

Role of Biodiversity and Ecological Consequences in India

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ABSTRACT

India has a diverse climate and topography; different kinds of forests, with a minimum of ten distinct bio-geographical areas, there are many as well as three biodiversity hotspots on the planet's surface. Because other native habitats have lost their native status, the forest currently houses the majority of terrestrial species. There is a vast network of protected areas in place, including 514 wildlife sanctuaries, there are 99 national parks in the United States, 18 biosphere reserves are included in the project, and several holy groves managed by native groups. Due to increased people in the world demands, land use changes, and the introduction of invasive alien species, forest degradation and biodiversity loss persist despite a favorable forest policy and a strong regulatory framework. The extent and loss of biodiversity must be constantly monitored, and individuals must be encouraged to join in large-scale biodiversity conservation rehabilitation.

Keywords: biodiversity, value, species diversity, ecological, conservation

I. INTRODUCTION

Biodiversity refers to the enormous variety of life on the globe. It can also apply to all of the species present in a given region or environment. Biodiversity refers to the diversity of all living things, including plants, bacteria, animals, and humans. According to scientists, the world's plant and animal species number approximately 8.7 million. So far, only about 1.2 million species have been identified and described so far, with insects accounting for the majority of them. This implies that millions of different animals could exist.

Over centuries, all living species have developed distinguishing characteristics that set them apart from other species. Scientists utilize these traits to differentiate between different species. Different species are organisms that have evolved to the point that they are no longer capable of reproducing. A single species is made up of all organisms that can reproduce with one another.

Given that there is still so much biodiversity to find, the amount of biodiversity on a global scale is of interest to scientists. They also include the number of species in a single habitat, grassland, such as a forest, lake or tundra. From bugs to snakes to antelopes, single Grassland can sustain a wide range of species spectrum of animals. Tropical regions, for example, have a warm and humid climate that is ideal for plant growth in ecosystems with the greatest biodiversity. Ecosystems can also hold creatures that are too small for humans to notice. Examining soil or water samples under a microscope shows a vast world of bacteria and other microscopic creatures.

Some places in the world have more biodiversity than others. Greetings from, South Africa, the southwestern United States, Brazil, Mexico, and Madagascar. Areas with exceptionally high levels of biodiversity are known as hotspots. Endangered species, or species that can only be found in one location, can also be found in hotspots.

All of the Earth's species work together to survive and protect their ecosystems. Cattle, for illustration, graze on pasture grass. Cattle then produce excrement, which replenishes soil nutrients and promotes grass growth. This manure can also be used as a fertiliser in agriculture. Food, clothing, and medicine are all provided by a variety of species.



Figure 1: Biodiversity refers to the enormous variety
Source: <https://www.nationalgeographic.org/encyclopedia/biodiversity>

Despite the fact that insects all share the same structure and may be genetic cousins, the stunning range of colors, forms, facade, and extents demonstrates the near of difference that can exist level among near linked species. Frans Lanting took the photo.

A number of scientists, including Subba Rao (2001), Kaushik et al. (2008), Prakash et al. (2016, and 2017, 2018), have detailed and described biodiversity from time to time. The authors are attempting to examine biodiversity loss and its ecological consequences in India in this conversation.

II. BIODIVERSITY OF INDIA

India is a mega diverse country, home to roughly 10 percent of the biosphere's kinds. It also has a long and illustrious national history dating 1000s of years ago. Much of India's biodiversity is inextricably linked to the country's socio-cultural activities. In this post, we provide a comprehensive overview of India's biodiversity.



Figure 2: India's Biodiversity
Source: <https://indiabiodiversity.org>

At the global, regional, and local levels, the environmental services provided by species and ecosystems are critical. India is a mega diverse country that is home to roughly ten percent of all species on the planet. It also has a long and illustrious national history dating 1000s of years ago. Far of India's biodiversity is inextricably linked to the country's socio-cultural activities. Several species are threatened with extinction as a consequence of population growth, the effects of global warming, or the lax execution of environmental legislation. The following is a comprehensive overview of India's biodiversity:

2.1 India's Flora and Fauna

There is 7–8 percent more plant and animal species in India than anywhere else in the world, but it only takes up 2.4 million square miles of the world's surface area.

