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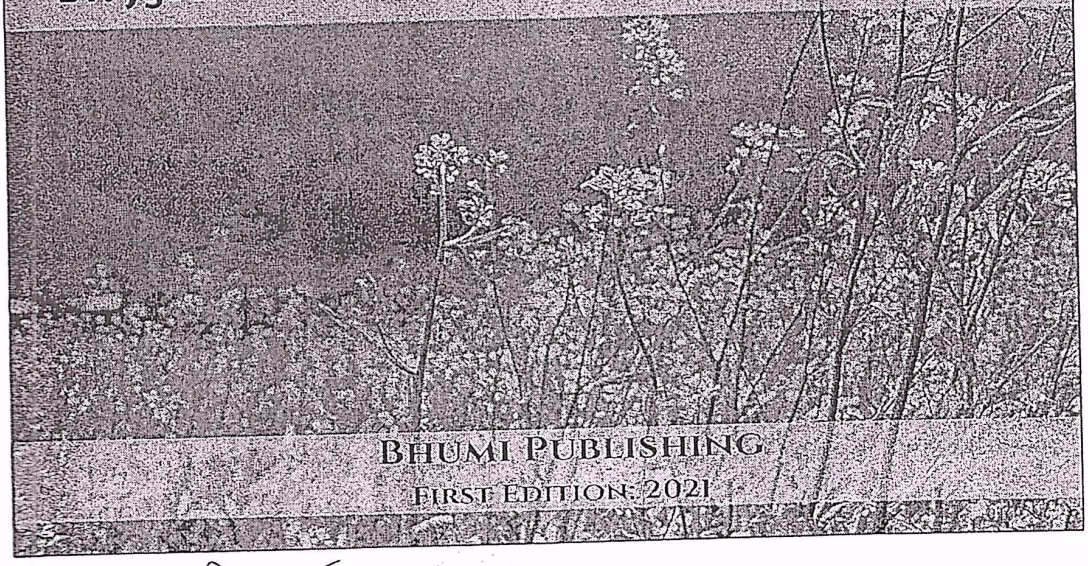

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BIODIVERSITY CONSERVATION AND SUSTAINABLE DEVELOPMENT

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Biodiversity is being viewed in the condition of sustainable development offers opportunities for poverty control, help in human well-being and the living status and socio-cultural integrity of people and in particular in developing countries which are rich in biodiversity but are poor and stressed to catch up with the globalization challenge and economically stable. Biodiversity constitutes the living natural resources that are found inhabiting our aquatic (including marine and fresh water) and terrestrial (including all the major biomes like forests) ecological systems. Biological diversity is the key international tool to make guarantee the integration of biodiversity-related issues into the Millennium Development Agenda has been examined and underscored. In order to ensure sustainable development, it is necessary to improve the methods of conserve biodiversity and use it sustainably.

Biodiversity is nothing but the biological diversity because variety of life found on Earth. The number of biotic components are present, number of plant species are found, animals, and microorganisms, the enormous diversity of genes in these species, the different ecosystems on the planet, such as deserts, terrestrial, evergreen forest, rainforests and coral reefs are all part of a biologically diverse Earth[1]. Appropriate conservation and sustainable development strategies attempt to be responsive of this as being essential to any approach to preserving biodiversity. Almost all cultures have their origin in our biological diversity in some way or form. Biodiversity boosts ecosystem productivity where each species, no matter how small, all have an important role to play for example, a larger number of plant species means a greater variety of crops and greater species diversity ensures natural sustainability for all life forms. Healthy ecosystems can better survive and get better from a variety of disasters and so, while we dominate this planet, we still need to preserve the diversity in wildlife. Isn't it interesting to just know that you share this

world with millions of other species? Biodiversity further classifies into three major types. They are as follows.

1. Genetic diversity:

It is primarily the variety of species expressed at the genetic level by each individual in a species. A single species are also shows high diversity at genetic level. No two individuals belonging to the same species are exactly similar genetically for example, in plant two verities of same genus having different species depends on their genetic constitution, in the species of human beings, each human shows a lot of diversity in comparison to another human[2]. People living in different regions show a great level of variation. Like animal plants also have genetic variation in same species. The genetic variation showed by medicinal plants which are essential for human welfare. India has more than 50000 genetically different strains of rice and 1000 variety of mango. This genetic variation expresses the characteristic features of living organisms.

Importance of genetic diversity:

- Genetic diversity gives rise to different physical attributes or external appearance to the individual and capacity to adapt, to stress, diseases and unfavorable environmental conditions. So because of adaptations different ecosystems are found in environment.
- Now a day lots of environmental changes are seen that are natural or due to human involvement, show the way to the natural selection and survival of the fittest. Hence, due to genetic diversity, the varieties of plants as well as animals that are vulnera Clement[1] able, die and the ones who can adapt to changes will survive.
- Genetic diversity is important for a healthy population by maintaining different varieties of genes that have capacity to be resistant to pests, diseases or other conditions.
- New techniques are developed for adaptation of environment at genetic level and with the help of these varieties of plants can be grown by cross-breeding different genetic variants and produce plants with desirable traits like disease resistance, increased tolerance to stress.
- Genetic diversity reduces the duplication of undesirable inherited traits.
- Genetic diversity ensures that at least there are some survivors of a species left.

