

Introduction about the
Botanic Garden
&
Deforestation : A Lurking Menace



Introduction about the Botanic Garden

A Botanic Garden is an open museum of living collection of myriad of plants, where trees, shrubs, herbs, climbers, lianas etc. are scientifically arranged, properly labelled based on an internationally accepted classification, and more closely allied groups/plants are specially grown together for better understanding of species. Unlike parks, in Botanic Gardens trees conserved in Arboretum, Gymnosperms and Pine trees are grown in Pinetum, Pandanus (screw pine) in Pandanetum, orchids in Orchidarium, bamboos in Bambusetum, palms in Palmetum, cactus in Cactarium etc.

Primarily, the earlier Botanic Gardens were set up with a role to introduce, grow and multiply important economic plants from around the globe and to carry out acclimatization study in different trial plots so as to release for cultivation in newer areas. Further emphasise was given to develop improved varieties of economically important plants of the region for commercial exploitation by conducting various horticultural researches such as hybridization, selection, cross pollination, trial etc. It also acts as a data base of plants and a living repository of native and exotic species. Comparative study of living and preserved herbarium specimen also being made through Botanic Garden for clear understanding of particular species and further taxonomic advancement.

At present there are about 2000 Botanic Gardens in the world and India having about 120 (including university, municipal and regional gardens) among that the Indian Botanic Garden (IBG), Howrah formerly known as 'Company Bagan', the Royal Botanic Garden, Kolkata, at present AJC Bose Indian Botanic Garden (AJCBIBG), Howrah, is one of the best landscaped gardens in the world. The original history of IBG is almost similar to the Kew Garden in England which is situated on the bank of the river Thames, a few miles away from London. The Kew garden is about 50 years younger to IBG, Howrah which owes its interests in the Botany of Royalty but the latter has been established with economic and scientific aims. The Kew garden started initially with a meagre area of 15 acres of land in 1841 and during the course of time it grew further under the hands of a well-known botanist Sir William Hooker, the first director of Royal Botanic Garden, Kew and now it possesses 288 acres. The Royal Botanic Garden, Kolkata, on the contrary, situated on the bank of river Hooghly a few kilometres away from Kolkata, established by Col. Robert Kyd in 1787, in a vast area of about 300 acres of land and it was regarded as the largest and one of the oldest botanic gardens in the world till the middle of 19th century and now occupies an area of 273 acres.



The Great Banyan Tree of AJCBIBG, Howrah



The Kyd's Monument at AJCBIBG, Howrah

Currently, the garden with an area of 273 acres and being a living repository of 1377 species of plants possesses 25 divisions and 24 interconnected lakes, and the lakes are connected to the Ganges through sluices for the regular inlet and outlet of water. The garden is a unique place of learning & rich array of curiosity and occupies matchless attractions like the 'Great Banyan Tree', a living wonder in the plant kingdom; the Large Palm House containing rich collection of palms including *Lodoicea maldivica* (the Double Coconut palm); Branching palm (*Hyphane thebaica*) introduced from Egypt; The century Palm (*Corypha macropoda*) ; The Giant Water Lily (*Victoria amazonica*) brought from Amazon river; The queen of flowering trees (*Amherstia nobilis*) a native of Burma; The mountain rose or Venezuelan rose (*Brownea* sp.); The Baobab tree or Kalpavriksh (*Adansonia digitata*) native of Africa; The Rosogolla tree (*Chrysohyllum cainito*); The Cannon ball tree (*Couroupita guianensis*); The African Sausage tree (*Kigelia pinnata*) and the mad tree (*Pterigota alata* var. *irregularis*); The 'Candle Stick Tree' (*Permentiera cereifera*) etc., are a few to mention.

Right now, Acharya Jagadish Chandra Bose Indian Botanic Garden is taken as a centre of conservation of plant resources from their extinction. This garden serves as a living repository of plants of a country and also of selected exotic species, and a 'safe abode' for the rare and endemic plants. As a result, it houses the germ plasm collection of selected economic, ornamental and medicinal plants and their wild progenitors. The garden also acts to promote educational programmes in order to generate awareness about the value of trees and other curious, beautiful, interesting plants with delightful landscaping and display. This garden also organises flower, foliage and plant shows etc.; exchange of viable seeds, seedlings and other propagules as well. As a whole, this garden acts as a data bank of information and documentation on holdings in the botanic garden.

