

# Biodiversity and its Conservation

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**Abstract:** Biodiversity is the variety of different forms of life on earth, including the different plants, animals, micro-organisms, the genes they contain and the ecosystem they form. It refers to genetic variation, ecosystem variation, species variation (number of species) within an area, biome or planet. Relative to the range of habitats, biotic communities and ecological processes in the biosphere, biodiversity is vital in a number of ways including promoting the aesthetic value of the natural environment, contribution to our material well-being through utilitarian values by providing food, fodder, fuel, timber and medicine. Biodiversity is the life support system. Organisms depend on it for the air to breathe, the food to eat, and the water to drink. Wetlands filter pollutants from water, trees and plants reduce global warming by absorbing carbon, and bacteria and fungi break down organic material and fertilize the soil. It has been empirically shown that native species richness is linked to the health of ecosystems, as is the quality of life for humans. The ecosystem services of biodiversity is maintained through formation and protection of soil, conservation and purification of water, maintaining hydrological cycles, regulation of biochemical cycles, absorption and breakdown of pollutants and waste materials through decomposition, determination and regulation of the natural world climate. Despite the benefits from biodiversity, today's threats to species and ecosystems are increasing day by day with alarming rate and virtually all of them are caused by human mismanagement of biological resources often stimulated by imprudent economic policies, pollution and faulty institutions in-addition to climate change. To ensure intra and intergenerational equity, it is important to conserve biodiversity. Some of the existing measures of biodiversity conservation include: reforestation, zoological gardens, botanical gardens, national parks, biosphere reserves, germplasm banks and adoption of breeding techniques, tissue culture techniques, social forestry to minimize stress on the exploitation of forest resources.

**Keywords:** Biodiversity, Ecosystem, genetic, biome, conservation

## I. INTRODUCTION

A variety of living creatures on earth have served the needs of man for thousands of years. This diversity of living beings forms a base system that is used by every culture for its growth and development. This information has helped harness the Earth's biological resources for the benefit of humanity and has become an integral part of the development process. This involved the use of biological resources as raw materials for health care, better crops and industrial development, raising the standard of living in the developed world. However, it has also created a modern consumerist society, which has negatively impacted the diversity on which biological resources are based. The diversity of life on Earth is so great that if we use it sustainably, we can develop new products from biodiversity for many generations. This will only happen if we manage biodiversity as a valuable resource and prevent species extinction.

Biodiversity generally increases from polar to equatorial regions. It is highest at sea level in the zero latitude regions. Biodiversity is low at high altitudes in equatorial regions. This pattern is called axial gradient in caste diversity. Many environmental factors affect diversity. But the most influential factor is temperature. There is great difference between minimum and maximum temperature, which lower the biodiversity. The definition of biological diversity or biodiversity has many meanings. Biodiversity as a general definition is species diversity, and species richness (biological richness), as defined by biologists, biodiversity is gene diversity, species diversity and ecosystem diversity, biological diversity is as defined (1). Biodiversity is made up of species diversity, (2) ecosystem diversity and (3) genetic diversity. Biodiversity is the diversity of living organisms and the ecosystems in which they exist. The variety found in living things on earth is called biodiversity. Biodiversity is a broad concept. Biodiversity can be seen in three forms (1) genetic diversity, (2) species diversity and (3) ecosystem diversity.

### 1.1 Genetic Diversity

The genetic diversity of a species of living organism is studied at this level. E.g. Rice with the scientific name *Oryza sativa* has two species worldwide. *indica* and *o.s.* There are two subspecies of *japonica* with more than 40,000 cultivated varieties. They vary in terms of plant height, pod length, number of grains per pod, grain size, smell, taste, time to harvest, natural pest resistance of the crop. *Oryza* is the smallest cereal at 340 m. B. That's all there is to the genome. It has twelve chromosomes. This breed is very amenable to genetic modification.

### 1.2 Ethnic Diversity

Biodiversity is the study of the biodiversity found in a particular region or a particular group of living organisms. Most of the warmer regions have more species diversity than the colder regions. For example, in a country with a short and hot climate like Costa Rica, the number of bird species is high. It is 830. This number is higher than Canada and the United States of America, which are larger and colder countries in terms of area.

### 1.3 Ecosystem Diversity

It includes animals and plants from various ecosystems on Earth. Any ecosystem consists of the living things in that particular habitat and the abiotic factors that those living things need. Each type of ecosystem has a characteristic mix of species of organisms and it is different from other ecosystems. E.g. Despite the same latitudinal extent, the western part of the Western Ghats of Maharashtra has more biodiversity and the eastern part has less biodiversity.

