

## Biodiversity conservation and management: A Review.

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### ABSTRACT

Firstly, while the biological profile of India is shown or highlighted, the issues relating to biodiversity are there in the context globally. And after that, significance of forest management and the policies are shown and also the need for new strategy and plans so that there must be conservation and also for the management of the biodiversity with the help of integrative approach by taking all kinds of aspects into account. "In the wide field of biodiversity, the French Institute's research programmes have been focusing for about four decades on species diversity and ecosystem diversity at the local (i.e. stand and community), landscape and regional levels". The concentration of the institution is on the ecology of plant containing a great emphasis on trees and forests and more. "Geographically speaking, most of the studies are being carried out in the Western Ghats and some projects in the Eastern Ghats and mangroves. The biodiversity-related activities of the French Institute come under assessment of biodiversity and monitoring the dynamics of biodiversity".

**Keywords:** Biodiversity conservation, geographical information system.

### INTRODUCTION

"Biodiversity refers to the variety and variability among living organisms, the ecological complexes in which they occur, and the ways in which they interact with each other and their environment". From the past of geography, it is an outcome of the string of turnover in the ratio in which they tell us about the evolution and extinction and it is a natural process. The record from geology shows us that due to the changing conditions many animal species and plants have lost their lives.

And the events are such as: "continental drift, massive volcanic eruptions or asteroid impacts". And presently, human species are the one that are most powerful one that are the reason for the changes in the environment during the latest thing of extinction. The activities done by humans have already caused the 1/3<sup>rd</sup> of the destruction of the forest of the world. And due to increasing demands of the natural resources, they have caused the genes, species, and much more.

The estimate shows that the activities of humans have resulted into the increase in the extinction rates of flora in between 10 to 100 times. "The IUCN Red List of Threatened Species indicates that species extinction is on an increasing spiral. Since the earliest date of recorded history, the fundamental social, ethical, cultural and economic values of humans have directly or indirectly revolved around biological resources. Diversity in genes, species and ecosystems has contributed immensely to the productivity of agriculture, forestry, fisheries and industry. Especially the tropical forests, which are rich in biological diversity, contribute substantially to the local communities in terms of security in income, employment and livelihood and farming systems".

#### **India's biological profile and status**

We all know that India is having a heritage that is rich and contains of variety of many. India figured with two hotspots -

- the Western Ghats and
- the eastern Himalayas

out of 25 biodiversity hotspots identified by Myers (1988). "In addition, India has 26 recognized endemic centres that are home to nearly one third of all the flowering plants identified and described to date. Of the 1.7 million of the world's described biota, India contributes 7.3% of the global fauna. Among flowering plants, India accounts for 7% of the 250,000 flowering plants so far described in the world. India is one of the 12 centres of origin of cultivated plants. There are 167 cultivated species and 273 wild relatives of crop plants. The endemism of Indian biodiversity is high. About 33% of the country's recorded flora (49,219 plant species) are endemic to the country and are concentrated mainly in north-east India, the Western Ghats, north-west Himalayas and the Andaman and Nicobar islands. In animals, the

endemism among mammals and birds is relatively low (6 to 9%). However, the amphibians and reptiles are, respectively, nearly 62 and 50% endemic to India, and the majority of them are found in the Western Ghats".

#### **Forest management and policies**

If we see that the concept of the forest's management was invented in India 150 years ago. "Colonial legacy and princely states carved out Reserved Forests and State Forests under different forest laws for the scientific management of forests". And in that course, an equal %age of the forest was kept away from the site of "Reserved forest" so that they can use it for community purpose and that is for getting requirements such as; timber, fuel, etc. We must notice that, at that time period, population was less that means the pressure on the forest was very minimal. And the most requirements was covered from the Revenue forests.

"Currently, the State Forest Departments, which are the custodians of forests, control large areas of forest as state property. However, substantial areas of natural vegetation still remain either in private control or under the Revenue Department's authority. The management of the Reserved Forests (RF) under the State Forest Departments has traditionally revolved around protection, silvi culture and plantation". And on the other side, without management, the revenue forests were in the control of the revenue departments. The people were living in that area was given free access to the revenue forest and because of huge pressure only; such areas were converted in private croplands. And because of revenue forest getting disappeared, the pressure was then on the reserved forest for such requirements of the people. And due to this only, there was degradation of reserved forests.

#### **Developing an information system to prioritize biodiversity conservation areas and management zones**

If you need to create a good strategy, you must require the meaningful data that is reliable also and at various levels. And there is French Institute of Pondicherry that conducts research programmes whose main target is on species and ecosystem

diversity at all levels. "The Institute has been concentrating on plant ecology with a strong emphasis on trees and forests, from open woodland to dense moist evergreen forests, considering their present status as well as their long-term history. Geographically speaking, most of the studies are being carried out in the western ghats and some projects in the Eastern Ghats and mangroves."

