

## ENVIRONMENTAL SUSTAINABILITY THROUGH PLANT PRESERVATION AND SUSTAINABLE DEVELOPMENT

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### ABSTRACT

**“Everything that isn’t me is environment.” - Albert Einstein**

Environmental sustainability has become an inevitable condition for the protection of global environment. It was in the late 1960’s; the nations all over the world realized the need for protecting the environment. Environmental protection developed in its current form, as a result of the intensive pollution and the resulted awareness among the public especially in the Western countries. The first global initiative for environmental protection was held in Stockholm, Sweden in 1972. The United Nations Conference on the Environment in Stockholm (1972) highlighted the environmental problems and need for protecting our mother nature. The nations adopted several principles for the proper management of the environment including the Action Plan for the Human Environment and Stockholm Declaration.

The Stockholm Declaration initiated 26 principles for attaining environmental sustainability. The Conference also led to the formation of the United Nations Environment Programme (UNEP) to evaluate and coordinate global efforts for the protection of environment and

promote sustainability. The most widely accepted definition of Sustainable Development was developed by Brundtland Commission in its report Our Common Future (1987). The commission defined sustainable development as development that meets the needs of present generation without compromising the needs and ability of future generation. Sustainable development aimed global efforts towards building a sustainable, inclusive, and resilient future. Environmental sustainability is crucial for the survival and well-being of all life on our planet. It requires us to balance economic development with protecting the natural resources that we rely on for our existence. One way to achieve environmental sustainability is through ecosystem preservation, which involves protecting the natural balance of ecosystems and the services they provide.

**Keywords: Environmental sustainability, ecosystem, plant preservation, pollution, biodiversity**

## 1. INTRODUCTION

Ecosystems are complex systems that include living organisms, their physical environment, and the interactions between them. They provide us with essential services, such as clean air and water, fertile soil for agriculture, and biodiversity that supports our food systems, medicine, and other industries. Ecosystems also help regulate the Earth's climate and mitigate the effects of natural disasters.

However, human activities, such as deforestation, pollution, and climate change, have disrupted the natural balance of ecosystems, resulting in the loss of biodiversity, degradation of soil and water quality, and increased frequency and intensity of natural disasters. Therefore, ecosystem preservation is essential to ensure the sustainability of our planet and the well-being of future generations.

Preservation of ecosystems can be achieved through various means, such as the protection of habitats, restoration of degraded ecosystems, and sustainable management of natural resources. For example, protected areas, such as national parks and wildlife reserves, provide essential habitat for wildlife and help to preserve biodiversity. Restoration of degraded ecosystems, such

as wetlands and forests, can help to recover the lost ecosystem services and mitigate the effects of climate change.

Furthermore, sustainable management of natural resources, such as fisheries, forests, and agricultural land, can ensure their long-term viability. Sustainable management practices, such as the use of organic farming methods, can reduce the negative impact of agriculture on the environment, improve soil quality, and maintain the health of the ecosystem.

Ecosystem preservation is crucial for achieving environmental sustainability. It involves protecting the natural balance of ecosystems and the services they provide, such as clean air and water, fertile soil for agriculture, and biodiversity that supports our food systems, medicine, and other industries. Preserving ecosystems can be achieved through various means, such as the protection of habitats, restoration of degraded ecosystems, and sustainable management of natural resources. It is our responsibility to protect and preserve ecosystems to ensure the sustainability of our planet and the well-being of future generations

## 2. ENVIRONMENTAL SUSTAINABILITY

Environmental sustainability is a crucial issue facing the world today. The preservation of ecosystems is a critical component of achieving environmental sustainability. Ecosystems provide vital services such as regulating the climate, purifying water, and providing habitats for wildlife. Unfortunately, ecosystems are under threat from human activities such as deforestation, pollution, and overfishing.

Ecosystem preservation is crucial for maintaining the delicate balance of nature. Ecosystems are complex, interconnected systems where every species plays a role in maintaining the health of the system. When one species is lost or disrupted, it can have a cascading effect on the entire ecosystem. For example, the loss of bees, which are vital pollinators, can lead to a decline in crop yields and threaten the food security of entire communities.

