

## Chapter 11

# Urban Forestry

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### Abstract

Pakistan is a forest deficient country and under prevailing set of climatic conditions, it is very difficult to rapidly increase the forest area in Pakistan. Therefore, it is urgent need of time to grow the trees on every available piece of available land to fulfill our urging demands for forest resources. Urban forestry is one of the best option to grow and manage trees in urban settlements including public and private organizations and institutions. Generally, trees in the urban areas are grown to increase the aesthetic value and for their environmental services. Though wood production is not the priority in urban forestry but harvested of course as one of the major tree product. In this chapter, importance of urban forestry, suitable places to grow urban forests and key points to manage the urban forests have been discussed. At the end, some common and suitable trees are mentioned, which could be grown in urban forests.

**Keywords:** Trees: Urban: Parks: Landscape: Environment, Wood.

### 11.1. Introduction

Urban forestry is the practice of forestry in an urbanized environment. It can be described as the science and art of growing trees in urban and peri-urban areas for obtaining various forest products as well as environmental benefits. Urban forestry deals with the role of trees as an integral part of urban infrastructure. It is practiced

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by municipal and commercial arborists, municipal utility foresters, environmental policy makers, city planners, consultants, educators, researchers and such other members of the civil society. Urban foresters plant and maintain trees, support appropriate tree's growth, preserve forest, conduct research and explore/promote as many benefits as trees provide (Dixon 1995; Fall 2003). So urban forestry, more precisely, can be defined as; *the establishment, management planning and design of individual trees and forest stand with some amenity values, suited in or around urban areas.*

Trees in the urban environment are often referred to as the urban forest, comprising trees in civic wood lands, parks and the streets. Earlier, urban trees were mainly regarded as aesthetic elements, whereas today these are recognized as having a positive impact on the environment as well as providing economic and social benefits. The value of urban forest is being increasingly recognized as a vital component in the maintenance of sustainable urban environment around the world as well as its high potential role in forest production. To develop a sustainable urban forestry model, trees are planted and managed along the motor ways, high ways, in streets, municipal parks, gardens and reserves, golf courses, cantonments, schools, colleges, universities, hospitals and all other public places where there is some space available for tree planting (Grey and Deneke 1978).

Due to ever increasing human population with meagre resources we are no more able to convert any other land use into conventional forestry. It is very difficult to increase forest cover in Pakistan by conventional methods. According to an official estimate of Punjab Forest Department, to increase 1% forest area in Punjab Province we need 0.5 million acres of land, 6000 cusec water and the funds of three thousand million rupees. We cannot bear so much huge expenses. The alternate option is to apply non-conventional approach to increase tree cover in Pakistan. Among them, urban forestry is extremely suitable approach by which we can enhance number of fast growing trees and hence forest production. It is worth mentioning that two hundred mature trees in scattered form have the combined effect and production equivalent to one acre of compact forest plantation.

## **11.2. Quantification of Urban Forestry Services**

Trees are precious gift of God which have so many benefits for human beings and ecosystem (Price 2003). It is necessary to grow trees in urban areas. There are several economical, ecological, environmental, social and cultural benefits which are provided by urban forests as well as trees planted in an urbanized environment.

### **11.2.1. Economic Benefits**

Urban forests provide a number of benefits which are very important for the continued economic growth and welfare of the society. Trees provide timber and fuel wood for domestic as well as industrial use, forage for livestock, food, fruit and medicine for human beings. Planting of fruit trees in urban areas is a giant step to ensure food security which is the burning issue of the globe at present. There are several other economic aspects of urban trees. It is a common observation that the

values of properties in tree lined areas will be much greater than in similar areas without trees. People like to do business in those urban areas where sufficient numbers of trees with good landscape are present. Similarly, tree cover has a positive effect on saleability of the properties. Properties on tree lined streets are said to be in more demand and easy to sell out.

### **11.2.2. Social and Cultural Calues**

Trees have a significant role in bringing peace harmony and brotherhood. Man always had a strong affinity for the trees. These are the source of spiritual replenishment. It has been proved by research that appropriate vegetation cover can lead to reduced crime rates. Areas with higher vegetation cover were found to have lower crime rates, as measured by police reports. Vegetation cover has a mitigating effect on mental fatigue and illness. Trees can help improve road safety in a number of ways. Trees lining of roads give the impression of narrowing the street and encourage slower driving. The stress reduction effect of trees has the effect of reducing road rage and improves the attention of drivers. It is universal truth that, sufficient number of trees is a guarantee of healthy and peaceful society.

