

B. Sc.- III

Paper : 1 ENVIRONMENTAL BIOLOGY & TOXICOLOGY

Chapter: Natural Resources & Their Conservation

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Introduction

The conservation of natural resources and different ecosystem comes under the most important applications of the ecology. Unfortunately, conservation means or the term conservation suggested 'hoarding' or 'to store' as to ration the static supplies. So, these would be some left for the future. The conservation may be defined 'as the most efficient and most beneficial utilization of natural resources'. So that conservation means protection, upliftment and scientific management of plants and wildlife so as to maintain it at its optimum level and derive sustainable benefits for the present as well as future strategies. In the word of **Raymond F. Das**- conservation is defined as "the rational use of the environment to provide a high quality of living for the mankind". According to him the most conservation could be maintained and development widest possible diversity on the earth. This includes protection of the natural diversity of the living species and community on the earth. The basic aim of conservation is-

- i- To ensure the preservation of quality to environment that consider aesthetic and recreational as well as products need (By Odum).
- ii- To ensure a continuous yield of useful plants, animals and materials by maintaining a balanced cycle of harvest and renewal (By Odum).

There are two general categories of natural resources renewable and non-renewable. In general renewable or biotic/living resources and non-renewable are minerals and fossil fuels, however the boundaries between these are not clear or mixed with but there are impact differences between biotic and non-living resources. Biotic resources are capable of reusing or replacing them and increasing an inanimate resource. However, it does not have space or does not show resources. This is so slow that it is not useful to consider it in terms of time of human life. A seedstalk, iron and petroleum does not grow once a non-renewable resource consume it is gone for above. Then we have found to substitute for it or without it.

Need of Conservation

Expanding human population resulted into expanding needs of man with scientific progress and development of technology man started utilizing natural resources at much a larger scale. It can create a situation when the non-renewable resources may come to an end

after some time. We would be using all those natural resources which are in fact the property of next generation. It is a matter of much concern. There must be some sort of balance between the population growth and the utilization of natural resources or we can say the population of animal is directly proportional to natural resources.

Conservation is also concerned with complete elimination of some unique species or which there may be no alternative at all. One cannot imagine a situation if *Penicillium* (a fungus) had been eliminated from the nature before mankind made use of it as a wonder drug antibiotic or if plant *Cinchona* (alkaloid extract) become extinct before quinine was discovered as a cure for malaria. It is therefore in our own interest to conserve our plant, animal and microbial wealth. There is a global realization about to need the conserve the biological diversity as possible earliest.

Conservation has been defined as ‘the management for the benefit of all life including human kind of the biosphere so that it may yield sustainable benefit to the present generation while maintaining its potential to meet the needs and aspirations of the future generations’. The biotic/living resources conservation has three specific objectives-

- i- To maintain essential ecological process and life support system.
- ii- To preserve biological diversity.
- iii- To ensure that any utilization of species and ecosystem is sustainable.

A forest is the most effective ecosystem that supports many kinds of organism and absorbs the energy of the sun to build up organic materials. Forests not only provide timber, pulpwood, and fodder; they are also crucial in the regulation of erosion, floods and soil. The national forest policy (1988) envisages to bring one third of the geographic area of the country under forest cover to maintain ecological balance and environmental stability.

Protection or Conservation forestry- It includes the following ways-

- i-Degraded forests are mended through silviculture practises. The forests are allowed to recoup before allowing its exploitation.
- ii-Certain forests included under sanctuaries and national parks are not allowed to be exploited.
- iii-Well stocked and matured forests are exploited scientifically.

Forest (Conservation) Act, 1980, amended 1988: the basic objectives of this act are-

No forest land can be deserved and diverted to non forest purpose without the approval of central government. A diversion when permitted would be accompanied by compensatory afforestation, in some cases twice the forested area lost. Six regional officers have been setup to monitor enforcement of the act- Bangalore, Bhopal, Bhubhneshwar. Lucknow, Shillong and Chandigarh.

National forest policy (1988) aims at increasing forest cover of the country both in plains and hills so that the optimum of 33% forest cover is achieved in plains and 67% in hills. Presently, the total forest cover in India is about (21.67%) of the total geographical area.

Whereas, the total forest and tree cover in India is 24.56 percent of the total geographical area of the country.

Wild life conservation

One objective of wildlife conservation is to prevent the extinction of rare species of animals, especially the birds and mammals. The efforts to foster and increase wildlife populations may be directed along four major objectives-

- Preservation of breeding stock by means of game laws restricting the harvest and other similar measures.

- Artificial stocking

- habitat improvement

- farming

Balance of nature- there is a balance of nature in an ecosystem. The different living organisms live in equilibrium. The food web consist of an interlocking system of food chains, the destruction of any species of wildlife in an ecosystem can disrupt the entire balance of nature. There exists a balance between the number of plants, herbivores and carnivores in an ecosystem. If the carnivores decrease in number, the herbivores increase. Since the herbivores eat plant food, this result in a decrease in the number of plants. This in turns leads to a reduction in the number of herbivores, because they no longer have enough food.

