The Biodiversity of India

Abstract

Biodiversity is defined as the variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems. Biodiversity of India is rich because of the close relationship between the religious, socio-cultural beliefs and conventions. It comprises of rare and threatened species of plants and animals. Among the 25 hot spots of the world, two are found in India extending into neighboring countries- the western Ghats/Sri Lanka and the indo-Burma region (Covering the eastern Himalayas). In order to bring about sustainable resource conservation and management, it is essential to adopt several different approaches for managing our biodiversity.

Keywords: Biodiversity Conservation, Threats to Biodiversity, Hotspots in India.

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Introduction

What is Biodiversity?

Life exists in many forms: Plant range from grass to giant tree and animals from tiny worms and insects to elephants and whales; life is found everywhere, from the depths of oceans to the tops of mountains and from arid deserts to tropical rainforests. it is this wide range that makes up biodiversity, which is defined as the variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems.

Globally, however, biodiversity is under siege, the 2000 IUCN (World Conservation Union) red list of threatened Species indicates that species extinction is on an increasing spiral. Since the last assessment of globally threatened species in 1996 the IUCN red list of threatened Animals, listed 169 critically Endangered (CR) and 315 endangered mammals, the 2000 analysis listed 180 CR and 340 endangered.

Similarly, for birds there is an increase from 168 to 182 CR and from 235 to 321 endangered species. Approximately, 25% of reptiles, 20% of amphibians and 30% of fishes (mainly freshwater) are listed as threatened. Globally the number of threatened plants listed is 5,611, but this is based on an assessment of only 4% of species is likely to be much higher (IUCN. 2000, Red list of Threatened Species, Switzerland: The World Conservation Union)

Why is Biodiversity Important

A healthy biodiversity provides a number of natural services for everyone:

Ecosystem Services, Such As

1. Protection of water resources
2. Soils formation and protection
3. Nutrient storage and recycling
4. Pollution breakdown and absorption
5. Contribution to climate stability
6. Maintenance of ecosystems
7. Recovery from unpredictable events

Biological Resources, Such As

1. Food
2. Medicinal resources and pharmaceutical drugs
3. Wood products
4. Ornamental plants
5. Breeding stocks, population reservoirs
6. Future resources
7. Diversity in genes, species and ecosystems

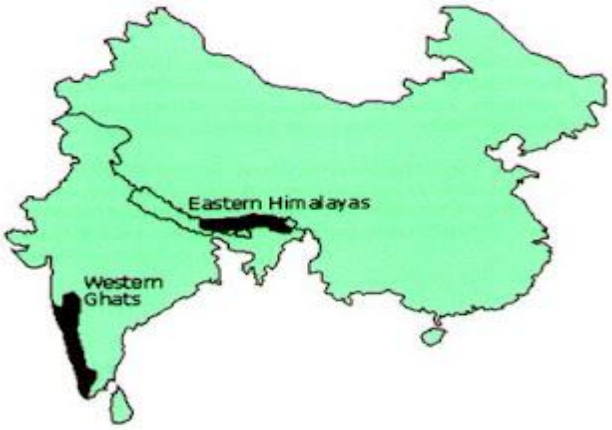
Social Benefits, Such As

1. Research, education and monitoring
2. Recreation and tourism
3. Cultural values

India's Biodiversity

Hot Spots in India

Hot spots are area that are extremely rich in species, hive high endemism, and are under constant threat. Among the 25 hot spots of the world two are found in India extending into neighboring countries- the western Ghats/Sri Lanka and the indo-Burma region (Covering the eastern Himalayas). These areas are particularly rich in floral wealth and endemism, not only in flowering plants but also in reptiles, amphibians, swallow-tailed butterflies, and some mammals.



Some salient features of India's biodiversity have been mentioned below.

1. India has two major realms called the Palaearctic and the Indo-Malayan, the three biomass, namely the tropical humid forests, the tropical dry/deciduous forests, and the warm desert/semi-deserts.
2. India has ten biogeography regions including the Trans-Himalayan, the Himalayan, the Indian desert, the semi-arid zone(s) the western Ghats, the Deccan peninsula, the Gangetc Plain, North-East India, and the islands and coasts (Rodgers and Panwar, 1988)
3. India is one of the 12 centers of origin of cultivated plants.
4. India has 5 world heritage sites, 12 biosphere reserves, and 6 Ramsar wetlands. Amongst the protected areas, India has 88 national parks and 490 sanctuaries covering and area of 1.53 lakh sq km.