Ecosystems also provide important services that are essential to human well-being. For example, forests regulate the climate by absorbing carbon dioxide from the atmosphere and releasing oxygen. They also help to prevent soil erosion and provide habitats for wildlife. Wetlands, such

as marshes and swamps, help to purify water by filtering out pollutants and providing habitat for aquatic species. Without these services, human life would be significantly impacted.

Preserving ecosystems is also important for biodiversity. Biodiversity is the variety of life on Earth and includes all species of plants, animals, and microorganisms. Biodiversity is essential for ecosystem function and provides us with a wide range of benefits such as food, medicine, and materials for construction. However, biodiversity is under threat due to human activities such as habitat destruction and climate change. Protecting ecosystems is critical for preserving biodiversity and ensuring that we continue to have access to these benefits. Ecosystem preservation is essential for achieving environmental sustainability. Ecosystems provide vital services, such as regulating the climate and providing habitats for wildlife, that are essential for human well-being. Preserving ecosystems is also important for maintaining biodiversity, which provides us with a wide range of benefits. We must take action to protect ecosystems from the threats posed by human activities, and work towards a sustainable future where ecosystems are preserved for future generations.

### **3. POLLUTION LEVELS & DEFORESTATION STATISTICS IN INDIA**

According to the World Air Quality Report 2020, India is home to 22 of the world's 30 most polluted cities. The report also found that air pollution levels in India have increased by 90% since 2010.

In terms of specific pollutants, a report by the World Health Organization (WHO) found that India has the highest levels of PM<sub>2.5</sub>, a fine particulate matter that can cause respiratory and cardiovascular problems, in the world. The report also found that 13 of the world's 20 cities with the highest levels of PM<sub>2.5</sub> are in India.

In 2019, 99% of the world population was living in places where the WHO's strictest 2021 air quality guideline levels were not met (UNEP (2020) Pollution Action Note). Globally, air pollution is a major environmental health risk, responsible for an estimated 7 million premature deaths annually, according to the WHO. The majority of these deaths occur in low- and middle-income countries, such as India.

Water pollution is also a significant problem in India, with many rivers and water bodies contaminated with pollutants such as sewage, agricultural runoff, and industrial waste. According to a report by the Central Pollution Control Board (CPCB), nearly half of India's rivers are polluted to the extent that they are not fit for bathing, fishing, or irrigation.

India has experienced significant deforestation in recent years, with a loss of approximately 9.4 million hectares of forest cover between 2001 and 2018. According to the Global Forest Watch, India lost 1.5 million hectares of tree cover between 2001 and 2018, which is an average of 64,000 hectares per year. In 2019, India ranked third in the world for the highest amount of primary forest loss, behind Brazil and Indonesia. The major causes of deforestation in India include agricultural expansion, logging, infrastructure development, mining, and wildfires. Forest degradation and deforestation have led to a decline in India's forest cover, which now stands at around 24.39% of the country's total land area. Deforestation has severe consequences for India's biodiversity, as many species rely on forest habitats for their survival.

The government of India has implemented various measures to combat deforestation, such as the National Afforestation Program and the Compensatory Afforestation Fund Management and Planning Authority. Some non-governmental organizations in India, such as the Wildlife Conservation Society-India and the Indian Council for Forestry Research and Education, are also working to address the issue of deforestation through conservation and research efforts.

There have been several plant species that have gone extinct in India due to human interaction.

Indian Sandalwood (*Santalum album*) - This plant was once abundant in the Western Ghats region of India. However, due to over-exploitation for its fragrant wood and oil, it is now considered extinct in the wild.

Malabar chestnut (*Pachira macrocarpa*) - This tree, also known as the money tree, was once found in the forests of the Western Ghats and the Eastern Himalayas. However, deforestation and habitat destruction have led to its extinction in the wild.

Himalayan yew (*Taxus wallichiana*) - This plant was once abundant in the Himalayan region of India. However, over-harvesting for its valuable wood, which contains a compound used to make cancer-fighting drugs, has led to its extinction in many parts of the region.

Indian ebony (*Diospyros ebenum*) - This tree, which is prized for its hard, black wood, was once found in the forests of the Western Ghats and the Eastern Himalayas. However, over-exploitation for its wood has led to its extinction in many parts of India.

