

## *Chapter - 4*

# URBAN HORTICULTURE

### OBJECTIVES

After reading this chapter, students will be able to:

- Elaloorate urban and peri-urban horticulture (UPH)
- Identify & enlist different and basic components of UPH
- Understand the benefits and challenges of UPH
- Practise UPH in their towns and/or cities

### INTRODUCTION

During the recent years, there has been a rapid increase in urbanisation and industrialization throughout the world, due to which the cultivable land for horticultural crops is also diminishing day-by-day. As a result, the concept of urban and peri-urban horticulture came in to existence. Although, it has become an integral part of several advanced countries, but in India, it has also started expanding because of great desire of urban population for safe food and pollution-free environment. Urban and peri-urban horticulture opportunities are emerging in urban areas as demand for fresh fruits, vegetables are increasing. Roof and terrace gardening is finding now place to get fresh fruits, vegetables and flowers, and also for environmental services. Vegetable production has expanded in and around cities in many developing countries as an informal activity practiced by poor and landless city dwellers. The broad diversity of horticultural crop species allows year-round production, improved employment and income. Growers have realised that intensive horticulture can be practiced on small plots, making efficient use of limited water and land resources. Horticultural crops, as opposed to other food crops, have a considerable yield potential and can provide up to 50 kg of fresh produce per m<sup>2</sup> area per year depending upon the technology applied. In addition, due to their short cycle, they provide a quick and emergency needs for food. Leafy vegetables provide a quick return to meet a family's daily cash requirements for purchasing food. Leafy vegetables are particularly perishable and post-harvest losses can be reduced significantly when production is located close to consumers. Mushroom centres, which do not need land, can be a

most promising activity in urban and peri-urban areas. Evidently, there is an accelerated production of mushroom around metropolitan cities. There are new practices to grow cucurbits on the arches created on the pathways, utilising the zero-land for additional production.

In this chapter, you will learn about the components of UPH, its benefits and challenges. Read it carefully and adopt this type of culture to boost production and productivity of horticultural crops for your own benefit and for the benefit of society and surroundings.

### What is UPH?

Growing of horticultural crops in towns and cities is called as urban horticulture whereas growing of horticultural crops on the periphery of towns and cities is called as peri-urban horticulture. In urban areas, horticultural activities are primarily restricted to kitchen gardening, landscape gardening, roof gardening, terrace gardening whereas in pre-urban localities, large scale cultivation of fruits, vegetables and flowers can be adopted. UPH is a highly profitable venture, which not only helps in increasing the food and nutritional security but creates employment opportunities to rural and urban youths, and makes our surroundings more attractive and beautiful.

#### Points to remember

- Growing of horticultural crops in towns and cities is called as urban horticulture, and
- Growing of horticultural crops on the periphery of towns and cities is called as peri-urban horticulture.
- Several activities related to fruit, vegetable and floricultural crops can render UPH as one of the best business opportunities in our country.
- Think positively and act accordingly in this direction.

### Some important components of urban and peri-urban horticulture (UPH)

#### 1. Cultivation of fruits, vegetables and flowers

India is fortunate to have varied agro-climatic conditions, which facilitates cultivation of a wide range of horticultural crops. Among the horticulture produce, fruits and vegetables together have the largest share of production (78 %). Fruits and vegetables not only contribute to the food basket of the country but are also a highly remunerative crops, which are greater in urban areas, as these form one of the most important components of a balanced diet. In urban and pre-urban areas, there is always a scarcity of land, hence conventional/traditional system of growing horticultural crops can't be adopted, rather intensive system of growing should be

followed. Thus, production of horticultural crops and profitability of farmers can be enhanced by encouraging 'off-season' production of such crops under protected cultivation in green houses, shade and net houses, etc. For peri-urban and urban areas, fruit crops such as papaya, strawberry, papaya, phalsa, aonla, Amrapali mango, pomegranate, bael etc. can be grown with minimum available water conditions. The package of practices for the cultivation of above mentioned fruits is the same as discussed in chapters on production technology of these fruit crops.

Almost all the vegetables can be grown in urban and peri-urban areas, depending upon the availability of land, resources and demand of consumers in such areas. For instance, in metropolitan cities like Delhi, Mumbai, Chennai, Kolkata etc., vegetables remain in high demand and farmers of peri-urban areas of such cities can get premium price for the vegetables they grow. Similarly, near cities, there is always a great demand for cut flowers. Hence, farmers near big cities or towns should grow roses, gladiolus, gerbera, carnation etc. on a large scale to meet the demand of such cities. It will help not only the consumers for getting fresh produce but farmers will also get premium price of their produce. The package of practices for growing above mentioned vegetables or flowers have been discussed in different books on horticulture.