The diversity of ecosystems sustains life on Earth. For example, carbon dioxide (CO<sub>2</sub>) from the environment is absorbed by plants. If plants are destroyed, the concentration of CO<sub>2</sub> in the atmosphere increases and can add to the greenhouse effect. Scientists fear that an increase in the greenhouse effect will lead to a permanent increase in global temperatures and the destruction of living organisms. Each species and ecosystem is different and adds to nature.

Biodiversity is uneven on Earth. It is affected by factors like location, climate, soil, water source, living things etc. Biodiversity generally increases from polar to equatorial regions. Biodiversity is less in low latitude regions. Although biodiversity-rich hotspots (hot-spots) are scattered around the world, they are more common in tropical forests. Maintaining biodiversity is very important. Genetic diversity persists despite changes in the environment. At any given moment or location, genes in a particular organism help that organism adapt to a changed environment. Species with greater diversity in genetic traits are better able to adapt to environmental changes.

India's biodiversity rests in the Western Ghats, the forests of Northeast India and the Silent Valley in Kerala. In terms of ecology, the Western Ghats are of special importance and many species of animals, birds and numerous types of plants are found there. About 27% of high quality plants (4,000 - 15,000 species) are found in India. Among them, 1,800 species of plants are found in the Western Ghats. About 5,000 species of flowers are found in the Western Ghats, out of which about 1,600 species are found nowhere else in the world.

The year 2010 was celebrated as the International Year of Biodiversity. The aim behind it was to reduce the loss of biodiversity. Maintaining air quality, purifying water, increasing pollination, preventing erosion, fertilizing soil, regulating chemicals in the atmosphere and water environment, etc. are achieved through biodiversity. Biodiversity is decreasing due to human activities like population growth, deforestation, pollution, global climate change etc. Biodiversity can be maintained by eliminating alien species from the ecosystem, reducing the use of pesticides, enacting laws at the national level to maintain biodiversity, creating gene pools, etc.

### 1.4 Evolution and Origin of Biodiversity

Biodiversity as it exists today has a history of 350 million years. Although scientists have not been able to say exactly when life was created, living things with rudimentary structures appeared twenty to thirty million years after the origin of the Earth. The living organisms that existed sixty million years ago, the bacteria, were single-celled. Fifty-four million years ago, during the Phanerozoic Era, the Cambrian Era experienced a dramatic increase in biodiversity. This process is called the Cambrian explosion. The Cambrian Era saw the formation of multicellular organisms. Over the next 40 million years, most invertebrates became more numerous in diversity. During this period, vertebrate life increased exponentially. Along with this increase was the loss of biodiversity due to many environmental factors. Declines and increases in biodiversity due to mass extinctions have been occurring since the creation of living

organisms. During the Carboniferous Era extinction, rainforests were buried underground. Coal and crude oil produced by the process of high pressure and carbon sequestration on fossils buried during this period provide 90% of our fuel needs today. Twenty-five million years ago, the Permian-Triassic extinction event caused the greatest loss of biodiversity. (Dinosaurs died out during this period). It took three million years for vertebrates to recover from this shock. Studies of fossils from the past two to three million years have shown that the biodiversity that exists today has never existed. Not all scientists agree with this statement. His objection is that fossils can never represent all living things. According to some scientists, there may not be much difference between biodiversity 30 million years ago and today. The number of living species at present is estimated to be between two million and one hundred million. Considering all options, the number of living beings reaches 130 to 140 lakhs. The number of arthropods is the highest among them. Biodiversity tends to increase in places where there is less conflict between organisms, meaning that 'fitness' (Darwin's theory) is not subject to natural selection.

## II. INDIAN GEOGRAPHICAL CLASSIFICATION

Our country can be divided into ten major regions on the basis of geographical structure, climate and vegetation patterns and the mammals, birds, reptiles, amphibians, insects and other invertebrates that inhabit it. Each of these regions has different types of ecosystems such as forests, grasslands, lakes, rivers, wetlands, mountains and hills with specific plant and animal species.