1. Plants account for roughly 45,000 species or about seven percent of the total global. Around a third of them are widespread.
2. There are approximately 91,000 animal species on the planet, accounting for approximately 6.5 percent of all fauna. They include 2,456 fish species, 1,230 bird species, 60,000 insect species, over 440 reptiles and amphibians, 372 mammals, with 200 amphibians having the largest concentration in the Western Ghats, and 500 molluscs.
3. There is a lot of variety in the livestock. India has 400 sheep breeds, 27 cattle types, and 22 goat breeds.
4. There are 15,000 flowering plants on the globe, accounting for 6 percent of the whole. Approximately 1500 different types of plants are on the verge of extinction.

2.2 India's Biodiversity Classification

1. **Malaya's Biodiversity:** Runs along the Eastern Himalayas' thickly forested sections and along the shoreline.
2. **Ethiopia's Biodiversity:** Biodiversity of this kind may be found in Rajasthan's regions of aridity and semi-aridity.
3. **Europe's Biodiversity:** Type of biodiversity can be found in the Himalayas' highest reaches, where the climatic conditions are usually moderate.
4. **India's Biodiversity:** Type of biodiversity can be found in the deep woodland regions of the Indian plains.

III. BIODIVERSITY LEVELS

Biodiversity is made up of three layers: genetic diversity, species diversity, and ecosystem diversity.

3.1 Genetic Variability

- Species are groups of individual creatures that have certain physical characteristics in common.
- The variance of genes within a species is referred to as genetic biodiversity.
- Genetic variety is necessary for the healthy reproduction of a species' population.
- Humans are genetically related to the homo-sapiens group, although their physical traits, such as height, colour, and physical appearance, vary greatly. Genetic variation is to blame for this.

3.2 Species Diversity

- This refers to the wide range of species available.
- The richness, abundance, and kind of a species can all be used to determine its diversity. Some locations have a greater diversity of species than others. Hotspots of diversity are areas with a high diversity of species.
- It has to do with the number of species in a certain area.

3.3. Ecosystem Diversity

- Ecosystem diversity is defined by the wide variability across ecosystem types as well as the ecological processes and habitat diversity that occur in each type of ecology.
- As a result, defining ecosystem boundaries is tough and complicated.
- Communities (species relationships) and ecosystems have a lot of wiggle room when it comes to defining their boundaries.

This type of biodiversity can be found in the deep woodland areas of the Indian plains.

1. Trans Himalaya this zone is divided into three provinces: the Ladakh Mountains, the Tibetan Plateau, and Trans-Himalaya Sikkim.
2. The Himalayas are divided into four provinces: the North-West Himalaya, the West Himalaya, the Central Himalaya, and the East Himalaya.
3. The Indian Desert is divided into two provinces: Thar and Kutch.
4. Semi-Arid: This category includes two states: Punjab and Gujarat, as well as Rajasthan.
5. The Western Ghats: This zone includes two provinces: Malabar Plains and the Western Ghats Mountains.
6. The five provinces that make up the Deccan Plateau are Central Highlands, Chhota Nagpur, Eastern Highlands, Central Plateau, and Deccan South.
7. The Coasts: The West Coast, East Coast, and Lakshadweep are the three provinces that make up the West Coast.
8. The Gangetic Plains: This zone is divided into two provinces: the upper and lower Gangetic plains.
9. 9. North East India is covered, including the Brahmaputra Valley and the North-East Hills
10. This zone is made up of two provinces: Andaman and Nicobar. It's a biome with a lot of variety.

Despite the fact that India is one of the world's most diverse countries, many plants and animals are endangered. 253 wildlife species are classified as endangered under the Wildlife Act, while 135 plant species are listed as endangered by the Botanical Survey of India.

IV. THE VALUE OF BIODIVERSITY

Biodiversity has aided the development of human culture in a variety of ways, and human societies, in turn, have shaped natural diversity at the genetic, species, and ecological levels.