## 2. Roof gardening

In big towns and cities, availability of cultivable land is a big problem. In spite of this, horticulture can be taken as one of the enterprises in such areas as well by growing horticultural plants on the roof of house or balcony. Roof garden is one of popular alternatives in urban areas, because of the limited available space in the grounds of a house. However, care should be exercised to confirm that the roof of the house is strong enough to bear the heavy load of soil and potted plants. In roof garden, potted plants like cacti and succulents, chrysanthemums, dahlias, orchids, bougainvillea, roses, seasonal flowers and several kinds of shrubs and herbs can be



A view of roof garden

grown. Besides, the vegetable crops such as tomato, brinjal, chillies, beans, leafy vegetables and gourds can also be grown. In a strong roof structure with waterproof system, the area can be laid out with lawns and herbaceous borders which require at least 30 to 45 cm soil depth. Such planting can be done by

placing the soil between the outer wall or the parapet and the wall built on the inner side of the roof. To prevent seepage of water, the roof is to be treated with a bitumen compound or fitted with moisture-proof wood shutters. Polythene sheets may also be used for this purpose. It is a good idea to have some other colour of the roof than the traditional off-black on the surface. Colours like green, brown or soft red can be a good choice. Similarly, some framework or screening devices can also be used for enhancing the beauty of the roof garden. Hence, free-standing trellis or wall-attached trellis may be erected for supporting plants.

In the roof garden, few large permanent shrubs and climbers should also be grown. For this, tubs and boxes of different sizes and shapes are helpful for growing such plants. With main tubs and boxes, smaller pots and boxes can be arranged along with hanging basket, which will further aid in the beauty of roof garden. Similarly, ornamental stones, sculptures and other decorative pieces may be suitably arranged in the roof garden. However, all this depends on the interest of the growers/gardener, availability of material in the vicinity and financial status of the grower.

### 3. Kitchen gardening

Kitchen gardening is growing of fruits, vegetables or ornamentals on a piece of land near to your kitchen. Basically kitchen gardening is done for the consumption of your own family and not for commercial purposes. However, if there is availability of good land, for larger cultivation, one can use that piece of land for commercial production of horticultural crops.

A well maintained kitchen garden can provide fruits, vegetables and cut flowers throughout the year. In kitchen garden, intensive system of planting is followed. On bunds, vegetables like carrot, radish, and in the fields cabbage, cauliflower, and dhanian can be easily grown. Near the wall of house, some trailing type bean should be grown. Among fruits, choice is limited but strawberry, Amrapali mango, Kagzi Kalan lemon and papaya can be easily grown. Similarly one grapevine can be trained to wall of house. On side rows of kitchen garden, a row of roses, gladiolus or chrysanthemum or any other seasonal flowers can be grown to make kitchen garden more attractive and to meet the demands of your family.



A view of modern kitchen garden



#### 4. Terrace gardening

Terrace gardening refers to growing of horticultural crops in an area, which is in the immediate vicinity of a building or of your house. This is a raised ground space constructed around a dwelling house or on the sides of a hill. The terrace forms a link between the house and the rest of the outdoor living space and must, therefore, be designed in harmony with the plan of the house. However, terrace gardening is a highly specialised job for landscape gardeners and civil engineers. It involves land raising and construction of steps, ramps, walls and paved paths as well as planting of lawn grasses and other plants. Such gardens are mainly for relaxation; hence all arrangements should be made in a way to provide both sunny and shady areas in the terrace garden and must offer a fine year-round view of the entire garden. Addition of sculptured rocks, a small lily pond with a fountain and water plants will add more beauty to such gardens.



Terrace garden

#### 5. Landscape gardening

In the recent years, landscape gardening as emerged as one of the finest components in beautification of towns and cities. It includes growing and utilisation of garden flowers, turf grass, bedding plants, potted plants, hedges, edges, water garden, rock garden etc. Landscape gardening has made appreciable growth in the last two decades as commercial venture. Floriculture has now become as an integral part of modern lifestyle and floral products are being utilised in floral decorations, floral craft, and beautifying commercial premises. At present, landscaping is in demand for public offices (e.g., government offices, hospitals, courts, private offices, corporate houses, cinemas, hotels), educational institutes (e. g., like university campus, research institutes, pvt. institutes, schools, colleges etc.), factories, places of historical importance, places of worship (e.g., temple, mosque, church). In addition, landscaping of highways, railway stations, railway lines, bus terminus, airports, etc., is also very important. Similarly, there is a great demand for landscaping of golf industry, lawns for cricket grounds and pitches etc.



Bonsai of banyan tree

#### 6. Bonsai, a challenge for UPH

Bonsai is a Japanese art of growing huge trees in containers under controlled nutrition. Bonsai can be

an integral part of UPH in countries like India. In India, trees like banyan, peepal (*Ficus religiosa*), pilkhan (*Ficus infectoria*), maple, juniper are well suited to bonsai.

## 7. Window gardens, need of the hour

In window gardening, plants are grown in containers, which are attached to house or window. The best suited plants for window gardening are seasonal annuals, petunias, pansies and miniature roses.

## 8. Living walls, an important consideration in UH

Living walls are nothing but walls covered with living plants. They are also referred to as vertical gardens. Usually climbers are used for creating living walls.

## 9. Hanging baskets, an integral part of UH

Hanging baskets with training of cascading plants are suited for indoors as well as outdoors. Such baskets can be hanged at the entrance of the house or can be kept in the lawn or in a hall or can be suspended from trees, electric poles or fences. Plants like petunias, salvia, pansies and geranium are suitable for hanging baskets.



