

Preface

Biodiversity is the variety of plant and animal life found in an ecosystem and the variation in their genetic makeup. Biodiversity is a measure of the health of an ecosystem, with healthy ecosystems having greater variety and variation in plant and animal life than unhealthy ones. It is a large number and wide range of species of animals, plants, fungi, and microorganisms. Ecologically, wide biodiversity is conducive to the development of all species. Biodiversity, a contraction of the phrase "biological diversity," is a complex topic, covering many aspects of biological variation. In popular usage, the word biodiversity is often used to describe all the species living in a particular area. If we consider this area at its largest scale-the entire world - then biodiversity can be summarized as "life on earth." However, scientists use a broader definition of biodiversity, designed to include not only living organisms and their complex interactions, but also interactions with the abiotic aspects of their environment. Definitions emphasizing one aspect or another of this biological variation can be found throughout the scientific and lay literature. For the purposes of this module, biodiversity is defined as the variety of life on Earth at all its levels, from genes to ecosystems, and the ecological and evolutionary processes that sustain it.

There is also an important spatial component to biodiversity. The structure of communities and ecosystems for example the number of individuals and species present can vary in different parts of the world. Similarly, the function of these communities and ecosystems i.e. the interactions between the organisms present can vary from one place to another.

Different assemblages of ecosystems can characterize quite diverse landscapes, covering large areas. These spatial patterns of biodiversity are affected by climate, geology and physiography.

The structural, functional, and spatial aspects of biodiversity can vary over time; therefore there is a temporal component to the analysis of biodiversity. For example, there can be daily, seasonal, or annual changes in the species and number of organisms present in an ecosystem and how they interact. Some ecosystems change in size or structure over time (e.g. forest ecosystems may change in size and structure because of the effects of natural fires, wetlands gradually silt up and decrease in size). Biodiversity also changes over a longer-term, evolutionary, time-scale. Geological processes changes in sea-level.

The history of origin and the process of evolution have led to the diversity of life forms. The increase in environmental awareness over the last few decades has underlined the need to enhance our understanding of the ways in which human race and biodiversity interact. It is surprising that till 1992, the subject of biodiversity was never given the attention that it deserved, both at the national and the international level. It was only in June 1992, at the United Nations Conference on Environment and Development (UNCED) that the issue of biological diversity was taken up as a priority area for action for conservation and sustainable use. However, preparations for a Convention on Biological Diversity (CBD) were initiated by the Governing Council of the United Nations Environment Programme (UNEP) in 1987 through the establishment of an Ad Hoc Working Group of Experts on Biological Diversity, which met in 1988. The Ad Hoc Working Group was followed in 1991 by an Inter-Governmental Negotiating Committee for devising a Convention on Biological Diversity. The agreed text of the CBD was adopted by 101 governments in Nairobi in May 1992 and was signed by 159 governments and the European Union at the UNCED held in Rio de Janeiro in June 1992. The Convention finally entered in to force on December 29, 1993, which has since then been signed by 184 countries.

India became a signatory to the Convention by signing it on June 5, 1992.

The main objectives of the CBD, to be pursued in accordance with its relevant provisions, include conservation of biological diversity, sustainable use of its components and the fair and equitable sharing of benefits arising out of the utilisation of genetic resources by means of appropriate access to genetic resources, appropriate transfer of relevant technologies, and appropriate funding.

This book is organized in 15 chapters. The first chapter deals with biodiversity – concept meaning and Functions. This chapter discusses functions of bio diversity, species, functional types, and composition of biodiversity, ecosystem responses to changes in biodiversity. biodiversity and ecosystem stability, predictability and reliability, affiliated ecosystems, economics and biodiversity, importance of biodiversity, soils formation and protection, contribution to climate stability, maintenance of ecosystems and social benefits. The second chapter discusses agricultural biodiversity

It covers topics such as food crops and biodiversity, source regions of major crops, introduced crops, agriculture and genetic diversity, genetic engineering genetic diversity and livestock breeding genetic improvement of forest species risks of high-yielding crop varieties, the value of biodiversity and soil biodiversity. The third chapter is Indian Biodiversity. It narrates about Wetlands Forests Marine Environment Species Diversity Endemic Species, Threatened Species Protected Areas of the Western Ghats Coastal and Marine Biodiversity of India and Threats to coastal and marine biodiversity. The fourth chapter is biodiversity and food security. It analyses genetic erosion in agriculture, preserving options for the future, genetic inter-dependence, farmers as innovators and conservers of diversity, biodiversity and indigenous knowledge, seeds of survival dangers of genetic uniformity and importance of crop genetic diversity. The fifth chapter discusses about biodiversity loss. It covers topics such as massive extinctions from human activity, declining ocean biodiversity, people and forests, misuse of land and resources,

long term costs, species at higher trophic levels and species with chronically small populations. The sixth chapter deals with climate change and biodiversity. It explains climate change affects all biodiversity, The links between climate change and biodiversity, Biodiversity, land use and climate change, Poverty, climate change and biodiversity, climate change, conservation and development, Biodiversity and climate change and research priorities. The eighth chapter deals with people's biodiversity register with basic behavioral issues, revealed preference and biodiversity conservation, objectives of the people biodiversity register and benefit sharing. The ninth chapter discusses about biodiversity economic valuation and this chapter discusses economic valuation techniques, travel cost method, valuing changes in environmental quality at a site, basic model of ITCM, application of the individual travel cost approach, advantages of the travel cost method, evaluation of travel cost method and random utility model. The tenth chapter is biodiversity measurement. It discusses species diversity: measures and scales, species richness, functional diversity and the niche preemption model or the geometric model. The eleventh chapter narrates about biodiversity survey techniques and this chapter explains biodiversity survey, standardized data collection methods, scat collection and point count method. The twelfth chapter is bioregional planning. It points out characteristics of bioregional planning, challenges to bioregional managers, integrated strategic planning, protected areas in a bioregional framework, bioregional planning frameworks and bioregional planning in India. The thirteenth chapter is gender and biodiversity. It deals with Gender Dimensions of Biodiversity Management, *FAO, gender and biodiversity*, Ecofeminism and Biodiversity and Global Action for Women towards Sustainable and Equitable Development. The fourteenth chapter is indigenous knowledge and biodiversity. The fifteenth chapter is biodiversity education. It deals with biodiversity education methods.

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