*Rauvolfia serpentina* (Sarpagandha) - This plant, which is used in traditional Ayurvedic medicine, was once abundant in India. However, over-harvesting for its medicinal properties has led to its extinction in the wild in many parts of the country.

These are just a few examples of plant species that have gone extinct in India due to human interaction. The loss of these species has not only impacted the biodiversity of the region but has also affected traditional medicine and local livelihoods.

#### 4. THE STATE OF INDIA'S ENVIRONMENT REPORT 2023

The State of India's Environment report 2023, published by the Centre for Science and Environment (CSE) and Down to Earth (DTE) Magazine, evaluates a wide range of issues, including water, plastics, forests, and biodiversity in addition to climate change, agriculture, and industry.

The yearly report has a strong emphasis on the food, health, and migration systems. It also covers subjects like biodiversity, forestry and wildlife, energy, industry, habitat, pollution, waste, and rural development. CSE is a research-based organisation with a New Delhi base that promotes the general welfare.

##### Major Highlights of the Report

- India produces 150,000 tonnes of municipal solid waste (MSW) every day, of which more than half is either disposed of in landfills or encroaches on more than 30,000 aquatic bodies.
- In India, 4 years and 11 months on average are lost to air pollution.
- Due to health issues brought on by air pollution, more years are wasted in rural India than in the city.
- 35% increase in community health facilities is needed in rural India.

- Environmental crimes continue unabatedly, and courts need to handle 245 cases every day to clear the backlog.
- Between January and October 2022, there were 271 days with severe weather in India.
- The severe weather claimed the lives of more than 2,900 individuals.

There is growing evidence in agriculture that conventional and regenerative agricultural methods are effective. The evidence for the efficacy of traditional and regenerative farming methods is emerging. It is a sad fact that forests are vanishing, but at the same time, more and more people are requesting rights to their woods, and these demands are even being granted, in relation to the topic of forests and biodiversity.

Despite the fact that the problem of plastic trash is still very large, several policies and urgency are moving in the right way. Cities are learning to segregate waste at the source, use less plastic, and recycle waste to make money as they become more waste-aware.

India ranked 121 in 2022 after falling nine positions in the last five years in the global standing for meeting the Sustainable Development Goals (SDGs) established by the UN. In the bottom position, India is behind Bangladesh, Bhutan, Sri Lanka, and Nepal in South Asia. India had a total SDG score of 66 out of 100. 192 members of the United Nations adopted the Sustainable Development Goals (SDG) in 2015 as a component of the 2030 agenda. India's rating declined primarily as a result of the country having a tough time reaching the 11 SDGs, which include eradicating hunger, promoting general health and wellbeing, attaining gender equality, and creating sustainable cities and communities. India also performed low in terms of having access to high-quality education and rural life. In 2021, India battled to end hunger and ensure food security, achieve gender equality and build resilient infrastructure, promote inclusive and sustainable industrialization, and support innovation.

## 5. INDIA'S INITIATIVES FOR ENVIRONMENTAL PROTECTION

Plant conservation in India is crucial as the country is home to a diverse range of plant species. India has about 47,000 plant species, of which around 15,000 are endemic to the country, which means they are found nowhere else in the world. India also has a rich tradition of using plants for

medicinal purposes, and many of these plants are now endangered due to over-exploitation and habitat loss.

To address these issues, India has several initiatives in place for plant conservation. The Botanical Survey of India (BSI) is a premier institution in the country that is responsible for documenting plant diversity, conducting research, and identifying and conserving rare and endangered plant species. The BSI maintains a National Herbarium, which is a repository of plant specimens collected from across the country.

India has also established several national parks, wildlife sanctuaries, and biosphere reserves to protect plant species and their habitats. These protected areas not only conserve plant diversity but also support the conservation of wildlife, including endangered species such as tigers, elephants, and rhinoceros.

The Indian government has also enacted laws and regulations to protect plant species. The Wildlife Protection Act, 1972, provides legal protection to plants and animals against poaching and illegal trade. The Forest Conservation Act, 1980, aims to protect forests and their biodiversity by regulating the diversion of forestland for non-forestry purposes.