During the time of establishment of this Garden in 1787, Bengal was reeling through the aftermath of 'Great Bengal Famine' and subsequent failure of crops. So the garden played a greater role for introduction of many crops and economic plants like Tea, Coffee, Mahogany, Teak, Cardamom, Cinchona, Cinnamon, Cotton, Indigo, Nutmeg, Pepper, Clove, Sugarcane, Potato, Sago, Cocoa etc., and other species used as food, vegetable, fodder, oil, fruit, fibre, timber and ornamental plants were first introduced into this historic Garden. Multiplication of most of the introduced species carried out in the Garden itself and distributed to different parts of the country for commercial cultivation. Such a way this garden has helped for the economic development of the country.

Deforestation: A Lurking Menace

Deforestation is the permanent destruction of forests in order to make the land available for other uses. An estimated 18 million acres (7.3 million hectares) of forest, which is roughly the size of the country of Panama, are lost each year, according to the United Nations' Food and Agriculture Organization (FAO).

Causes :

There are many causes of deforestation. The WWF reports that half of the

trees illegally removed from forests are used as fuel.

Some other common reasons are :

- To make more land available for housing and urbanization
- To harvest timber to create commercial items such as paper, furniture and homes
- To create ingredients that are highly prized consumer items, such as the oil from palm trees
- To create room for cattle ranching

Common methods of deforestation are burning trees and clear cutting. These tactics leave the land completely barren and are controversial practices.



The scene of deforestation in India

Clear cutting is when large swaths of land are cut down all at once. A forestry expert quoted by the Natural Resources Defense Council describes clear cutting as "an ecological trauma that has no precedent in nature except for a major volcanic eruption."

Slash – and-burn agriculture : Burning can be done quickly, in vast swaths of land, or more slowly with the slash-and-burn technique. Slash and burn agriculture entails cutting down a patch of trees, burning them and growing crops on the land. The ash from the burned trees provides some nourishment for the plants and the land is weed-free from the burning. When the soil becomes less nourishing and weeds begin to reappear over years of use, the farmers move on to a new patch of land and begin the process again.



Due to deforestation forests are changed into barren lands



A view of slash-and-burn agriculture

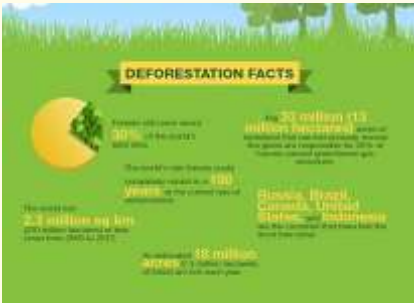
Deforestation and climate change :

Deforestation is considered to be one of the contributing factors to global climate change. According to Michael Daley, associate professor of environmental science at Lasell College in Newton, Massachusetts, the No. 1 problem caused by deforestation is the impact on the global carbon cycle.

Gas molecules that absorb thermal infrared radiation are called greenhouse gases. If greenhouse gases are in large enough quantity, they can force climate change,

according to Daley. While oxygen (O₂) is the second most abundant gas in our atmosphere, it does not absorb thermal infrared radiation, as greenhouse gases do.

Carbon dioxide (CO₂) is the most prevalent greenhouse gas. In 2012, CO₂ accounted for about 82 percent of all U.S. greenhouse gas, according to the Environmental Protection Agency (EPA). Trees can help, though. 300 billion tons of carbon, 40 times the annual greenhouse gas emissions from fossil fuels, is stored in trees, according to Greenpeace.