The endemism of Indian biodiversity is high. about 33% of the country's recorded flora and endemic to the country and are concentrated mainly in the North-East, western Ghats, North-West Himalaya and the Andaman and Nicobar islands, India's record in agro- biodiversity is equally impressive. there are 167 crop species and wild relatives. India is considered to be the centre of origin of 30,000-50,000 varieties of rice, pigeon-pea, mango, turmeric, ginger, sugarcane, gooseberries etc and ranks seventh in terms of contribution to world agriculture.

Data Tables

Comparative Statement of Recorded Number of Plant Species in India and the World (Source: MOEF 1999.)

Taxa	Species		Percentage of India to the world
	India	World	
Bacteria	850	4000	21.25%
Viruses	Unknown	4000	-
Algae	6500	4000	16.25%
Fungi	14,500	72000	20.14%
Lichens	2000	17000	11.80%
Bryophyta	2850	16000	17.80%
Pteriodphyta	1100	13000	8.46%
Gymnosperms	64	750	8.53%
Angiosperms	17500	250000	7%

Biosphere Reserves of India

Name of the site	Date of Notification	Area in Sq. Km	Location (State)
Nilgiri	01.08.86	5,520	Parr of Wynad, Nagarhole, Bandipur and Madumalai, Nillabbur, Silent Valley and Siruvani Hills(Tamil Nadu, Kerala And Karnataka)
Nanda Devi	18.01.88	5,860.69	Par of Chamoli, Pithoragarh, Almora Districts (Uttaranchal)
Nokrerk	01.09.88	820	Part of Gora Hills (Meghalaya)
Manas	14.03.89	2,837	Part of Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamprup and Darang District (Assam)
Sunderbans	29.03.89	9,630	Part of Gulf of Mannar between India and Sri Lanka (Tamil Nadu)
Great Nicobar	06.01.89	885	Southern most islanda of Andaman and Nicobar (A&N Islands)
Similpal	21.06.94	4,374	Part of Mayurbhanj District (Orissa)
Dibru-Saikhowa	28.07.97	765	Part of Dibrugarh and Tinsukia District (Assam)
Dehang Debang	02.09.98	5,112	Part of Siang and Debang Velley (Arunachal Pradesh)
Pachmarhi	03.03.99	4,926.28	Parts of Betul, Hoshangabad and Chindwara District (Madhya Pradesh)
Kanchenjunga	07.02.00	2,619.92	Part of Kanchenjunga Hills (Sikkim)

(Source: MOEF 1999.)

Threats to Indian Biodiversity

India has a total of 89,451 animal species accounting for 7.31% of the faunal species in the world (MoEF 1997) and the flora accounts for 10.78% of the global total. The endemism of Indian Biodiversity is high-about 33% of the country's

recorded flora are endemism to the country and are concentrated mainly in the North-East, Western Ghats, North-West Himalayas and the Andaman and Nicobar islands. However, this rich biodiversity of India is under severe threat owing to habitat destruction, degradation, fragmentation and over-exploitation of resources.

According to the Red List of threatened Animals (IUCN, 2000), 44 plant species are critically endangered, 113 endangered and 87 vulnerable, Amongst animals, 18 are critically endangered, 54 endangered and 143 are vulnerable, Ten species are lower Risk conservation dependent, while 99 are Lower Risk near threatened. Indian ranks second in terms of the number of threatened mammals, while India is sixth in terms of countries with the most threatened birds (IUCN, 2000.)

