

Prospects of Urban Forest in City Development

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Abstract

A forest or group of trees that are grown inside of a town, city, or suburb is known as an urban forest. In a broader sense, it could refer to any type of vegetation made of wood that grows in or near human settlements. In a more restricted meaning (also known as a forest park), it designates regions whose ecosystems have been passed down from remnants or leftovers of the wilderness. Municipal woods, which are owned by the government, may be found outside of the town or city of which they are a part of. This is the case with urban forests.

Urban trees and shrubs provide numerous advantages, such as improved property values, better wildlife habitat, decreased air pollution, reduced urban heat island effect, decreased storm water runoff, reduced air pollution, reduced energy costs and they support in the mitigation of negative impacts on environment.

Urban forests are vital to the ecology of human environments in a variety of ways, including filtration of air, water, and sunshine, animal refuge, and public recreation areas. In order to save energy, they temper the local climate, reducing wind and storm water and providing shade for homes and businesses. They have a crucial role in lowering the heating effect, which may lessen the frequency of unhealthy days which large urban areas experience during the hottest parts of the summer.

Keywords: Urban, Forest, Temperature, VOC, Canopy

I. INTRODUCTION

Urban people's health has long been linked to trees' ability to decrease stress. People can gather, mingle, and have fun in urban green spaces and under the canopy of trees. While the notion of Biophilia argues that humans are inherently drawn to nature, the Attention Restoration hypothesis goes further to demonstrate the concrete benefits of being in nature, in terms of scholastic, medical, and other consequences. Comprehensive planning and community involvement are necessary for the best outcomes..

For birds and other organisms, trees and plants offer food and places to nest. People like to observe, feed, take pictures of, and paint urban wildlife and its surroundings. In cities, urban flora and fauna enhance people's capacity to feel linked to the natural world.

II. BENEFITS OF URBAN FOREST

2.1 Economic benefits

People have long been aware of the financial benefits of trees and other plants. These benefits are now beginning to be measured more often. Spending on public and private tree maintenance becomes more rational when considering the quantifiable economic benefits of trees. A deciduous tree planted to grow north and east (in the Southern Hemisphere) or south and west (in the Northern Hemisphere) of a structure is a great example of economic value. When the leaves fall in the winter, the sun may still heat the building even though it is protected and kept cool by the shadows in the summer.

The physical effects of trees—which include reduction of traffic, pollution absorption, humidity, wind, erosion, evaporative cooling, screening of sound and vision, shade (solar regulation), and precipitation—have positive economic effects.

2.2 Reduction in Air pollution

Trees can help purify the air in cities that find it difficult to adhere to air quality regulations. Particulate matter, ozone, sulphur oxides (SO_x), and oxides of nitrogen (NO_x) are the primary contributors to urban air pollution. When NO_x and VOCs, or volatile organic compounds, react chemically in the presence of sunlight, ground-level ozone, often known as smog, is created. This process moves more quickly at higher temperatures. The primary sources of NO_x emissions are industrial facilities and automobiles, particularly those with diesel engines.

The main sources of VOCs in the environment include fuel fumes, car emissions, industrial operations, and plants, trees, and other flora. Particulate matter includes tiny solid and liquid particles like PM₁₀ and PM₂₅, which can be inhaled and adhere to lung tissue, posing a major health risk. Smoke and diesel soot are the primary sources of particulate matter pollution, which can aggravate healthy people and pose a major risk to individuals who already have heart or lung issues. Reducing pollutants and enhancing air quality can be achieved at a low cost by planting trees.

2.3 Temperature control and Reduction in smog

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A significant, healthy forest can greatly improve the air quality in urban areas. Trees lower air temperatures and mitigate the impact of heat islands in urban areas. Ozone formation is temperature-dependent, therefore this temperature decrease reduces energy use while simultaneously improving air quality. When trees are present in great numbers, they produce temperature differentials between their immediate environs and the surrounding areas in addition to offering direct shade. Wind is created as a result of the two regions' differing in air.

If the forest is close to a city, this phenomena is known as the urban breeze cycle; if the forest is inside a city, it is known as the park breeze cycle. The city feels somewhat cooled off by that air. The formation of ozone increases with temperature. The temperature can drop by three to five degrees Celsius under large shade trees. Trees can lower daytime temperatures by 0.04 to 0.2 degrees Celsius for every percent increase in canopy cover. If there were five million trees in Sacramento County, California, the summertime temperature would drop by three degrees.

Peak ozone levels would climb by 7% as a result of this temperature drop, while smoggy days would fall by 50%. Parking lot shade trees lower the temperature, which lowers evaporative emissions from parked cars. Parking lots without covers are like little heat islands, where the occasional high rises above the surrounding average. The air temperature will be considerably lowered by the tree canopy. The majority of hydrocarbon emissions come from tailpipe exhaust, with evaporative emissions from hot fuel distribution systems in parked cars accounting for 16% of total hydrocarbon emissions. The local microclimate affects both these evaporative emissions and the exhaust emissions in the initial minutes of engine running. The quantity of evaporative emissions from gasoline and volatilized plastics will be greatly reduced if cars are shaded in parking areas. Compared to cars parked in lots with just 8% canopy cover, vehicles parked in parking lots with 50% canopy cover emit 8% fewer evaporative emissions.

