

# Impact of Biodiversity Park on Surrounding Environment

Mansi L. Rohit\*, Isha Pandya, Bharat Maitreya

*Department of Botany, Bioinformatics and Climate Change Impacts Management, School of Sciences, Gujarat University, Navrangpura, Ahmedabad – 380009*

## ABSTRACT

Biodiversity parks serve a key role in conserving natural ecosystems, protecting endangered species, and encouraging ecological equilibrium. By acting as living habitats for plants and animals, these parks lessen the negative consequences of urbanization and climate change. They improve air quality, control temperature, and promote groundwater recharge by protecting native plant species. Biodiversity parks also help sequester carbon, which lowers the carbon impact overall. They also act as hubs for environmental awareness and education, helping communities get a better understanding of ecological sustainability. These green areas also serve as habitats for a variety of species, which supports pollination, soil fertility, and the preservation of biodiversity in general. Beyond its ecological advantages, biodiversity parks have a positive social and psychological impact by providing recreational opportunities and enhancing mental health. All things considered, biodiversity parks are crucial to repairing damaged ecosystems, halting environmental deterioration, and guaranteeing a sustainable future for both human and wildlife populations.

**Keywords:** Biodiversity, Biodiversity Park, environment impact

## INTRODUCTION

It can be incredibly stressful to live in a city. Numerous variables, like pollution, loud noises, strong artificial lights and Odors, and crowding, cause people to be overstimulated with unwanted stimuli, which can have an adverse effect on their mental health and general well-being. (Gonçalves, P. 2021). Engaging with nature can provide a variety of advantages that could help counteract these impacts (Gonçalves, P. 2021). The effects of biodiversity on physical well-being. The emphasis is on non-communicable diseases that exposure to biodiversity and green space can either cause or prevent (Marselle, M. R. 2019). Biodiversity Park is simply an attempt to achieve harmony between nature and people. The human population is undoubtedly the primary cause of the extinction and disappearance of all flora and animals, and this imbalance has disrupted the entire biological and ecological world. One of the most valuable natural resources for human survival is biological diversity, whose gradual decline could lead to a decline in class economic value in the direction of the individual contest. The few protection resources available must be strategically listened to in addition to opportunities likely to provide the most

conservation benefit. Restoring the balance between people and the atmosphere is the goal of biodiversity conservation (Singh, A. K. 2017). It contributes to the functioning of an ecosystem by offering a variety of functions, including the cycling of nutrients and water, the formation and retention of soil, resistance to invasive species, plant pollination, climate regulation, and protection from pests and pollutants. (Mishra, Dev & Pathak, I. 2020). Biodiversity is valuable both economically and ecologically. It provides us with a variety of necessities, including clothing, food, shelter, and fuel. It also gains from the financial gains made by tourism. Therefore, leading a healthy lifestyle requires a solid awareness of biodiversity (Pant, P.).

## 2.About Biodiversity

The variety of living things, including terrestrial, marine, and aquatic ecosystems as well as ecological complexes, is known as biodiversity. This encompasses species, interspecies, and ecosystem diversity. It lays the foundation of the broad array of ecosystem services that critically contribute to all human beings. Both naturally occurring and human-managed ecosystems depend on biodiversity (Singh, A. K. 2017). It is the cornerstone of ecosystem

**Relevant conflicts of interest/financial disclosures:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



services, to which humans are closely connected. The variety of life on Earth is referred to as "biological diversity" or "biodiversity." It refers to the diverse range of ecosystems and living things, including plants, animals, their genes, and their habitats. The earth and the processes of evolution are extremely old occurrences. The term biodiversity was first used around the year 1970. For ecosystems to work properly, it is essential for things like oxygen, food, fresh water, rich soil, medications, shelter, storm and flood protection, a stable climate, and leisure. Interacting with nature can lead to a number of advantages, including decreased stress and anxiety as well as enhanced cognitive function, self-worth, joy, and life satisfaction (Singh, A. K. 2017).