### 2.1 Geographical regions of India

1. Ladakh's cold hilly snow-covered Himalayan region,
2. Himalayan ranges, Kashmir, Himachal Pradesh, Uttarakhand, Assam and other states of North East.
3. Terai, a plain where the Himalayan rivers flow...
4. Ganga and Bamputra Plain,
5. Thar desert of Rajasthan
6. Deccan Plateau the semi-arid grasslands of Gujarat, Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu,
7. North Eastern States of India,
8. Western Ghats in Maharashtra, Karnataka and Kerala,
9. Andaman Nicobar Son.
10. Long western and eastern coastlines with sandy beaches, forests and mangroves,

### 2.2 Values of Biodiversity

When biodiversity is mentioned, only its consumption or aesthetic use is considered.

But biodiversity has many important values. Biodiversity values are as follows

- **Use value:** Every plant or animal species as well as healthy ecosystems for humans has a specific value. To meet the daily needs of humans, genetic resources and ecosystems are important resources for future human existence. E.g. Food, medicines, cloth, fodder etc. Those needs are necessary to ensure the quality of human life.
- **Productive value:** Biodiversity provides raw materials useful for domestic and industrial use to human culture. In a developing country like India, nearly 80% of the population depends on traditional medicine for primary health care. More than 20,000 types of plants are used medicinally in our country. Even in developed countries, 21 major essential drugs out of 25% of medicines are made from plants. Also future food security depends on conservation of wild plants.
- **Social value:** Social value is the most important value of biodiversity in developing countries. A large part of the population depends on local biodiversity for survival and daily needs. When the ecosystem and its diversity are degraded due to some reason, and along with that degradation, tribal and rural people who have lost their future start coming to the city. As a result, the pressure on the city increases.
- **Ethical value:** The ethical value of biodiversity has been given great importance in traditional Eastern, cultural and religious practices. Each species is a unique creation of nature and has a right to exist. This approach is

considered important in modern society. Hence, this idea was adopted in the 1982 United Nations' World Charter for Nature.

### **2.3 Agriculture**

Eighty percent of the potato crop was destroyed in TCH6 by a fungal potato disease called Irish potato blight. As the Irish depended solely on potatoes for food, the 1946 crop was only twenty percent of the 1844 yield. A million people died in the ensuing famine and an equal number were displaced. Till 1946 only two varieties were used for potato crop. The seeds were used. Both these potato varieties were susceptible to the fungus *Phytophthora infestans*.

In 1966, the rice crop in Indonesia was destroyed by the disease 'Rice Grassy Stunt Virus'. One the virus is spread by brown ticks. Come because Indonesia's staple food is rice Indian rice variety 6203 was tested in 1970 for resistance to the virus of which only one rice variety turned out to be resistant to the virus. This one rice variety with other varieties Rice crops in Indonesia, Philippines, China, Japan were successfully saved by hybridization. In 1970, a coffee star in Sri Lanka destroyed all the coffee plantations there. The effect was so dire that the national income of Sri Lanka, once a coffee exporter, fell by forty percent. After that, Sri Lanka is known as the only tea exporting country done

In agriculture, it is a practice of growing a single crop over a wide area to get more production. Most of the disasters in agribusiness are caused by planting a single variety over a wide area. Chief among these are the 19th-century brewing crisis in Europe and the 1970s drought caused by corn blight in America. 80% of food for human consumption comes from only twenty types of plants. But its 40,000 varieties are in actual human use. These include shelter, food, fruits, medicines, and clothing. There is no doubt that the Earth's biodiversity is still meeting the needs of a growing population, but the diversity of human consumption species is rapidly diminishing. It's time to think about it.

### **2.4 Human Health**

Biodiversity and human health are currently at the forefront of international politics. Scientific research has shown that the loss of biodiversity is affecting the health of the earth. Global climate change is one of the many factors affecting human health. Spread of disease-carrying organisms, shortage of fresh water, decline in agricultural production, same crop in agricultural production etc. After the extinction of a caste, there was naturally a substitute for it. But now such options are becoming less available. Those castes that survive are transmitted to new hosts. Old diseases are being transformed into new diseases that are not appreciated.

Bird flu, swine flu and influenza are all mutated forms of the same virus. New viruses such as West Nile virus, Lyme disease, Hantavirus have been introduced into humans due to changes in their original host. Increasing demand for water and non-availability of potable water is associated with human health. Although the distribution of clean water has increased, water sources in many countries are disappearing. Underdeveloped according to the 2008 World Population Study Only 62% of people in the nation have access to clean potable water.