The deforestation of trees not only lessens the amount of carbon stored, it also releases carbon dioxide into the air. This is because when trees die, they release the stored carbon. According to the 2010 Global Forest Resources Assessment, deforestation releases nearly a billion tons of carbon into the atmosphere per year, though the numbers are not as high as the ones recorded in the previous decade. Deforestation is the second largest anthropogenic (human-caused) source of carbon dioxide to the atmosphere, ranging between 6 percent and 17 percent.

Carbon isn't the only greenhouse gas that is affected by deforestation. Water vapor is also considered a greenhouse gas. "The impact of deforestation on the exchange of water vapor and carbon dioxide between the atmosphere and the terrestrial land surface is the biggest concern with regard to the climate system," said Daley. Changes in their atmospheric concentration will have a direct effect on climate. Deforestation has decreased global vapor flows from land by 4 percent, according to a study published by the National Academy of Sciences. Even this slight change in vapor flows can disrupt natural weather patterns and change current climate models.

Other effects of deforestation :

Forests are complex ecosystems that affect almost every species on the planet. When they are degraded, it can set off a devastating chain of events both locally and around the world.

Loss of species : Seventy percent of the world's plants and animals live in forests and are losing their habitats to deforestation, according to National Geographic. Loss of habitat can lead to species extinction. It also has negative consequences for medicinal research and local populations who rely on the animals and plants in the forests for hunting and medicine.



Consequences of deforestation

Consequences of deforestation :

Water cycle : Trees are important to the water cycle. They absorb rain fall and produce water vapor that is released into the atmosphere. Trees also lessen the pollution in water, according to the North Carolina State University, by stopping polluted runoff. In the Amazon, more than half the water in the ecosystem is held within the plants, according to the National Geographic Society.

Soil erosion : Tree roots anchor the soil. Without trees, the soil is free to wash or blow away, which can lead to vegetation growth problems. The WWF states that scientists estimate that a third of the world's arable land has been lost to deforestation since 1960. After a clear cutting, cash crops like coffee, soy and palm oil are planted. Planting these types of trees can cause further soil erosion because their roots cannot hold onto the soil. "The situation in Haiti compared to the Dominican Republic is a great example of the important role forests play in the water cycle," Daley said. Both countries share the same island, but Haiti has much less forest cover than the Dominican Republic. As a result, Haiti has endured more extreme soil erosion, flooding and landslide issues.

Life quality : Soil erosion can also lead to silt entering the lakes, streams and other water sources. This can decrease local water quality and contribute to poor health in populations in the area.

Counteracting deforestation :

Many believe that to counter deforestation, people simply need to plant more trees. Though a massive replanting effort would help to alleviate the problems deforestation caused, it would not solve them all.

Reforestation would facilitate :

- Restoring the ecosystem services provided by forests including carbon storage, water cycling and wildlife habitat
- Reducing the buildup of carbon dioxide in the atmosphere
- Rebuilding wildlife habitats

Reforestation and massive plantation of trees would help in reducing global warming as well as making the earth greener for the future generation to live in. It would also help to revive the global biodiversity as well as regaining of lost species. Afforestation is the establishment of a forest or stand of trees in an area where there was no previous tree cover. Reforestation is the re-establishment of forest cover, either naturally (by natural seeding, coppice, or root suckers) or artificially (by direct seeding or planting). It is still necessary to avoid buildup in the atmosphere. Forestation is the establishment of forest growth on areas that either had forest or lacked it. Reforestation and afforestation are categories of forestation. Many governments and non-governmental organizations directly engage in programs of afforestation to create forests, increase carbon capture and carbon sequestration, and help to anthropogenically improve biodiversity. In addition to reforestation, some other tactics are being taken to counteract or slow deforestation.



Some of them include shifting the human population to a plant-based diet. This would lower the need for land to be cleared for raising livestock.

Global Forest Watch has also initiated a project to counteract deforestation through awareness. The organization uses satellite technology, open data and crowd sourcing to detect and alert others of deforestation. Their online community is also encouraged to share their personal experiences and the negative effects of deforestation.



Children should plant more trees and plants individually and collectively so that the process of greening of earth will continue. In such a way we can check global warming and green house effect. . Practically it will increase green cover and make afforestation possible

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