### 3. Biodiversity Park

Biodiversity parks are special wilderness settings that preserve and restore ecological assemblages of native species in the form of biological communities across a few hundred hectares of marginal or degraded land. To put it another way, Biodiversity Parks are nature reserves that preserve the region's natural history and offer cultural, educational, and conservation benefits while also improving the environment in urban areas. Restoring self-sustaining ecosystems with local flora and animals is the fundamental idea behind the Biodiversity Park, which aims to improve the quality of the urban environment (Singh, A. K. 2017). The goal behind the Biodiversity Park's construction was to combine the interests and experiences of various actors from the social, educational, and training sectors that operate in the Treviso, Italy, area. First and foremost, the 15000 m<sup>2</sup> green space where the park is being developed is owned by the Municipality of Treviso (Khan, M. A. A., & Krishna, A. 2017). One of the world's 17 mega-biodiversity nations is India. India features four biodiversity hotspots out of a total of 35: The Western Ghats, the Eastern Himalaya, the Indo-Burma, Sri Lanka, and Sundaland (Venkataraman, K., & Sivaperuman, C. 2018). Ecologists and conservation biologists who recognized the urgent need to preserve biodiversity in urban and semi-urban areas and to preserve a certain amount of wilderness in urban areas came up with the idea for Biodiversity Parks. These parks are regarded as a means of putting the three fundamental goals of the Convention on Biological Diversity—resource sharing, sustainability, and conservation—into

practice (Koul, M. 2017). The Biodiversity Park serves as a platform for knowledge growth, research, and education regarding the principles of local ecology and native species conservation and protection (Mishra, Dev & Pathak, I. 2020). The park's design is based on the fundamental idea of a complicated multistate agroforestry system. Two or more tree strata dominate land use, forming a complex agroforestry system with forest-like features. (Mishra, Dev & Pathak, I. (2020) The secret to maintaining agricultural productivity is biodiversity (Weishaguna, Weishaguna, 2018). Given their role as homes for biodiversity, green areas have become increasingly important in metropolitan settings (Bele, Archana & Chakradeo, Ujwala. 2021). The Delhi Development Authority (DDA) established the first Biodiversity Parks in India. The first phase was initiated close to Burari, Wazirabad, and the region was named Yamuna Biodiversity Park since it was chosen on a large area close to the Yamuna River and includes a portion of the Yamuna Flood Plains. Since a significant portion of the second area is part of the Aravalli Mountain Range, it was selected close to Mehrauli and stretches to Gurugram, Haryana. It was given the name Aravalli Biodiversity Park (Koul, M. 2017). From the microbes that help form the human biome to the genes that help us adapt to environmental stress, biodiversity provides resilience. It supports all types of livelihoods, may help regulate disease, and is essential for social, mental, and spiritual well-being as well as physical health (Buttke, 2014). Biodiversity is valuable both economically and ecologically. It provides us with a variety of necessities, including clothing, food, shelter, and fuel. It also gains from the financial gains made by tourism. Therefore, leading a healthy lifestyle requires a solid awareness of biodiversity (Pant, P.). the identification and verification of plant taxonomic names, the preservation and conservation of the genetic resources of both flora and animals, and the development and restoration of the current dry land and wetland environment (Khan, M. A. A., & Krishna, A. 2017). Ponds and other bodies of water are also valued for the park's fauna's survival and spread (Khan, M. A. A., & Krishna, A. 2017). The presence of biodiversity parks will give the community plenty of room for social and economic activity. The development site is also rather large (Weishaguna, Weishaguna, 2020). Through its various services, including pollination of

plants, soil formation and retention, resistance to invasive species, nutrient and water cycling, climate regulation, and pest and pollution control, it plays a significant role in the operation of an ecosystem (Mishra, Dev & Pathak, I. 2020). Nonetheless, a significant percentage of the vegetated land area is made up of agricultural ecosystems, and the impact of biodiversity on ecosystem characteristics in these systems is highly relevant from a practical standpoint

(Schläpfer, F., & Schmid, B. 1999). Urban green spaces—more especially, urban parks—are intricate social-ecological systems that serve as both ecologically significant reservoirs of biodiversity and socially significant gathering places (Gonçalves, P. 2021).

### 3.1. Biodiversity parks Other than Gujarat

No	Name of Park	Place
1	Mollem Biodiversity Park	Mollem, Goa
2	Shri Guru Nanak Dev Ji Biodiversity Park	Kapurthala, Punjab
3	Yamuna Biodiversity Park,	Wazirabad, Delhi
4	Aravalli Biodiversity Park	Vasant Vihar, Delhi
5	Tilpath Valley Biodiversity Park,	Sainik Farms, Delhi
6	Tughlaqabad Biodiversity Park	Tughlaqabad, Delhi
7	Neela Hauz Biodiversity Park	Vasant Kunj, Delhi
8	Kamla Nehru Ridge	Civil Lines, Delhi
9	Kalindi Biodiversity Park	Okhla, Delhi