Commercial value of wildlife- We have a rich variety of variety of wildlife to government established national parks and sanctuaries to attract many tourists from abroad. This in a valuable source of foreign exchange. Surplus animals are exported to foreign zoos and parks, also earning foreign exchange.

Sports and recreation-The sport of hunting is now greatly restricted because of the declining number of animals. Wildlife centres, however, provide good reaction in the form of camping and trekking.

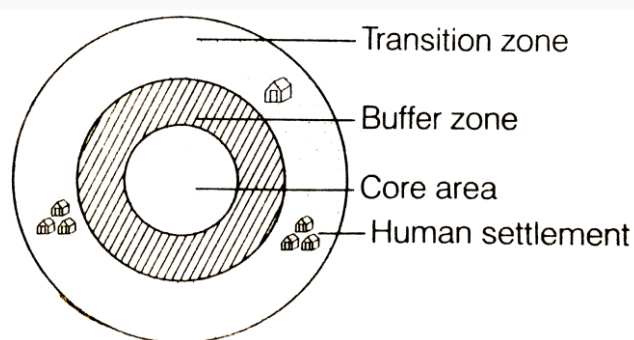
Biological Studies-Naturalists and behaviour biologists can study the ecology, physiology and behaviour of wildlife in their natural habitats, thus contributing to our knowledge of biology.

Protected areas- They are ecological areas where biological diversity along with natural and cultural resources is protected, maintained and managed through legal or other effective measures. They are delimited on the basis of biological diversity, e.g. cold desert (Ladakh & Spiti), hot desert (Thar), wetland (Assam), saline swampy area (Sunderban) etc. protected areas include national parks, sanctuaries and biosphere reserves. The National Parks, Wildlife Sanctuary, Reserve forest, Conservation reserves, Marine reserves, Community reserves, Biosphere reserves come under the Protected areas. India is one of the 17 megadiverse countries of the world. The country is bestowed with a plethora of flora and fauna. National parks are protected areas under IUCN category II.

National Parks- they are areas maintained by government and reserved for betterment of wildlife. The anthropogenic activities like developmental activities, industrial activities, forestry, poaching, hunting, and cultivation are not permitted. The boundaries of National Parks are well defined and no private activities are allowed inside the National Park. There are 105 national parks in India (2020) occupying nearly 1.23% of geographical area.

Sanctuaries- they are tracts of land with or without lake where wild animals/fauna can take refuge without being hunted. Other activities like collection of forest products, harvesting of timber, private ownership of land tilling of land etc. are allowed with the permission of authorities. Wildlife sanctuaries of India are classified as IUCN Category IV protected areas. India has 543 (2017) wildlife sanctuaries.

Biosphere Reserves- India has 18 biosphere reserves out of which 11 are a part of the World Network of Biosphere Reserves based on the UNESCO Man and the Biosphere (MAB) programme list. It recognised globally as important areas of biodiversity. But what exactly are Biosphere Reserves and how are they different from our national parks and wildlife sanctuaries? Biosphere Reserves are areas of biodiversity where not only flora and fauna but human settlements that are closely dependent on the nature for their survival, are protected. In short, it's a natural habitat where national parks or wildlife sanctuaries along with the buffer zones are protected. In India we have 18 such Biosphere Reserves and exploring them go beyond just exploring the national parks they host.



Zonation in terrestrial biosphere

S.No.	Biosphere Reserve	State/Year	S.No.	Biosphere Reserve	State/Year
1.	Nilgiri	Karnataka-1986	10.	Great Nikobar	Andman & Nikobar-1989
2.	Nanda Devi	Uttarakhand-1988	11.	Simlipal	Orissa-1994
3.	Gulf of Mannar	Tamil Nadu-1989	12.	Dibru Saikhowa	Assam-1997
4.	Agasthyamalai	Kerala-2001	13.	Dehang Debang	Arunachal-1998
5.	Sunderbans	West Bengal-1989	14.	Achanakmar	Chhatisgarh-2005
6.	Panchmarhi	M.P.-1999	15.	Panna	M.P.-2011
7.	Manas	Assam-1989	16.	Great Rann of Kutch	Gujarat-2008
8.	Kanchanjanga	Sikkim-2000	17.	Seshachalam hills	Andhra Pradesh-2010
9.	Nokrek	Meghalaya-1988	18.	Cold Desert	Himachal-2009

Core area or Natural zone- No human activity is allowed. The area is undisturbed and legally protected ecosystem.

Buffer Zone- It surrounds the core area. Limited human activity is allowed like resource use strategies, research and education.

Transition Zone (Manipulation zone)- it is the outermost or peripheral part of biosphere where an active cooperation is present between reserve management and local people for activities like settlements, cropping, recreation, forestry and other economic uses without disturbing ecology. Transition zone has different parts like forestry, agriculture, tourism and restoration regions. Restoration region is degraded area which is selected for restoration to near natural form.

Man and Biosphere Programme- MAB is an international biological programme of UNESCO (United Nations Educational Scientific and Cultural Organization) which was started in 1971 but was introduced in India in 1986. MAB has studied human environment, impact of human interference and pollution on biotic and abiotic environments and conservation strategies for the present as well as future.

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