The programmes of this institution which is related to biodiversity are divided into two:

- assessment of biodiversity
- Monitoring the dynamics of biodiversity.

"These programmes are being carried out in collaboration with Forest Departments in Karnataka, Kerala, Tamil Nadu and Andhra Pradesh, the School of Environmental Sciences (JNU), the Kerala Forest Research Institute, the Centre for Ecological Sciences (IISc), the Salim Ali School of Ecology (Pondicherry University) and the National Remote Sensing Agency (Department of Space)"

## ASSESSMENT OF BIODIVERSITY

### The habitat/ecosystem oriented approach

It is derived from two biogeography and phytoecology. And also it was the corner stone of the programme of ecological mapping which was initiated in the late 50s through FIP. "It consists in studying and classifying vegetation in relation to ecological conditions (climate and soil), in characterizing the species composition, structure and physiognomy of the vegetation units, in analyzing their dynamics and succession under 'natural' and 'disturbed' regimes".

### The species oriented approach

This approach is in direct lineage of taxonomic and botanical studies. It is best illustrated by the "Atlas of Endemic Plants of the Western Ghats" published by the FIP. "The species oriented approach consists in collecting information on the location of the species from various sources: herbaria, literature and field surveys. This information may be extended to include the ecological conditions (bioclimatic, soil, altitude, topography) and the type of ecosystems in which the plant is encountered, the role it plays in these ecosystems, as well as its biological traits

(morphology, architecture, growth and reproductive strategy). The ultimate goal is to have a sort of 'identity card' for each species. This information is most crucial for rare and endangered species in the perspective of their in situ conservation".

## MONITORING THE DYNAMICS OF BIODIVERSITY

### Land use and land cover changes

The very 1<sup>st</sup> step to monitor the changes in biodiversity is there in the comparison of successive conclusion. At the local level, this can be done by observing the appearance and disappearance of species: "it requires that the same sites be sampled on several occasions".

"In order to observe this, two permanent plots have been set up in the Biligirirangan hills (3.5 ha) and the Kadamakal RF (28 ha), both in Karnataka. In addition to these, initial data have also been collected from one hundred 1- ha permanent plots, established by the Karnataka Forest Department in the Karnataka, part of the Western Ghats."

### Ecosystem uses and forest products

If one needs to understand the changes occurring in the biodiversity, they need the analysis of the process which is running in the present. 1<sup>st</sup> set of process is related to the activities done by the humans and especially the ones that have exploited the ecosystem and the species. This is where the social sciences play a key role: "the land tenure system, the representation of ecosystem and species and the sacred and economic values of the resources are important factors to explain the changes".

### Forest dynamics

"Biological processes and ecological factors temporally govern plant demography and constitute a major set of processes, which have a strong influence on changes in biodiversity". And therefore it is necessary to evaluate all the conditions such as natural and disturbed; that how plants are getting new life or how they are dying when they are coming in contact with each other. And this kind of study is give its best result when it is taken from the local level and in huge

plots from where the conditions of the environment can be best briefed out.

### Perspectives

And through these kind of efforts only we are able to club the information together which will help in defining the conservation strategies in better way. "Further, using these data, it may be possible to construct models that simulate disturbance regimes and their impacts on the forest physiognomy and species composition. Modelling the effect of various types of activity, particularly on sensitive areas, would allow an informed assessment of the potential environmental impact and a comparison of costs and benefits, which also takes into account the losses of biological diversity". The new approaches coming will obviously require a degree of cooperation and coordination in between the institutions.

And in this, we can say that State Forest Department is assumed to be a leader and it will also given invitation to the institutions that are participating so that they could share their findings and also it will help in proposing resource management alternatives which will be based on the empirical studies.

"There also needs to be better coordination among government agencies and research institutions, for example, between the State Forest Departments and the Revenue Department, which between them administer vast tracts of land in India."

### CONCLUSION

We can conclude by saying that the conservation of biodiversity is important for the development of the economy and poverty alleviation. "Around 70% of the global poor live in rural areas where as much as 50% to 90% of livelihoods are sourced from non-marketed goods and ecosystem services. The agriculture sector is highly dependent on the services generated by biodiversity and neighboring natural ecosystems that provide key services such as pollination, pest control, genetic diversity, soil retention, structure and fertility, water supply, etc. Although there is certainly an increased adoption of good agricultural practices, there are still abundant unsustainable practices in agriculture that cause substantial environmental degradation, biodiversity loss and a progressive loss

of agricultural productivity at the same time". The approach of SAN has focused on 5 principles that are the causes of the pressure on the concept of biodiversity: "climate change, habitat loss and degradation, excessive nutrient loading and other forms of pollution, overexploitation and unsustainable use, and invasive alien species".

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