2. Species Diversity:

It is the biodiversity observed within a community. It stands for the number and distribution of plants and animal species for example the Western Ghat

have a greater amphibian species diversity than Eastern Ghat[3]. The number of species in region varies widely depending upon the varied environmental conditions and mal different community for organism example, it is usually observed that civilizations residir beside water bodies show more species than the one compared to the areas away fro water bodies. Like animals and human plant species are also more near the water bodie and develop variety of ecosystems.

Importance of Species Diversity:

- In a healthy ecosystem, diverse and specific number of species exist to maintain th balance of an ecosystem. In an ecosystem, all the species depend on each othe directly or indirectly. So to make a more efficient, productive and sustainabl ecosystem, it is important to maintain high species diversity[4].
- Large number of diverse species in ecosystem tends to be more useful. e.g. th ecosystem with a great variety of producer species will produce large biomass t maintain a greater variety of user species. Superior species wealth and productio makes an ecosystem more sustainable and stable
- The ability to withstand environmental stresses like lack or persistent huge numbe depends on more diverse the ecosystem.
- Species richness makes an ecosystem able to respond to any disaster. In species-ricl communities, each species can use a different part of resources available as per thei condition. e.g. plants with smaller roots can absorb water and minerals from shallow soil and plants with deeper roots can tap deeper soil. Rich diversity is important fo the survival of mankind.
- Healthy biodiversity has countless benefits like nutrients storage and recycling, soi development and protection from erosion, absorption of harmful gases, climate stability
- Humans get lots of product from nature like fruits, cereals, meat, wood, fiber, raisin, dyes, medicine and antibiotics. Pollinators, symbiotic relationships, decomposers. each species perform a unique role, which is unique variety of species.
- Varieties in large numbers help in large scale communication among organisms such as in the food web. In the nitrogen cycle, bacteria, plants have a essential relationship, earthworms contribute to soil fertility. Apart from these, there are other benefits such as recreation and tourism, education and research

3. Ecological Diversity:

At ecosystem level the diversity observed among the ecosystems in a particular region. Different ecosystems like mangroves, rainforests, deserts etc show a great variety of life forms residing in them[5].

It has taken millions of years of evolution, to accumulate this rich diversity in nature.Without the proper conservation of this diversity; we could end up in different unstable situations. So its need to conserve biodiversity. Biodiversity and its conservation are now vital environmental issue. Biodiversity conservation refers to the protection, survival, and management of biodiversity in order to derive sustainable benefits for present and future generations.

Objectives of Biodiversity Conservation:

- To preserve and improve the diversity of species.
- Sustainable utilization of species and ecosystem.
- To maintain life-supporting systems, natural resources and essential ecological processes.

Biodiversity Conservation Methods:

When we conserve and protect whole ecosystem, its biodiversity at all level is protected. we save the entire forest automatically the animal species are also protected. Biodiversity refers to the inequality of life on earth. It can be conserved in the following ways

- *In-situ* Conservation
- *Ex-situ* Conservation

In-situ Conservation:

In-situ conservation of biodiversity is the conservation of species within their natural habitat. In this method, the natural ecosystem is maintained and protected (Johnson *et al.*, 2020).The in-situ conservation has several advantages and disadvantages. For protection of species diversity "biodiversity hotspots" are developed and protects. Initially 25 biodiversity hotspots were identified but nine more hotspots are added. These hotpots are help to accelerate habitat loss. Following are the important advantages of in-situ conservation:

1. In-situ method of biodiversity conservation is a cost-effective because of low cost and a easy method for conserving biodiversity.

2. At time large number of living organisms can be conserved simultaneously.
3. In this method the organisms are in a natural ecosystem, they can evolve easily in ecosystem and food chain for better biodiversity and can easily adjust to different environmental conditions.

In India, ecologically unique and biodiversity rich regions are protected. These protected areas where in-situ conservation takes place include national parks, wildlife sanctuaries and biosphere reserves[6].

National Parks:

In India 90 national parks were help to conserve biodiversity by in-situ method.These are small reserves maintained by the government. It has restrictions for well demarcate and human activities such as grazing, forestry, habitat and cultivation are prohibited. For eg., Kanha National Park, Bandipur National Park.

Wildlife Sanctuaries:

In India 448 wildlife sanctuaries which protect biodiversity. Many forest were set a side for biodiversity protection. Aravalli hills of Rajasthan, Hill in Meghalaya, Western Ghat and Maharashtra are some example of wildlife sanctuaries. These are the regions where only wild animals are found. Human activities such as timber harvesting, cultivation, collection of woods and other forest products are allowed here as long as they do not interfere with the conservation project. Also, tourists visit these places for recreation.

Biosphere Reserves:

India now has 14 biosphere reserves. India has also a history of religious and cultural tradition for protection of nature. Biosphere-reserves are multi-use protected areas where the wildlife, traditional lifestyle of the population and cultivated plants and animals are protected[7]. Tourist and research activities are permitted here.

Ex-situ Conservation:

Ex-situ conservation of biodiversity involves the animals and plants are taken from their natural habitat and placed in special setting where they can protected and given special care. It also involves breeding and maintenance of endangered species in artificial ecosystems such as zoological park, nurseries, botanical gardens, gene banks, etc. For the conservation o biodiversity government provide funds so there is less competition for food, water and space among the organisms.

Botanical Gardens:

Botanical Gardens are developed for protection of commercially important plants and research based endangered species. It may contain specialist plant collection. Botanical