### 3.2. In Gujarat

1	Indroda Nature Park	Gandhinagar, Gujarat
2	GEER Foundation's Biodiversity Park	Gandhinagar, Gujarat
3	Sabarmati Riverfront Biodiversity Park	Ahmedabad, Gujarat
4	Kisna Nature Park	Surat, Gujarat
5	Vansda National Park	Vansda, Gujarat
6	Jambughoda Wildlife Sanctuary	Panchmahal, Gujarat
7	Gir National Park	Sasan Gir, Gujarat

## 4. Environmental Impact

The Biodiversity Park was created with numerous considerations for the preservation of plants and animals in mind. These are a few of Biodiversity Park's significant functions (Hussain, A. 2022-23).

**I. Quality of Air** Both point and non-point sources of air pollution can be effectively filtered by the varied forest communities, which have a top canopy that is 40–45 feet high and has a canopy that is two to three stories high (Hussain, A. 2022-23).

**II. Water Recharge on the Ground** Every year, a significant amount of rainwater is recharged into the ground water by the forest communities, grasslands, and wetlands (Hussain, A. 2022-23).

**III. The Carbon Sink** the Biodiversity Parks help mitigate and adapt to climate change and foster climate resilience because they are significant CO<sub>2</sub> sinks and store vast amounts of carbon (Hussain, A. 2022-23).

**IV. The Microclimate** In addition to buffering local meteorological conditions, especially ambient temperature, the biodiversity parks with their varied forest ecosystems also set up local cloud formation, which causes localized precipitation (Hussain, A. 2022-23).

**V. Human Microbiome** Enrichment By improving immunity, the human microbiome will lower health risks and the burden on the population (Hussain, A. 2022-23).

**VI. Bio-reserve:** Biodiversity parks varied biological niches provide perfect homes for endangered plants and animals, making them nature reserves that preserve natural heritage (Hussain, A. 2022-23).

**VII. Education:** By acting as living museums and labs, biodiversity parks support nature conservation efforts and conduct research on ecosystem services and processes (Hussain, A. 2022-23).

**VIII. Recreation** Biodiversity parks connect the city and its residents to biodiversity, offer recreational opportunities, and encourage ecotourism (Hussain, A. 2022-23).

**IX. Economy** By using local people as tour guides, biodiversity parks help to support their livelihoods (Hussain, A. 2022-23).

**X. Reviving Rivers and Lakes** By using artificial or natural wetlands to cleanse wastewater before it enters rivers and lakes, biodiversity parks can also help to revitalize these bodies of water (Hussain, A. 2022-23).

Important regulation services including carbon sequestration, reducing the effects of extreme events, preserving soil and air quality, and halting the spread of disease are provided by biodiversity and ecosystems (Weiskopf, S. R. 2020). Climate change, land or water degradation, changes in land or water use, and direct species deaths from collisions with infrastructure were the primary negative impacts (Kim, H. 2024). Alternatively, the consequences of vector-borne diseases and invasive alien species were the only evidence of biodiversity negatively affecting the other nexus members. Additionally, a variety of research shown how co-benefit-promoting techniques can foster favourable interactions between biodiversity and the other nexus parts (Kim, H. 2024). These included the preservation and restoration of ecosystems and species that offer vital ecosystem services, biodiversity-friendly management in pertinent sectors, green and blue infrastructure, including nature-based solutions, and climate change-reducing, sustainable, and healthful diets (Kim, H. 2024). Health trends are also impacted by social, political, and broader environmental variables. Climate change has an impact on health through climate extremes like high temperatures and climate-related catastrophes like flooding (Marselle, M. R. 2019). Biodiversity and climate serve as crucial "boundary conditions" for human health and welfare. Through natural habitats and related ecosystem activities, these boundary conditions have an impact on numerous other factors that impact people's health and well-being (Marselle, M. R. 2019). The procedures that replenish resources and provide a usable, livable environment are known as regulating services. These include the well-known ecosystem

services of purifying the air and water, as well as the less well-known ones of modifying the climate, influencing immunological and brain function (due to symbiotic bacteria, the human "microbiome"), and influencing infectious disease (Buttke, 2014). The healthy, functioning ecosystems that comprise the Earth are made possible by biodiversity, and without them, human societies could not function (Morton, S., & Hill, R. 2014). Through identity expression, spirituality, or aesthetic enjoyment, biodiversity contributes to cultural values (Morton, S., & Hill, R. 2014). Though not mental health, a wide variety of habitats and ecosystems may enhance mental well-being (Das, S. C. 2018).