Annuals in hanging basket

## Water management in UPH

We have always witnessed hue and cry for drinking water especially during summer in big towns and cities in India. People strive hard for getting drinking water. Hence, growing of horticultural crops in UPH with meager amount of irrigation water poses a great problem to the grower. Hence, growers are forced to use untreated waste water for irrigation. Another reason for using such type of water is that farmers find it cheaper than pumping ground water to irrigate crops. However, re-use of wastewater for irrigation is likely to be most prevalent in areas where water from other sources is scarce for part or all of the year. High content of nutrients in wastewater, particularly nitrogen and phosphorus, which can increase the productivity of farming provides another strong incentive for re-use of such water. However, it is strongly emphasized that due to scarcity of water, emphasis should be given on water harvesting, recycling and re-use of water in urban and peri-urban areas to grow different horticultural crops satisfactorily. Similarly, to prevent potential negative impacts on human health and the environment, the importance of waste water reuse in urban and peri-urban horticulture has to be recognised and clear cut policy guidelines for reuse of such water need to be established by the government.

## Integration of post harvest processing industry with UPH

To make UPH a viable enterprise, we need to integrate the production system of UPH with processing and value addition because the demand for some of the processed fruits and vegetables products has increased significantly in our country, especially in urban and peri-urban localities. After having critical evaluation of such situations in urban and peri-urban areas, the bulk production of horticultural commodities can be processed using drying, and developing fermented products, which plays an important role in horticultural crops. For example, in the recent years, some new products like juice punches, banana chips and fingers, mango nectar and fruit kernel derived cocoa substitute, fruit wines, dehydrated products from grape, pomegranate, mango, apricot and coconut, grape and fruit wines, value-added coconut products like snowball tender coconut, coconut milk powder and pouched tender coconut water (Cocojal) etc., have become quite popular in our country. Similarly, people in urban areas are now shifting towards the use of convenient foods, the demands for products like pre-packed salads, frozen vegetables, half processed vegetables, minimally processed vegetables etc., are increasing. Consumer friendly products like frozen green peas, ready-to-use salad mixes, vegetable sprouts, ready-to-cook fresh cut vegetables are now major retail items in metropol cities. Hence, producers can also think of using the valuable horticultural produce to convert it in to valuable processed product, which will definitely add value to the fresh produce.

## Benefits of urban and peri-urban horticulture (UPH)

- UPH can contribute in increasing food and nutritional security.
- No problem of marketing of the produce as it can easily be sold in a local market even at higher rates.
- People having little or no land can adopt part-time farming of vegetables by use of hydroponics or substrate culture in beds, which provides food and income.
- UPH enhances the freshness of perishable fruits and vegetables reaching urban consumers, because crops are produced in close proximity to the consumers, which does not travel long distance.
- In urban horticulture, women can combine food production activity with child care and other household responsibilities.
- There is significant reduction in post harvest losses as the fresh produce is sold in the market immediately.

- UPH can provide raw material to processing factories immediately, which will reduce the transportation cost significantly.

### Challenges in UPH

- Greater competition for natural resources like soil and water.
- There is a greater risk to health and environment due to inappropriate or excessive use of pesticides, nitrogen, phosphorus, raw organic matter containing undesirable residues such as heavy metals.
- Chances of microbial contamination of soil and drinking water are more, which may lead to cause several fatal diseases.
- Chances of air pollution are more in UPH due to production of carbon dioxide and methane from organic matter, ammonia, nitrous oxide and nitrogen oxide from nitrates.
- In some cases, odour nuisance is created in UPH.
- For the viability of UPH, availability of sufficient and good land is must, which will become a limiting factor due to increased urbanization.



### ACTIVITIES/EXERCISES

1. Make a list of horticultural plants grown in a well maintained kitchen garden of your locality.
2. Visit a flower show and make a list of plants grown in hanging baskets, potted plants and flowering annuals.
3. Plan a visit to some big town or a city and observe some building where roof gardening is practiced. Make a list of plants grown in it.

### CHECK YOUR PROGRESS

1. Define UPH. Enlist various components of UPH and describe briefly about bonsai, kitchen and roof gardening.
2. Describe briefly the benefits and challenges of UPH.

### WRITE TRUE (T) AND FALSE (F) FOR THE FOLLOWING STATEMENTS

- i. In UPH, extensive system of planting is followed.



- ii. Availability of cultivable land and quality irrigation is not a limiting factor in UPH.
- iii. In villages, UPH is a common practice.
- iv. UPH helps to increase food and nutritional security.
- v. UPH can help in increasing air and water pollution.
- vi. On one side, consumption of fruits and vegetables is good for health, yet on another side fruits and vegetables produced in UPH may deteriorate it.
- vii. Availability of sufficient and good land will become a limiting factor for UPH in the years to come.

#### SUGGESTED FURTHER READINGS

- Sumangla, H.P., Malhotra, S.K. and Chowdappa, P. (2013). Urban and peri-urban horticulture- a perspective. Confederation of Horticulture Associations of India, New Delhi.