Some other issues related to biodiversity are food security and availability of healthy food, infectious diseases, health sciences, availability of medicines, social and mental health. The drug development from biodiversity and the source of new drugs is continuously available. Today, 50% of the drugs in the American pharmaceutical industry use plant water or bacterial fungi somewhere in the process. 80% of the world's population depends on naturopathy or naturopathy for primary healthcare. Till date very few species have been studied for their medicinal properties. Biodiversity is rapidly being used in bionics, a joint branch emerging from the new electronics and biology. After 1980s, the development of new drugs in the pharmaceutical industry seemed to slow down. But with the completion of genetics and the Human Genome Project, there is an emphasis on the development of new chemical drugs. There is a need to re-examine drug development based on marine biodiversity.

### **2.5 Industrial Use**

Many industries use products derived from living things in large quantities. Housing, clothing, paint, rubber and fuel are all derived from living things. Biodiversity is vital for the regeneration of water, timber, paper, fibers and food. Biodiversity loss means economic loss.

## 2.6 Environmental Services

Biodiversity provides many ecosystem services. These services not directly but indirectly make human life easier. Evaluation of air element balance, freshwater cycle is impossible. Valued in rupees or dollars, this contribution to biodiversity cannot be missed by any developed nation. Nutrient cycle in the soil, creation of fertile land, such tasks are impossible if human efforts decide to do them. Only in a balanced way are the services provided by biodiversity valuable. To give a single example, we have to give pollination by insects.

## 2.7 Threats to Biodiversity

Naturalist Jared Diamond described threats to biodiversity as habitat loss, overhunting, introduction of new species into new habitats and secondary extinctions. Edward O'Wilson has coined the word 'Hippo' for Biodiversity Threats. According to International Union of Conservation of Nature (IUCN), all these are real threats to biodiversity.

## 2.8 Biodiversity act in India

1. Environment Protection Act of 1986: Prohibition and control of importation, manufacture, use etc. of dangerous substances
2. The Biodiversity Act of India is a law dealing with environmental measures. eg. On industrial and other processes in specific areas.
3. Fishermen Act of 1987: This Act prohibits the use of explosives or poisonous substances for fishing was banned.
4. Forest Act of 1927: The act contains information on planning and management of reserved, protected and village forest.
5. Forest Conservation Act of 1980: This Act prohibits the use of forest land for purposes other than forest.
6. Wildlife Protection Act of 1972 and 1991: These laws prevent poaching of animals. Similarly some special plant protection laws eg. Teak, as well as these laws regulate the trade in wildlife and the sale of teak products and ornaments.
7. Biodiversity Act of 2002: This Act aims to achieve the following three objectives
  - a) Conservation of biodiversity
  - b) Sustainable use of biodiversity resources
  - c) An equal share in the profits derived from the utilization of such resources.

The National Biodiversity Authority was established in 2003 as per the 2002 Act. b) The Biodiversity Regulations 2004 were expected to strengthen and diversify provisions on conservation, sustainable use and equity, with amendments made under these regulations elsewhere in the world. This rule was notified by the government on 15th April 2008.

Biodiversity laws in India are being modified according to the changing conditions and time and new experience of a vast country like India, because biodiversity is important for the preservation of the human race.

## 2.9 Some Important Aspects for Conservation of Biodiversity

- Changing people's attitudes and actions towards biodiversity,
- To build unity at the state level as well as at the global level for the conservation of biodiversity. Empowering local people for balanced use and conservation of biodiversity. Integrating biodiversity conservation and economic development at the national, regional and local levels. Minimize or balance human impacts on biodiversity as much as possible.

## III. SUMMARY

Due to human overuse of the environment and future population growth and economic turnover, the rate of biodiversity loss is increasing rather than stabilizing. According to research from Stanford University, 40% of the total terrestrial photosynthetic output on Earth is actually being wasted today due to human activities.

Years of research in conservation biology show that habitat loss not only reduces the number of species in a place, but also reduces the genetic diversity and the number of those species as a result of habitat loss. If the size of a habitat is reduced by 90%, the number of species that can survive in that location will decrease by more than 50% in the future.

Since humans began to dominate other species, development has come at the cost of human-made changes in key habitats and loss of biodiversity.

Future management and use of biological resources should be sustainable for the benefit of present and future generations to conserve biodiversity on Earth. In fact, this is the proper or lasting future of our earth. That is why changes are being made in the Biodiversity Act in India according to changing circumstances and time and new experience coming from a vast country like India because biodiversity is important for the survival of mankind.

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