## CONCLUSION

Ecological rehabilitation and environmental sustainability depend on biodiversity parks. They act as natural refuges that promote the preservation of wildlife, strengthen urban resilience to climate change, and improve the quality of the air and water. In addition to their ecological benefits, these parks offer worthwhile chances for community involvement, education, and recreation, which promotes a sense of shared responsibility for the environment. In order to preserve natural balance as urbanization grows, biodiversity parks must be incorporated into both urban design and rural conservation initiatives. In addition to protecting the environment, funding the creation and upkeep of biodiversity parks would enhance the standard of living for coming generations

## REFERENCE

1. Bele, Archana & Chakradeo, Ujwala. (2021). Public Perception of Biodiversity: A Literature Review of Its Role in Urban Green Spaces. *Journal of Landscape Ecology*. 14. 000010247820210008. 10.2478/jlecol-2021-0008.
2. Buttke, Danielle & Allen, Diana & Higgins, Charles. (2014). Benefits of biodiversity to human health and well-being. *Park Science*. 31. 24-29.
3. Das, S. C., Alam, M. S., & Hossain, M. A. (2018). Diversity and structural composition of species in dipterocarp forests: a study from Fasiakhali



- Wildlife Sanctuary, Bangladesh. *Journal of forestry research*, 29, 1241-1249.
4. Gonçalves, P., Grilo, F., Mendes, R. C., Vierikko, K., Elands, B., Marques, T. A., & Santos-Reis, M. (2021). What's biodiversity got to do with it? Perceptions of biodiversity and restorativeness in urban parks. *Ecology and society*.
  5. Hussain, A. (Year). Impact Assessment of Biodiversity Park in Sustainable Development of the Region - Tughlakabad Biodiversity Park, Delhi. [Master's dissertation, Name of University].
  6. Khan, M. A. A., & Krishna, A. (2017). Agro-biodiversity park for conservation and preservation of native flora and fauna in Professor Jayashankar Telangana State Agricultural University. India. *Journal of Agricultural Science and Technology B*, 7,351-357.
  7. Kim, H., Lazurko, A., Linney, G., Maskell, L., Díaz-General, E., Březovská, R. J., ... & Harrison, P. A. (2024). Understanding the role of biodiversity in the climate, food, water, energy, transport and health nexus in Europe. *Science of the Total Environment*, 171692.
  8. Koul, M. (2017). Biodiversity Parks—Restoring Degraded Environments.
  9. Marselle, M. R., Stadler, J., Korn, H., Irvine, K. N., & Bonn, A. (2019). Biodiversity and health in the face of climate change (p. 481). Springer Nature.
  10. Mishra, Dev & Pathak, I. (2020). Impact of Pollution on Biodiversity: A Review. 4. 11-15.
  11. Morton, S., & Hill, R. (2014). What is biodiversity, and why is it important. *Biodiversity: science and solutions for Australia*, 1-12.
  12. Pant, P., Rawat, A., & Awais, M. Animal Diversity in Uttarakhand, India.
  13. Schläpfer, F., & Schmid, B. (1999). Ecosystem effects of biodiversity: a classification of hypotheses and exploration of empirical results. *Ecological Applications*, 9(3), 893-912.
  14. Singh, A. K. (2017). Biodiversity Park: an innovative approach for green environment. *Rai Journal of Technology Research & Innovation*, 5(1), 9-11.
  15. Venkataraman, K., & Sivaperuman, C. (2018). Biodiversity hotspots in India. *Indian Hotspots: Vertebrate Faunal Diversity, Conservation and Management Volume 1*, 1-27.
  16. Weishaguna, Weishaguna & Mutia, Astri & Damayanti, Verry & Rochman, Gina. (2020). The Concept of Biodiversity Park Plan and Design for Abandoned Land Based on Community Participation. 10.2991/assehr.k.200225.065.
  17. Weiskopf, S. R., Rubenstein, M. A., Crozier, L. G., Gaichas, S., Griffis, R., Halofsky, J. E., ... & Whyte, K. P. (2020). Climate change effects on biodiversity, ecosystems, ecosystem services, and natural resource management in the United States. *Science of the Total Environment*, 733, 137782.

**HOW TO CITE:** Mansi L. Rohit\*, Isha Pandya, Bharat Maitreya, Impact of Biodiversity Park on Surrounding Environment, *Int. J. Sci. R. Tech.*, 2025, 2 (4), 497-501. <https://doi.org/10.5281/zenodo.15253923>