Biodiversity

POINTS TO DEVELOP

What biodiversity means and how variations have evolved over the ages.

Role of biodiversity.

Pressures on biodiversity leading to accelerated loss of species.

Impact of biodiversity loss.

How biodiversity is lost-actions of individuals, communities and nations.

Realization of the significance of biodiversity is growing and steps are being taken to maintain the balance.

Problems specific' to India.

Conclusion.

Biodiversity or biological diversity implies infinite variations in the species, both plant and animals, of nature and their living environment. Species diversity is represented by morphological, physiological and genetic features, whereas ecosystem diversity shows the difference in habitats and biological communities.

The process of species diversification started soon after the origin of life on the planet. It is a gradual process, influenced by various geo-physical and climatic factors, and resulting in the emergence of new strains of the species. Species which are not able to adjust themselves with the changing conditions gradually become extinct as evidenced in the case of the giant dinosaurs and other large mammals and birds of the past. However, on the whole, diversification has prevailed over extinction. As a result, estimates of the number of plant and animal species living on the earth range from three million to more than ten million, though to date only about 1.5 million species have been recorded in scientific literature. About most of these, little more is known than their appearance and location. It is possible that several million insects and plants-along with fewer members of other animal classes-await discovery, mainly in the tropics.

Biological diversity plays a significant role in nature. It provides major clues to the scientists about the origin and the evolution and the specialization process of various flora and fauna. It also acts as a major tool for assessing the impact of various factors in influencing the process of species diversification. Rich

biodiversity is an indicator of the health of a particular habitat and its potential to sustain life.

In ecology, biodiversity plays a significant role-it enriches soil, maintains water and climate cycles, humidity and precipitation and helps in recycling and converting waste material into nutrients. All the living creatures, from unicellular organisms and plankton to higher species, help maintain equilibrium within various components. Ecological diversity is of great significance to human society. Food, medicine and raw materials for industry and household purposes are obtained from various living resources.

During the past few centuries, with the increase in human population, biodiversity has come under tremendous pressure. Biological extinction which led to the disappearance of one species in several hundred years has now been replaced by an accelerated rate of extinction-one species every year. This is the result of the extensive habitat changes wrought by mankind. If the same pace continues, an estimated one-fourth to one-third of species is likely to become extinct within the next few decades. Over all, roughly 1000 birds and mammals are now thought to be in jeopardy. Although endangered animals, e.g., tigers in Aria, cheetahs in Africa, whales in the Antarctic, whooping cranes in North America, etc., receive great public attention, plant extinctions are often more significant ecologically. According to Peter H. Raven, Director of the Missouri Botanical Garden, a disappearing plant can take with it ten to thirty-dependent species such as insects, higher animals,

and even other plants. The International Union for Conservation of Nature and Natural Resources (IUCN) finds about 10 per cent of the world's flowering plants to be dangerously rare or under threat.

These estimates of species at risk understate the true problem, for they deal only with known and higher life forms. It seems probable that many unnamed species are disappearing in scientifically unchartered tropical areas. In his book The Sinking Ark, Norman Myers surmises on the basis of extrapolation that, right now, at least one species might be disappearing each day in tropical forests alone, even outside the tropics, many small, obscure organisms such as worms, mites, beetles, and herbs may be disappearing without our knowledge. Besides, an examination of the survival prospects of all forms of plant and animal life-including obscure ferns, shrubs, insects, molluscs, elephants and wolves-indicates that huge numbers of them have little future. Loss of such a multitude of species would constitute an irreversible alteration in the nature of the biosphere even before we understand its workings-an evolutionary Rubicon whose crossing Homo sapiens would do well to avoid.

The loss of biodiversity has immediate and long-term effects on human survival itself. The majority of the world's population still depends on wild plants and animals for their daily food, medicine, housing and household material. fodder, fuel wood, spiritual sustenance, and intellectual stimulation. For these billions (of human beings) the loss of biodiversity is a direct and irreversible attack on their livelihood and social security. The loss is even more direct in the case of domesticated biodiversity. Traditional farmers of the world have developed an incredible variety of crops and livestock. This too has been eroded over the last few decades, with literally lakhs of traditional crop strains and hundreds of domesticated livestock breeds being replaced by a harmful of laboratory-generated hybrids or by dominant cash crops.

The traditional diversity was bred to meet diverse human needs of nutrition, taste, colour, ritual, smell, and to resist drought, flood and pests. It provided several kinds of insurance to the farmer against crop failure.

Modern hybrids, on the other hand, while substantially increasing the grain yield and monetary profits, have forced the farmers to look elsewhere for their other daily needs (especially fodder), and left them dependent on the vagaries of markets, governments, and private corporations.