Biodiversity fulfills the following functions:

4.1 Environmental Functions

Many different species fulfill various services in an environment. Every organism gives something valuable to other organisms in addition to meeting its own needs. The species contribute to cycling water and nutrients across the ecosystem, fixing atmospheric gases and regulating the climate by collecting and storing energy, creating and digesting organic compounds, and assisting in the water and nutrient cycles.

As a result, they aid in soil formation, pollution reduction, and land, water, and air resource protection. These functions are critical for ecosystem health as well as human existence.

4.2 Functions of Science

Biodiversity is significant because each species can provide insight into how life has developed and will continue to evolve. Biodiversity also aids in the understanding of how life works and the significance of each species in the maintenance of ecosystems, of which we are a part.

4.3 Economic Activities

In everyday life, biodiversity is a valuable resource. Crop diversity, also known as agro-biodiversity, is an important component of biodiversity. Biodiversity is viewed as a resource reservoir from which food, medicinal, and cosmetic items might be derived. The degradation of biodiversity is due to this idea of biological resources. Food crops, animals, wood, fish, medicinal resources, and so on are some of the essential economic commodities that biodiversity provides to humanity.

4.4 Cultural and Social Services

Nature's diversity provides us with aesthetic enjoyment. It provides us with leisure opportunities, and the region's vast ecological diversity attracts tourists. A biologically diverse environment has allowed many tribes and cultures to co-evolve with their surroundings and the resources they provide. As a result, it plays an important societal role. It offers a number of important services, including:

- Tourism, particularly ecotourism,
- Leisure & Relaxation
- Spiritual encounters and a sense of belonging
- Inspiration, Art, and Design

It is our ethical responsibility to recognise that all species, including ourselves, have an inherent right to exist. As a result, intentionally causing the extinction of any species is unethical. The state of our relationships with other living species can be gauged by the level of biodiversity.

V. LOSS OF BIODIVERSITY

The loss of biodiversity within a species or ecosystem is a major issue, geographical area, perhaps even the entire planet is referred to as a result of extinction. Biodiversity is the number of genes, individual organisms within a species, and biological communities that live in a given area. This could be a single ecosystem to the entire biosphere, depending on where the area. A biotic community is a group of organisms that interact and occupy the same physical space. On the other hand, biodiversity loss, is defined as a decrease in the quantity, and variety of species, as well as biological communities, genetic diversity, in a given area. In locations wherever biological variety it's reduced, this can result in the ecosystem's collapse ability to function.



Figure 3: A seascape with bleached coral
Source: <https://www.britannica.com/science/biodiversity-loss>

In February 2016, a sea turtle swims over a bleached coral seascape at Heron Island Sea view Survey XL Catlin. Biodiversity is the most important factor usually connected with types diversity (the digit of kinds in a given location), biodiversity impairment is sometimes mistaken as a damage of species from an system or perhaps the total environment. Though, equating biodiversity harm with species extinction overlooks further, more insidious occurrences that have a long-term negative impact on ecosystem health. In some species, population explosion Social structures can be disrupted by dips, resulting in population decreases by making it more difficult for surviving males and females to find mates. A decrease in genetic variety may result in higher inbreeding following a substantial population decline (mating between people who are very similar). This can lead to even less genetic variation.

Even if a species does not vanish from the ecosystem or biosphere, its niche (the role it plays in the places it calls home) diminishes as its numbers decline. A rapid population reduction could alter the ecosystem's structure significantly. When trees are cut down in a forest, the ecology loses shade, temperature and moisture regulation, animal habitat, and nutrient delivery functions.

VI. BIODIVERSITY CONSERVATION

Biodiversity is essential for human survival. Because all forms of life are so intertwined, a disruption in one causes an imbalance in the others. When plant and animal species become endangered, they degrade the ecosystem, potentially jeopardizing human existence. In terms of biodiversity conservation, there are two approaches:

6.1 In-situ Conservation

This is a technique for preserving a threatened plant or animal species in its native habitat, either by protecting or cleaning up the area or by defending the species against predators. The following are some of the methods that fall under it:

- Reserves of Biosphere
- The National Park Service
- Wild animal sanctuaries

6.2 Ex-Situ Conservation

Endangered animals and plants are moved from their natural habitats to places where they can be safe and cared for.