### **11.2.3. Ecological and Environmental Importance**

Trees are the most important feature of the environment in which we live, work, play and enjoy the blessings of nature. Trees play an important role in the provision of neat and clean air (Selmi et al. 2016). It is well known that trees absorb carbon dioxide and release oxygen during the process of photosynthesis. The carbon absorbed by trees in this process is stored in the wood. On the other hand, trees can remove a number of pollutants from the atmosphere, including ozone, nitrogen dioxide and other toxic particulates (Lackner 2003). They have highest carbon sequestration rate among all type of vegetation. They have a significant role in energy savings. Careful tree planting can reduce the amount of fuel used on both heating and cooling buildings (Lackner et al. 1995). Trees provide shelter and reduce wind speed, thus reducing heat loss from buildings during winter. These also provide shade in the summer while the evapo-transpiration of water from the leaf surface area has a general cooling effect on the atmosphere. This can significantly reduce the need for air conditioning during hot weather. Trees in the urban environment can reduce storm runoff and improve water quality. They play an important role in the mitigation of sound pollution by reflecting and absorbing the sound energy. One estimate suggests that up to 8 db noise reduction can be achieved from every 30 meterS wide shelterbelt.

To cut the long story short, the important beneficial aspects of urban forestry can be summarised by highlighting the following points.

- Production of timber, fire wood and forage
- Environmental amelioration
- Reduction of pollution and energy use
- Beautification and aesthetic sense

- Shade, recreation, amenity and pleasure
- Conservation of biological diversity
- Sustainability in urban ecosystem
- Savings in public health care and increase in economic investment
- Provision of basic needs like food, fruit, fibre and shelter
- Employment opportunities in urban areas
- Reduction of air, land, water and noise pollution
- Reduction in wind/water storm and erosion
- Reduction of pressure on state forest

### **11.3. Distinctive Features of Urban Forestry**

#### **11.3.1. Objectives of Management**

Establishment of forest vegetation for environmental amelioration and beautification are the major objectives of urban forestry. Urban forestry among other things seeks to manage the trees in a city as a renewable resource that can produce a range of benefits which may include small timber and five Fs. viz., fuel wood, food, forage, fibre and fertilizer.

#### **11.3.2. Due Regard to Ornamentation**

Urban forestry is somewhat overlapping with landscape horticulture. In urban forestry, special consideration is given to landscape principles. The greatest contribution that urban forester can bring to a city is its skills to plan, establish and manage the urban forest in the best interest of human beings and their ecosystem. Plants having ornamental and amenity values are selected to develop an urban forest. Single stem forestry is applied here. Clear felling in urban areas is not recommended as felling on large areas can cause some social and environmental issues.

#### **11.3.3. Efficient Utilization of Available Resources**

All necessary resources in the form of suitable site, planting material, sewage and rain water, trained and untrained labour, funds and capitals are available in urban areas. In remote areas, sometimes labour is not available or so much costly to perform different silvicultural operations. We have no problem to face the shortage of labour in cities. Planting material is at our disposal at every time. Normally sufficient funds are allocated for the development and beautification of urbanized environment. So, the need of the time is to utilize these precious resources efficiently by adopting proper planning and applying suitable management techniques.

### **11.3.4. Less Competition for Space and Nutrients**

Trees in urban forest generally face less competition for space, nutrients and water. Sufficient spaces remain available for plants because these are planted by maintaining proper distance and spacing. All types of water i.e. rainwater, canal water, underground water, domestic waste water and industrial waste water is ready to irrigate. Normally, there is no shortage of water for urban forestry trees and hence, no competition for water. Similarly, most of the nutrients which are essential for plant growth are present in urban areas which can be used to promote forest vegetation without the danger of extermination.

### **11.3.5. Protective Role of Trees is Dominant Over Productive Role**

Although urban vegetation plays productive as well as protective role in the environment and ecosystem but their protective role is dominant over productive role. Urban trees are more important for their intangible benefits rather than tangible benefits. The productive potential of trees can also be enhanced by exploiting and utilizing the special favourable conditions for tree growth in urban areas.

### **11.3.6. Attractive Market**

There is no difficulty in the marketing of urban forestry products. Transportation of all these products is very easy. There are minimum transportation and carriage expenditures. Availability of labour for harvesting and handling is another favourable point for urban forestry. So, all these factors make the urban forestry as most suitable practice in the urban areas of Pakistan.

## **11.4. Various Types of Urban Forests**

Different kinds of urban forests are found in Pakistan. Some of them are briefly described here.

### **11.4.1. Road Side Plantations**

Road side are distributed throughout the Pakistan along the motor ways, high ways, G.T. roads and all other inter-city and intra-city roads and avenues as mentioned below in Figure 11.1. These are owned by Govt. and generally have limited space to grow. These should face a greater extent of pollution and hardships. These plantations need regular pruning to remove the branches causing hurdle in traffic flow. The first impression about the greenery of a country can be picked by the extent and magnitude of road side plantations. So, these plantations must be managed as these have a significant role to develop the soft image of a country.

