and Lupine the endangered species by establishing Blue Lupine in wild areas. All parts of the wild lupine flower are poisonous to humans, pets, horses, but deer can eat this plant, and small mammals & birds eat the seeds which are poisonous to Human. (Jeanne Rose, 2009.)

Eastern Ghats are highly significant in terms of its Bio-diversity. Nearly 560 tree species are represented. (Sandyarani *et al*, 2007). The close bonding of humans
with the trees may be traced back to their arboreal ancestry. Reposing under a tree is like being cuddled by a mother – comfortable and secured. Trees are major components of forests which profoundly influence the Carbon dioxide and Oxygen the gaseous cycle and water cycle in the environment. And also trees bind the soil, recycle minerals and regulate the course of rain water. Unparalleled in the variety of useful products they give, a wide range of organisms they feed and shelter, and also trees are essential for maintaining the health of several ecosystems. Thimmamma marrimanu (Banyantree) is one of the biggest tree in Andhra Pradesh, occupied in 5 acres and it is recorded as the biggest tree of the world in 1989. (Thimmamma marrimanu, 2009. www.ten-thousand-trees.blogspot.com)

Wild ornamental development and utilization

Above all trees are friendly, beautiful and invoke awe and admiration. They are the largest and longest lived immobile and offer an amazing diversity of forms. Trees have come to symbolize benevolence, fertility and mobility. Natural resources survey like floristic studies (enumerations) play an important role in the economic development of the country especially of the tribal population. Besides meeting human needs they serve as host for many animal products like lac, honey, silk etc and act as wind breakers and shelter belts, generate raw material for feeding the small scale industries.

1. The major situations for the plant resources disproportionate status are:
   (a) Healthy unclear, inadequate protection
   (b) Technology backward, blind introduction

2. Wild ornamental plants in gardens of
   (a) Rich plant species, improve the urban quality
   (b) The development of wild resources build an ecological city
   (c) The rational use of wild plants to increase the species diversity of city.

3. The introduction of wild ornamental plant resources, domestication
   (a) Climate similarity theory
   (b) Eco-historical analysis
   (c) Michurin theory – Darwin theory
   (d) Flora occurred France
   (e) Eco-similarity method

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The wild ornamental plant resources development and utilization is based on the basic principles proposed the domestication and use in garden should pay attention. China's vast territory is occupied with abundant wild ornamental plant resources about 6000 angiosperm species. Ornamental plants originating in China is not only a wide range of high quality and also the ornamental plant cultivation is having a very ancient history as early as 700 BC during the Western Zhou Dynasty. Ornamental garden flowers species in many of the cities of China are nearly 300 - 400 species. (www.Hi138.com, 2009)

Wild ornamental plants – Medicinal significance

Asati and Yadav (2010) in their studies on Diversity of Horticultural Crops in North Eastern region of India mentioned about the ornamental plants and their medicinal and aromatic significance, income generating and poverty alleviation programmes in the rural areas.

India is a varietal emporium of medicinal plants and is one of the richest countries in the world in genetic resources of medicinal plants. It exhibits a wide range in topography and climate, which has a bearing on its vegetation and floristic composition. Moreover, the agro-climatic conditions are conductive for introducing and domesticating new exotic plant varieties.

Plants have provided a source of inspiration for novel drug compounds as plants derived medicines have made significant contribution towards human health. Phytomedicine can be used for the treatment of diseases as is done in case of Unani and Ayurvedic system of medicines or it can be the base for the development of a medicine, a natural blueprint for the development of a drug.

Nature has been a source of medicinal agents since time immemorial. The importance of herbs in the management of human ailments cannot be over emphasized. It is clear that the plant kingdom harbors an inexhaustible source of active ingredients invaluable in management of many intractable diseases. Furthermore, the active components of herbal remedies have the advantage of being combined with many other substances that appear to be inactive. However, these complementary components give the plant as a whole a safety and efficiency much superior to that of its isolated and pure active components.
Plants play a vital role in existence and survival of man. Medicinal plants have been used for centuries as remedies for human diseases because they contain components of therapeutic value (Nastro et al, 2000). It is estimated that 2,50,000 species of higher plants and the majority of them have not been examined for their pharmacological activities. The antimicrobial properties of certain Indian medicinal plants were reported based on folklore information (Ram et al 2000, Nagalakshmi et al 2001, Jayasinghea et al 2003, Mishra et al 2005, Lavanya et al 2006) and a few attempts were made on inhibitory activity against certain pathogenic bacteria and fungi (Taylor et al 1995). The plant is well reputed in traditional system of medicine and used by tribal peoples to treat various diseases i.e. skin allergies, astringent and diarrhoea (Pullaiah and Rani, 1999). These are common in most of the tribal inhabitants due to lack of sanitation, potable water and awareness of hygienic food habits. Thus there is an increased need for the development of alternative antipathogenic substances. One possible approach is to screen local medicinal plants in search of suitable chemotherapeutic antibacterial and antifungal substances.