- This is accomplished through zoological parks, botanical gardens, and animal safari parks.
- Ex situ conservation has advanced past the confinement of endangered animals in recent years.
- Now, utilizing cryopreservation techniques, imperiled species' gametes can be kept viable and fruitful for long periods of time, Plants can be produced by tissue culture processes, and eggs can be fertilized in vitro.
- The seeds of various commercially available genetic strains significant plants can be stored in seed banks for lengthy periods of time.

There is a growing awareness that conservation with sustainable use is only achievable with the participation and collaboration of local communities and individuals. The creation of institutional institutions at the local level is required for this. The crucial issue is not just the preservation of species or habitat, but also the continuance of the conservation process.

The following steps for biodiversity conservation have been suggested by the global conservation strategy:

1. It is necessary to protect food crops, fodder plants, timber trees, livestock, animals, and wild relative varieties.
2. Extinction prevention necessitates careful planning and control.
3. Species should be able to forage, breed, rest, and nurse their young in habitats that are safe and protected.
4. Efforts should be made to save threatened and endangered species.
5. Wild plant and animal trading should be regulated internationally.
6. Each country should identify and protect the habitats of wild relatives.

VII. CONCLUSION

We are harmed in different ways as a result of the loss biodiversity. Our biological environment is firmly ingrained in our cultural identity. Plants and animals are symbols of our world, immortalized in flags, sculptures, and other portrayals that help us and our communities identify. Simply admiring nature's beauty and power provides us with inspiration. Comprehensive conservation project reporting and documentation are required, as is the integration of pressures and responses in ecological study design. This evaluation, however, will not be possible without sufficient documentation and controlled settings. Finally, the individual citizen is the ultimate decision-maker in terms of biodiversity. Because personal consumption fuels development, which in turn uses and pollutes nature, individual choices have a significant impact. Human survival and economic well-being, as well as environmental function and stability, require biodiversity. It is vital to measure and maintain biodiversity at both the regional and global levels, given the growing recognition of biodiversity's value and the high rates of loss. There are few effective techniques for involving people in biodiversity preservation. With increasing inputs from the government, scientists, and non-governmental organisations, India should take the lead in creating acceptable methodology and policies for biodiversity evaluation and protection.

REFEERENCES

1. Thomas, J.A. (2005). Monitoring change in the abundance and distribution of insects using butterflies and other indicator groups. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 360(1454), 339-357.
2. <https://indiabiodiversity.org>.
3. Kaushik A., & Kaushik C.P. (2008). *Environmental studies*. New Delhi: New Age International Publishers.
4. Raman, S.R. (2010). Corporate social reporting in India--A view from the top. *Global Business Review*, 7(2), 313–324.
5. National Biodiversity Authority. (2014). *Biological diversity act and the India-UNDP biodiversity project activities*. Available at: <http://nbaindia.org/undp/>.
6. Verma A.K. (2015). Values and need of biodiversity conservation. *Bioherald: An International of Biodiversity and Conservation*, 5(1-2), 77-79.
7. Verma A.K. (2016). Distribution and conservation status of cat fishes in alwara lake of district Kaushambi (U.P.). *International Journal on Environmental Sciences*, 7(1), 72-75.
8. Prakash S., & Verma A.K. (2017). Conservation status of fresh water fishes reported in alwara lake of district Kaushambi (U.P.). *International Journal of Zoology Studies*, 1(5), 32-35.
9. Prakash S., & Verma A.K. (2017). IUCN Conservation status of fishes of khanwari pond of District Kaushambi (U.P.); *Proceedings of the Zoological Society of India*, 16(1), 81-84.
10. Siddiqui, J. (2018). Mainstreaming biodiversity accounting: Potential implications for a developing economy. *Accounting, Auditing & Accountability Journal*, 26(5), 779–805.
11. <https://www.britannica.com/science/biodiversity-loss>.
12. Prakash, V. (2018). Recent changes in populations of resident gyps vultures in India. *Journal of the Bombay Natural History Society*, 104(2), 129–135.