The ways in which humans destroy other species are legion. The excessive hunting or collecting of animals for food, profit, or recreation is a time-honored means of extermination. From the Stone Age to this date, hunters and collectors remain significant threats to many mammals, birds, reptiles and fishes. Animals have become endangered in the pursuit of their hides, heads or tusks; there are, besides poachers, some unscrupulous zoo suppliers who imperil rare species. The lure of spectacular profits offers the impetus for trade in endangered species and derivative products; for example, a Bengal tiger coat sells for $ 95,000 in Tokyo!

An important cause of extinctions over the next few decades will be the destruction of habitats. As both populations and economies grow, and human settlements sprawl, undisturbed natural areas are bound to shrink. Wildlife breeding zones, migration routes, and browsing and hunting domains are paved, inundated with water, grazed, or ploughed. Forest lands are denuded by farmers or timber companies and then given over to cattle, crops, or nonnative tree species. Plant species unique to a small locality along with the animals that feed on them can be erased from the earth by a single bulldozer; predators dependent on a complex food web may disappear once the wild area around them is compressed below a critical minimum level.

The problem of habitat destruction exists in every continent, but it is particularly serious in the humid tropics which is where major species losses are predicted. Viewed in terms of biodiversity, the moist tropical forests of Africa. Asia and Latin America hold an importance far beyond the land area they occupy. Suffused with exceptional amounts of light, warmth and moisture, the tropical rain forests house a remarkable variety of ecosystems and species. The rain forests, home to half of the world's life forms, continue to be destroyed at the rate of over 100,000 sq. km. every year.

The roots of biodiversity destruction lie in the relations between the communities within each nation, and between the nations themselves, point out certain observers. This is responsible for cornering the vast biological resources for the benefit of a small minority within the poor nations, and for the wasteful consumption patterns of the North. Eighteen million hectares of Amazonian forest has been cleared in Brazil to meet the European and American demand for coffee. Germany causes the degradation of 200,000 hectares of rain forest a year for timber. Adverse terms of trade, protectionist policies of the North, dumping of environmentally-destructive technologies and materials in the South, and a host of other factors continue to cause severe and widespread biodiversity destruction.

The exploitative policies followed by the elites within the southern countries are no better. Vast natural habitats have been plundered to meet the ever-growing needs of this minority, aided by laws which legitimise urban-industrial control over resources. The poor are forced to overstrain the meagre resources that are left in their control, and are then portrayed as ecological culprits. In countries like India, the development policies and projects have rarely been sensitive to the need for biodiversity conservation, and that of the local communities. The government's failure to remove poverty and curb consumerism has led to conditions in which sensible natural resource management assumes a low priority.

In the last few years the world has started realising the significance of biodiversity. Several conventions and agreements on conservation and protection of various organisms have been drawn up since 1970, when UNESCO held the first Man and Biosphere Convention.

At the Earth Summit at Rio in June 1992, the majority of the world's nations signed a convention on biological diversity. Though the expectations from the Rio Summit were very high, the polarisation between the North and the South on various issues such as funds and use of biodiversity has raised certain doubts about the applicability and implementation of various programmes. Funds are

certainly going to have a major impact on conservation programmes, especially in developing countries.

India’s biodiversity is immense mainly because of its unique biogeographical composition, comprising living components of three different realms, namely Palearctic, Indomalayan and Ethiopian. With just two per cent of the world’s land mass, the country has about five per cent of living resources, and stands, therefore, as one of the 12 mega-diversity states in the world. The country faces problems such as over-population, large number of cattle, growing demand for land, energy and water supply. Unplanned developmental works and over exploitation of resources have made its living resources most vulnerable. Over exploitation has not only resulted in shortages of various materials but also left our biodiversity exposed to various ecological threats.

Slowing the loss of species entails much more than the ratification of international treaties, the passage of national conservation laws, and the policing of national park boundaries, essential as all these steps are. The future shape of the biosphere will depend in good measure on the shape of political and economic policies affecting employment, land tenure, income distribution, and population growth. The extermination of a species seldom poses such an obvious threat to humans as other kinds of environmental deterioration such as air pollution and the spread of deserts. Yet for many reasons, a decline in the diversity of life forms should worry everyone. The impending large-scale loss of species is without precedent and will result from the disruption of complex ecological systems. Not surprisingly, no means exist for quantifying the costs. But the biological impoverishment of the earth will certainly mean economic as well as aesthetic impoverishment of humans.

We made progress so far as our relationship with nature was on a sustainable level. We will be doomed if, in our greed, we kill the goose laying the golden egg:

Unprofitably travelling toward the grave Like a false steward who hath much received and renders nothing back.