It takes longer for the volatile elements of asphalt pavement to evaporate in parking lots and on shaded highways. In addition to lowering emissions, the shade also reduces shrinkage and cracking, increasing maintenance intervals. Less maintenance means fewer heavy machinery emissions and hot asphalt smells. The way asphalt roofs work is also similar.

2.4 Active pollutant removal

Since they actively remove pollutants from the atmosphere, trees lessen pollution. Polluting gases are drawn in by the pores on the leaf surface, or stomata, and are subsequently absorbed by the water within the leaf. Certain tree species are more prone to absorbing pollutants, which can have a detrimental effect on plant development. The best trees to choose are those that are

resistant to the harm that they can do and that absorb larger amounts of pollutants.

According to a research conducted in the Chicago area, in 1991 trees prevented about 17 tonnes of CO₂, 93 tonnes of SO₂, 98 tonnes of NO₂, 210 tonnes of ozone (O₃), and 93 tonnes of sulphur dioxide (SO₂).

2.5 Carbon sequestration

When using fossil fuel-powered forestry equipment, urban forest managers are occasionally interested in estimating the ratio of carbon dioxide that is released into the environment to the the amount of carbon taken out of the atmosphere and kept as wood in the forest.

2.6 Interception of particulate matter

Trees soak toxic gases, but they also act as air filters, gathering particulates in the air and reducing the concentration of pollutants in the atmosphere. The surface area and leaves of the tree gather particles. While seated on the tree's surface, these particles could be carried away by strong winds, rain, or even fall to the ground collectively with a fallen leaf. If trees didn't exist, particulate matter would still be airborne and hazardous to people, even if they only act as a temporary home for the particles. Particulate matter collected from the air increases in relation to the amount of tree cover.

The largest particles are collected by massive, densely leafed evergreen trees. Trees eliminated almost 234 tonnes of PM₁₀, or particulate matter smaller than 10 micrometres, in 1991, according to a Chicago study. Large, healthy trees with a trunk diameter of more than 75 cm remove about 70 times more air pollutants annually (1.4 kg/yr) than small, healthy trees with a diameter of less than 10 cm (0.02 kg/yr).

2.7 Approach to the potential of urban forestry in developing countries

There are two main ways to approach the possibilities of forestry in and around urban populations. One is to concentrate on the trees themselves, the possible advantages and disadvantages of growing them in an urban setting, possible management strategies to optimise the former, and the challenges that urbanisation poses to the trees' existence. This research aims to present an alternate viewpoint by first concentrating on urban people, their requirements, and the characteristics of their always varied living environments, and then exploring potential benefits of trees for them.

2.8 Growing environmental concerns

The development of unserviced self-help houses on marginal land is just one of the many environmental issues that have accompanied the fast growth of Third World towns and cities. However, a lot of Third World governments are too busy trying to provide for the

fundamental requirements of their urban populations to dedicate enough resources to environmental challenges.

Many developing nations are making some efforts to enhance urban settings, and the topic is now more generally discussed and acknowledged than it was ten years ago. During the Rio de Janeiro Earth Summit (1991), a number of environmental issues that are prevalent in Third World towns were included in Agenda 21.

As much as information is known, the question of whether trees may improve urban settings in Third World countries is examined in section four, which also discusses how trees can help urban residents materially and in another way contribute to sustainable development. Initially, though, the possibility for more tree cultivation as well as their current presence are taken into account while planning a town or city.

III. URBAN GREEN

Due to the continuous emphasis on growing more trees and the stringent oversight of tree-cutting permits, New Delhi, has developed into one of the greenest capitals in the world. This has been made possible in spite of the infrastructure projects that have arisen as a result of the concerted efforts over the years by different organizations. Many Parks & Gardens were recently established as part of Delhi's greening initiatives. There are several well-kept parks and gardens in the city, including Buddha Park, Mughal Garden, Lodhi Garden, and Deer Park.

City	Population in million (Census, 2001)*	Forest and tree cover (km ²)	Per capita green space (m ² /inhabitant)
Gandhinagar	0.20	32.56	162.80
Chandigarh	0.90	49.00	54.45
Delhi	13.80	297.00	21.52
Bangalore	5.60	97.00	17.32
Jairour	2.32	5.43	2.30

Figure 1 PerCapita Green Sapce in some indian Cities;

Source: <http://www.ijesd.org/papers/104-D529.pdf>

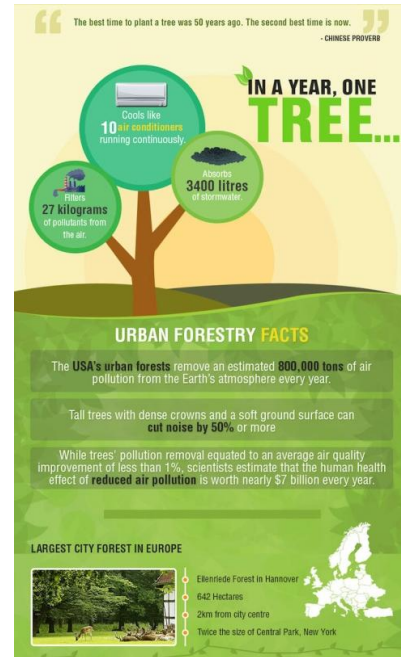


Figure 2 Urban Forestry Facts

Source: <https://inhabitat.com/infographic-why-urban-forests-are-essential-to-successful-cities/>

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