Several non-governmental organizations (NGOs) are also working towards plant conservation in India. For example, the Foundation for Revitalization of Local Health Traditions (FRLHT) is working towards the conservation of medicinal plants in India. The FRLHT has established a Medicinal Plants Conservation Area in Karnataka, which is a unique model for conservation that involves local communities in the management of the area.

Overall, plant conservation in India is a multi-dimensional effort that involves government institutions, NGOs, and local communities. These efforts are essential to ensure the conservation of India's rich plant biodiversity and to support sustainable development in the country

There are various initiatives and programs for plant preservation in India, both by the government and non-governmental organizations (NGOs). Here are some statistics related to plant preservation in India:



**National Green India Mission:** The National Green India Mission (NGIM) was launched in 2014 to increase forest and tree cover in the country. Under NGIM, a target of increasing the forest and tree cover to 33% of the total geographical area of the country has been set. As of 2021, the forest cover in India is 24.56% of the total geographical area, and the tree cover is 3.07%.

**State-wise forest cover:** According to the India State of Forest Report 2019, the top five states with the highest forest cover in India are Madhya Pradesh, Arunachal Pradesh, Chhattisgarh, Odisha, and Maharashtra. The state with the lowest forest cover is Haryana.

**National Medicinal Plants Board:** The National Medicinal Plants Board (NMPB) was set up in 2000 to promote the conservation and cultivation of medicinal plants in India. As of 2021, NMPB has identified 385 endangered plant species in India and is working towards their conservation.

**Botanical Survey of India:** The Botanical Survey of India (BSI) was established in 1890 to survey, collect, and document plant resources in India. As of 2021, BSI has documented over 49,000 plant species in India.

**Indian Council of Forestry Research and Education:** The Indian Council of Forestry Research and Education (ICFRE) is an autonomous body under the Ministry of Environment, Forest and Climate Change. ICFRE conducts research and provides training on forestry and allied disciplines. As of 2021, ICFRE has 9 research institutes and 5 regional centers across India.

Overall, while there are various initiatives and programs for plant preservation in India, there is still a need for more concerted efforts to protect and conserve the country's rich plant biodiversity.

## **6. PLANT PRESERVATION: A KEY TO ENVIRONMENTAL SUSTAINABILITY**

Plant preservation and environmental sustainability are closely related, as plants play a critical role in maintaining a healthy environment. Plants are responsible for producing oxygen, filtering pollutants from the air, and providing food and shelter for a wide range of animal species.

Here are some ways that plant preservation can contribute to environmental sustainability:

**Conserving biodiversity:** Plants are a vital component of the earth's biodiversity, and conserving plant species can help protect entire ecosystems. By preserving plants and their habitats, we can ensure that the biodiversity of our planet is maintained, and that ecosystems are able to function properly.

**Carbon sequestration:** Plants absorb carbon dioxide from the atmosphere through photosynthesis, helping to mitigate the effects of climate change. By preserving and planting more trees and other vegetation, we can increase the amount of carbon that is sequestered from the atmosphere.

**Soil conservation:** Plants play a crucial role in preventing soil erosion and maintaining healthy soil. Preserving plant species and their habitats can help prevent soil degradation, which in turn can help ensure that our soil remains fertile and able to support plant growth.

**Sustainable agriculture:** Preserving plant species can also help promote sustainable agriculture practices. By preserving traditional crop varieties and other important plants, we can help ensure that farmers have access to a diverse range of crops that are well-adapted to local conditions.

Overall, plant preservation is critical to environmental sustainability, and efforts to protect plant species and their habitats are essential for ensuring a healthy and thriving planet.

## **7. CONCLUSION**

Environmental sustainability in India is a critical issue given the country's large population, rapid industrialization, and diverse ecosystems. India faces numerous environmental challenges, including air and water pollution, deforestation, waste management, and climate change. However, the Indian government and various organizations have taken several initiatives to promote environmental sustainability and address these challenges. While significant progress has been made, challenges remain in implementing and enforcing environmental regulations, ensuring effective waste management, and addressing the complexities of sustainable development. Continued efforts and collaboration among government, businesses, civil society, and individuals are essential for achieving long-term environmental sustainability in India.

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