

4. Botanical Gardens Today Represent a Metric of National Success

Prelims Syllabus: Environment

Mains Syllabus: GS-III Environment & Biodiversity | Climatic Change Conservation, Environmental Pollution & Degradation, Eia



Why in News?

- The establishment of a large botanical garden in Tamil Nadu, the Chengalpattu Botanical Garden, is a welcome piece of news as it has the potential to become a major center for the exploration and discovery of India's plant wealth, research, education, citizen science, and outreach in plant biology.

Chengalpattu Botanical Garden (CBG):

- **It will be India's largest botanical garden:** The ₹300 crore Chengalpattu Botanical Garden (CBG), at Kadambur village in Chengalpattu district, is being planned across 138 hectares and will be India's largest botanical garden.
- **Potential major centre exploration and discovery of our plant wealth:** The CBG has the potential to become a major center for the exploration and discovery of our plant wealth, a center of research, education, citizen science, and outreach in plant biology, and be a forceful voice in conservation.

Background: Historical association of Plants and Gardens

- Plants have been the foundation of human civilization and the long-standing association of humanity with gardens can be traced back to the dawn of agriculture over 11,000 years ago. The tradition of home gardens, which are planned spaces around homes to grow edible and medicinal plants, has been noted in ancient texts and depicted in cave paintings, demonstrating the antiquity of gardening.
- Rulers, from ancient to modern civilizations, have owned botanical gardens that are rich in native plants and plants collected from distant places.
- These patrons of botanical gardens not only funded them but also oversaw botanical collections as a beautiful garden was a metric of one's prosperity and eclectic administration.

History of Botanical Gardens:

- European explorations led to the establishment of several academic botanical gardens between the 15th to 17th centuries.
- The oldest of these, Orto Botanico di Padova in Italy, was founded in 1545, and the most well-known, the Royal Botanic Gardens in Kew near London, was formally consolidated in 1840.

Botanical Gardens in India:

- **Oldest garden:** The oldest of the Indian academic gardens, the Acharya Jagadish Chandra (AJC) Bose Indian Botanic Garden, in Howrah, Kolkata, was established in 1787.
- **Exact number is not yet known:** The exact number of botanical gardens in India is not known, but only a handful of botanical gardens have plant exploration and education programs.
- **India's flora diversity:** India is home to approximately 47,000 plant species, which make up around 6-7% of the world's total plant species. The Western Ghats and the Eastern Himalayas are two of the world's top biodiversity hotspots, with a large number of endemic plant species found in these regions.
- **The Importance of Plants:** India has a high diversity of plants and animals. Plants are the structural foundations of our diverse ecological communities that feed us, provide us with nutrition and medicine, mitigate climate change, enrich our spirits, and secure us against an uncertain future. Yet, our knowledge of our vast botanical heritage is extremely limited.

What are Botanical Gardens?

- Botanical gardens are institutions that are dedicated to the collection, cultivation, preservation, and display of a wide range of plants, with the aim of promoting public education and awareness of the importance of plants in the ecosystem.
- These gardens may be associated with universities, museums, or government bodies, and are often open to the public for visitation and education.
- They are often involved in research, conservation, and horticultural activities, and may collaborate with other botanical gardens around the world to share knowledge and resources.
- Botanical gardens typically feature a variety of plants from different regions and climates, including rare and endangered species, and may also include features such as greenhouses, herbaria, and educational exhibits.

Significance of botanical gardens

- **Conservation of plant species:** Botanical gardens often maintain collections of rare, threatened, and endangered plant species for conservation purposes. These gardens also serve as a refuge for plants in danger of extinction and work towards their preservation.
- **Scientific research:** Botanical gardens play a significant role in scientific research related to plants and their uses. Researchers use the gardens to study the characteristics and behavior of various plant species, their adaptability to different environmental conditions, and their potential uses in medicine, agriculture, and other fields.
- **Education and awareness:** Botanical gardens offer an opportunity for the public to learn about plant diversity, conservation, and ecology. They often organize tours, exhibitions, and educational programs to raise awareness about the importance of plants and their role in sustaining life on earth.
- **Recreation and tourism:** Botanical gardens are often popular tourist destinations and provide a peaceful and scenic setting for people to relax and enjoy nature. They also offer recreational activities such as hiking, bird watching, and photography.
- **Aesthetic value:** Botanical gardens are also valued for their aesthetic beauty and are often designed to showcase different plant species in a visually appealing manner. The gardens often include water features, sculptures, and other artistic elements that enhance their beauty and appeal to visitors.

Challenges related to botanical gardens in India

- **Maintenance and conservation:** Botanical gardens require regular maintenance to ensure that the plants remain healthy and the infrastructure is in good condition. Lack of funding and trained staff can make it difficult to maintain the gardens, leading to deterioration of the plants and infrastructure.
- **Climate change:** Climate change is a major challenge for botanical gardens, as it can affect the growth and survival of plants. Changing rainfall patterns, temperature fluctuations, and extreme weather events can all have a negative impact on the plants in the gardens.
- **Invasive species:** Invasive species can pose a serious threat to the biodiversity of botanical gardens. These non-native plants can outcompete local species and disrupt the delicate balance of the ecosystem in the garden.
- **Urbanization:** Urbanization and the expansion of cities can lead to the destruction of natural habitats and reduce the available space for botanical gardens. It can also lead to increased pollution, which can have negative effects on the plants in the gardens.
- **Lack of public awareness:** Many people in India are not aware of the importance of botanical gardens and the role they play in conservation and research. This can make it difficult to raise funds and gain support for the gardens, which can limit their potential impact.

Way ahead: Steps to conserve botanical gardens in India

- **Conservation measures:** The conservation of botanical gardens can be done through various measures, such as preserving rare and endangered plant species, protecting the habitats of various plants, and using sustainable gardening practices.
- **Education and awareness:** Education and awareness programs should be conducted to promote the significance of botanical gardens and their role in preserving plant diversity. It can help in spreading the knowledge about the importance of plants, conservation methods, and ecosystem services.
- **Scientific research:** Scientific research on plant biology, taxonomy, and ecology can be carried out in botanical gardens. It can help in better understanding the plants and their natural habitat, thus helping in developing better conservation strategies.
- **Sustainable practices:** Botanical gardens should adopt sustainable practices, such as the use of eco-friendly materials, rainwater harvesting, and composting, to conserve the environment and reduce carbon footprint.

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- **Community participation:** Community participation can be encouraged in botanical gardens by organizing various events, such as plant shows, gardening competitions, and nature walks. It can help in creating awareness and generating interest in plant conservation.
 - **Collaboration and partnerships:** Collaboration and partnerships with various organizations, such as NGOs, research institutions, and government agencies, can help in creating a network for sharing knowledge, resources, and expertise. It can also help in developing new conservation strategies and initiatives.

Conclusion

- Given the complex engineering that goes behind the construction and maintenance of a successful garden, botanical gardens today represent a metric of national success, from the perspectives of science, technology, and outreach, just as in the golden ages of this region, dating as far back as the Maurya monarch, Aśoka, when a botanical garden was a display of prosperity, scientific dispositions, and eclectic administration.
- In this era of climate change and declining biodiversity, we need every inch of our backyards and elsewhere to nurture native plants and associated living organisms, to remind ourselves and the generations to come of the need to heal our earth through the power of plants.