### 11.4.2. Canal Side or Drain Side Plantations

Canal side and drain side plantations perhaps grow in best conditions in an urban environment as mention below in Figure 11.2. These have to face relatively less extreme conditions due to availability of a permanent source of water. These also need continuous management. Especially our canal sides have a significant potential to support forest vegetation. Due to which, these sites are called as “Timber Mines” of Pakistan.

**Fig. 11.1** Road side Plantation



### 11.4.3. Plantations along Railway Tracks

Rail side plantations have sufficient spaces to grow on both sides of railway track all over the Pakistan as mention below in Figure 11.3. But unfortunately, these plantations are not looked after and maintained properly due to negligence of the government.

## 11.5. Institutional Plantations

The trees grown in schools, colleges, universities and hospitals are said to be institutional plantations as mentioned below in Figure 11.4. These plantations relatively have larger spaces to grow. Their establishment, protection and management is easier than roadside plantations. Due to increased awareness among public and better availability of resources in the form of labour, water and funds, these plantations are more precisely managed for landscape purpose.

**Fig. 11.2** Canal side or Drain side Plantation



**Fig. 11.3** Plantation along Railway Tracks



**Fig. 11.4** Institutional Plantations



### 11.5.1. Airport Plantations

The plantations in and around the boundaries of airports are called airport plantations as mention below in Figure 11.5. Normally, airports have thick tree populations for security reasons. These lands can be rightly said as best sites for tree production in urban areas. Generally trees growing in these areas are not allowed to fell and human interference in these areas is kept limited.

**Fig. 11.5**  
Airport Plantations



### 11.5.2. Parks and Garden Plantations

The trees in parks are a source of pleasure and relaxation for people as mention below in Figure 11.6. These ameliorate the climate, provide shade in summer and add to the beauty of area. These plantations need permanent care and management, otherwise their beauty and growth is affected badly.

**Fig. 11.6**  
Parks and  
Garden  
Plantation



### 11.5.3. Home Garden Plantations

Due to ever increasing human population, the magnitude of home gardens is decreasing day by day. At present limited number of homes in urban areas have gardens or parks and very limited numbers of trees have been planted in these areas. Generally home gardens are intensively cared and managed by the custodians of homes as mention below in Figure 11.7. Home gardening is a healthy and useful hobby which should be promoted to keep the people physically and mentally sound.



**Fig.**

**11.7** Home Garden Plantations

## 11.6. Management of Urban Forests

- In urban forestry, more concentration is given on environmental and social benefits rather than economic benefits.
- In urban forests, trees are not cut or harvested until and unless they grow old, get diseased and expired
- Thorny species are generally avoided in roadside planting
- Flowering and foliage ornamental trees are specially selected for road side planting but one should not plant trees along the roadside having large watery flowers which shed on ground in large numbers and cause accidents.
- Plant trees, which have relatively broader leaves so that they can capture more dust
- Water loving plants should be planted along the canals and drains. For example, willow and poplar
- Remove the branches/limbs which create hurdles in smooth running of traffic.
- Fell those trees which are old or grow slowly or which have been attacked by insect pest or pathogens.
- Save the plants from lopping and pollarding by un authorized people

**Table 11.1** Major urban forestry trees of Pakistan

### Woody Trees

S. No	Common Name	Scientific Name
1	Sheesham	<i>Dalbergia sissoo</i>
2	Sufaida	<i>Eucalyptus camaldulensis</i>
3	Siris	<i>Albezzia lebbek</i>
4	Poplar	<i>Populus deltoides</i>
5	Neem	<i>Azadirachta indica</i>
6	Bakain	<i>Melia azedarach</i>
7	Mullberry	<i>Morus alba</i>
8	Simal	<i>Bombax ceiba</i>

### Flowering Trees:

S.No	Common Name	Scientific Name
1	Gul Mohr	<i>Delonix regia</i>
2	Amaltass	<i>Cassia fistula</i>
3	Neelam	<i>Jacaranda mimosifolia</i>
4	Gul e Nishtar	<i>Erythra suberosa</i>
5	Dhak	<i>Butea frondosa</i>
6	Kachnar	<i>Bauhinia purpurea</i>
7	Paulownia	<i>Paulownia tomentosa</i>

## Foliage Ornamental Trees:

S. No	Common Name	Scientific Name
1	Devil Tree	<i>Alastonia scholaris</i>
2	Toon	<i>Cedrela toona</i>
3	Pilkhan	<i>Ficus infectoria</i>
4	Silver oak	<i>Grevillea robusta</i>
5	Kangar	<i>Pistacia integerrima</i>
6	Kanak-champa	<i>Pterospermum acerifolium</i>
7	Jiaputra	<i>Putranjia roxburghii</i>
8	Baid-e-Majnoo	<i>Salix babylonica</i>
9	Baid-e-Laila	<i>Salix tetrasperma</i>
10	Arjum	<i>Terminalia arjuna</i>

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