

Chapter: I

INTRODUCTION

Biodiversity is the abbreviated word for Biological Diversity, and it has become a key science in the present century. The term "biodiversity" was coined by Walter and Rosen in 1985 (Sarkar and Margules, 2002). The entire living world directly depends on biodiversity for their needs of food, firewood, housing, medicine and fodder. It has enormous value for all of us and it has a special environmental meaning. The word biodiversity is now very widely used by the scientific community, general public, environmental groups, conservationists, industrialists and economists.

Global Biodiversity consists of 1.4 million species of various life forms. These include 3,00,000 species of vascular plants, 40,000 species of vertebrates, 8,000 species of insects and 3,60,000 species of micro-organisms.

India is very rich in all aspects of biodiversity and it is one of the most significant biodiversity centers of the world. This high level of biodiversity is due to varying physiographic and climatic conditions in different parts of India. 48,000 species of plants which represent 11 % of the total world flora and 80,000 species of animals representing 6.4% of the world's fauna are found in India. India's floral diversity includes 17,500 Angiosperms, over 64 Gymnosperms, 1022 Pteridophytes, 2843 Bryophytes, 1600 Lichens, 23,000 Fungi and 2500 species of Algae. According to an estimate, 35% of the flowering plants and 18% of the total flora are endemic to India. Many of the biologically rich areas in India are either unexplored or under-explored. India is identified as one of the important biodiversity pools, known for genetic ecological and economic prudence (Mandal and Ray, 2006) Biodiversity is important to humankind in fulfilling its needs by way of providing food (80,000 species), medicine (20,000 species), drug formulations (8000 species) and raw materials (90 per cent from forests) for industry. (Ramachandra and Nagarathna, 2003).

Western Ghats of Maharashtra is very rich in all aspects of biodiversity. It is most significant hotspot of the world. Its floral diversity includes 1,593 species of Angiosperms, 1 species of Gymnosperm, 73 species of Pteridophytes, 55 species of Bryophytes 6,600 species of Algae (Jagtap, 2003)

Biodiversity is considered as an 'umbrella term' referring to organisms found within the living world. Infact it is the variation in number, variety and variability of living organism. It may be thus assumed to be synonym for 'Life on earth' or 'variety of life and its processes' (Anonymous, 1992). Darwin (1859) exclaimed biodiversity as 'Lifes endless forms'. Taken in the general sense, biodiversity is indeed 'the essence of

life' (Franklin 1988). In reality, however biodiversity is a very vast and complex concept and its ramifications extend deep into all sphere of human life and activity.

Biodiversity is treated in terms of genes, species and ecosystems in correspondence with the three fundamental hierarchical levels of biological organization. These three diversities are respectively referred to as Genetic, Species and Ecosystem diversities. Diversity within species is Genetic Diversity, diversity between species is Species Diversity (also often referred to as Taxonomic or Organismal Diversity), and diversity at the ecological or habitat level is Ecosystem Diversity., Wilson (1988 a, b), Szaro and Shaprio (1990), Szaro and Salwasser (1991) and Noss (1992) among many others, have included a fourth form of biodiversity called Landscape Diversity. Landscape is 'a heterogeneous land area composed of a cluster of interacting ecosystems that is repeated in similar form throughout' (Forman and Godron, 1986). Landscapes therefore have a pattern and this pattern consists of repeated habitat components. For example, a landscape may be interspersed with grasslands, meadows, ponds, streams, shrubby areas and forests. Thus, landscape diversity is in fact pattern diversity (Scheiner, 1992).

The complex nature of biodiversity is defined variously by different scientist. According to Mc Neely *et al.* (1990) defined Biodiversity as a term for the degree of nature's victory. It encompasses all species of plants, animals and micro-organisms and the ecosystem and ecological processes of which they are part. Biodiversity can be seen as a measure of nature and its diversity, rather than an entity in itself and is usually measured at three levels genes, species and ecosystems. Fidler and Jain (1992) defined Biological diversity as full range of variety and variability within and among living organisms, their associations and habitat oriented ecological complexes. The term covres ecosystem, species and landscape as well as intra specific levels of diversity. Wilson (1992) similarly has proposed biodiversity as the variety of organisms considered at all levels, from genetic variants belonging to the same species through arrays of species to arrays of genera, families and still higher taxonomic levels. It also includes the variety of ecosystem, which comprise both the communities of organisms within particular habitats and the physical conditions under which they live. Meffe and Carroll (1994) define 'Biodiversity is the variety of living organisms considered at all levels, from genetics through species, to higher taxonomic levels and including the variety of habitats and ecosystems.'

International Council for Bird Preservation (1992) defined as biodiversity is the

total variety of life on earth. It includes all genes, species and ecosystems and the ecological processes which are the part of biodiversity (Sisodia, 2007).

The World Conservation Monitoring Centre (1992) in their edited work "Global Biodiversity" holds the following definition. Diversity is a concept which refers to the range of variation or differences among some set of entities. The biological diversity thus refers to variety within the living world. The term biodiversity is indeed commonly used to describe the number and variability of living organisms. This very broad usage, embracing many different parameters is essentially a synonym of Life on Earth.

The complexity of the biodiversity concept is reflected in the existence of numerous definitions for this word. The most acceptable definition of biodiversity is the one held by the Convention of Biological Diversity (CBD), which was signed by more than 150 nations on June 5, 1992 at Rio-De-Janeiro. The CBD states that 'Biological Diversity' means the variability among living organisms from all sources, inter-alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within species, between species and of ecosystems (Sisodia, 2007).

The above definitions make it amply clear that biological diversity or biodiversity which are defined differently in various ways. Most of the above definitions are theoretical and are not practical in sense, therefore a complete practical definition explaining its role in human welfare is wanting.

Biodiversity is important to humankind in fulfilling its needs by way of providing food, medicine, clothing shelter, number of useful products and raw material for industry.

Man has used 5000 species of plants for food, but less than 20 species now provide nearly 90 percent of the worlds food supply. The vast majority of world's population depends on just three or four carbohydrate crops as their dietary staples. The most important contribution of the plants is to provide food to ever increasing human population. Of the 3, 00,000 flowering plant species, 75,000 are edible. Of these 200 plant species have been domesticated with 15-20 constituting crops of major economic value. Many species of plants are used as fodder. They are used directly from the wild. Grasses and legumes are the most important fodder sources (Negi *et al.* 2002).

Plants are very important in health care. Many people still rely on traditional medicines obtained from local plants. About 90 percent of medicinal plants used by industries are collected from the wild. While over 800 species are used in production by industry, less than 20 plant species are under commercial cultivation (Misra and Sahu, 1984). Therefore, medicinal plants having great significance. A few aboriginal medicines have been widely used as medicine. *Eucalyptus* oil for relief of respiratory tract infections, but many more are now being investigated. A prime example is provided by current research, the bark of a tree which is known to aboriginal people, is used as a powerful painkiller. (Kalotas, 1993).

Wood, the source of timber, is one of the most utilized commercial plant products throughout the world. Plants, which provide wood, are predominantly harvested from the wild. At the same time monoculture plantations under agro- and social-forestry programmes are increasingly being raised as a source of timber. Wild sources of timber, especially hardwoods, are predominantly used. Wood remains a basic commodity for shelter and fuel throughout the world. It is also used for furniture, produce paper, and manufacture a range of consumer products. The timber industry generates significant revenues and is major resource of income (Singh *et al.* 2000)

Natural vegetative cover in watersheds protects ecosystem from extreme events such as flood and drought, and regulates or stabilises water runoff, thereby maintaining water cycles and water quality. Removal of vegetation or deforestation leads to siltation of reservoirs. (Melbourne, 1993).

Biodiversity has also great aesthetic value. Throughout human history, people have related biodiversity to the very existence of the human race through their cultural and religious beliefs.

Biological diversity helps in the formation and maintenance of soil structure, retention of moisture and to maintain nutrient levels. Soil protection by maintenance of biological diversity can preserve the productive capacity of the soil. Trees and other vegetation also assist in soil formation. A significant contribution is the introduction of organic matter through leaf litter decaying and regeneration of tiny fibrous roots, both of which facilitate microbial activity. (Attiwill and Leeper, 1987).

Ecosystems and ecological processes play an important role in the breakdown and absorption of many pollutants created by humans and their activities. These include wastes such as sewage, garbage and oil spills. Components of ecosystems from

bacteria to higher life forms are involved in these breakdown and assimilative processes. Excessive quantities of any pollutant, however, can be detrimental to the integrity of ecosystems and their biota.

The plant diversity plays most significant role in the global warming, atmosphere, pollution control, wild life conservation, in agriculture, and in biotechnology. (Yadav, 2008)

Justification for present study

Jarandeshwar hill represents a dry deciduous forest; it is green only in rainy season. The present work aims at

- 1) To assess and describe plant species richness.
- 2) To describe the level of spatial heterogeneity in the composition of the forest.
- 3) To analyze economically important plants and categorize them as endemic, edible medicinal, ornamental, fodder etc.

The scope of this research was also to determine ethnobotanical value, population and structure of forest. This baseline data will be used in framing conservation measures for biodiversity resources.