	EX	EW	CR	EN	VU	LR/cd	LR/nt	DD
Animals	0	0	18	54	143	10	99	31
Plants	7	2	44	113	87	1	72	14

Legend

Ex-extinct; EW-Extinct in the wild; CR-Critically Endangered; VU-Vulnerable; LR/cd-Lower Risk conservation dependent; LR/nt- Lower Risk near threatened; DD-Data Deficient

Threatened Species of India by Taxonomic Group (IUCN,2000)

Taxonomic group	Number of threatened species
Mammals	86
Birds	70
Reptiles	25
Amphibians	3
Fish	3
Molluscs	2
Other Invertebrates	21
Plants	244
Total	459

The major proximate causes of species extinction are habitat loss degradation. The main causes of habitat loss are agricultural activities, extraction (including mining, fishing, logging and harvesting) and development (human settlements, industry and associated in restructure). Habit loss and fragmentation leads to the formation of ,isolated. small, scattered populations. Changes in forest compositional and quality, and the resultant habitat type lead to declines in primary food species for wildlife.

Exploitation such as hunting, collecting fisheries and trade are a major threat to birds (37%), Plants(8% of those assessed), reptiles and marine fishes. In India, poaching is another insidious threat that has emerged in recent years as one of the primary reasons for the decline in numbers of species, such as the tiger.

The underlying causes of biodiversity loss. however are poverty, macroeconomic policies, international trade factors, policy failures, poor environmental low/weak enforcement, unsustainable development projects and lack of local control over resources (Wood et al. 2000). Population pressures and concomitant increases in the collection of fuel wood and fodder. and grazing in forests by local communities too take their toll on the forests, and consequently its biodiversity.

Biodiversity Conservation

Key Issues and Approaches

Ecological degradation and its corollary – biodiversity loss-pose a serious threat to development. In order to bring about sustainable resource conservation and management, it is essential to adopt several different approaches for managing our forests biodiversity.

Future efforts for conversations and management of our natural resources must derive form a set of clear objectives, mechanisms for actions, and commitment form all stakeholders. Apart from this, halting the process of degradation and species loss requites specialized solutions and an understanding of ecological process. All the ecological processes that have maintained the area's biodiversity such as predation, pollination, parasitism, seed dispersal, and herbier, involving complex interactions between several species of plants and animal needs to be ensured (Terborgh. 1999).

There is also the need for greater involvement of communities and for models with decentralize of management and conservation roles and responsibilities. More importantly, laws and policies governing natural resources are still not sufficient enough to tackle the scale of the problem, and these insufficiencies have not been addressed with a sense of urgency.

Some Success Stories in Indian Conservation Efforts

Dudwa Rhino Reintroduction

The Dudwa forest were hone to one horned rhino a century and half ago. However due to rampant poaching for its valuable horn and for game hunting, it was wiped out from the area by the late 19th century. Rhinos were successfully reintroduced to Dudwa on 1 April, 1984 following a systematic reintroduction effort of captive bred stock. Suitable habitats were first earmarked prior to their reintroduction. About 27 Km of grasslands and open forests with perennial source of water was earmarked as the rhino-reintroduction area and two monitoring stations established. Currently there are seven rhinos breeding successfully- 4 adult females, 1 adult male, and 2 sub-adult males.

Project Tiger- A Success in Species Conservation

Tiger populations declined drastically from estimates of 40000 at the turn of the century (Gee, 1964) to 1800 by the 1970s. This led in 1973 to the initiation of project Tiger with the objective of conserving and rescuing this species from annihilation. Twenty-three tiger reserves were set up along with the impositions of a total ban on hunting and trading in products at the national and international levels and the implementation of habitat improvement and anti-poaching measure. Between 1973 to 1989, the species showed a marked recovery resulting in an increase in numbers to more than 4000 by 1989.

India and the Convention of Biological Diversity

Convention of Biological Diversity (CBD)

The convention of Biological diversity (CBD) was signed by over 150 governments at the 1992 Earth Summit in Rio de Janeiro and became effective as international law in December 1993. It is the first

international agreement committing governments to comprehensive protection of the earth's biological resources. The CBD has three overall goals:

1. The conservation of biological diversity
2. The sustainable use of its components.
3. The fair and equitable distribution of benefits derived from "genetic resources'

To keep in line with the commitment made at the CBD and in an effort to protect our own rights the government has introduce two bills in Parliament.

1. The biological Diversity Bill 2000
2. The protection of Plant varieties and Farmers Right's Bill

The Biological Diversity Bill 2000:

1. Protect our biological resources from being stolen or destroyed.
2. Protect the interest of certain classes like forest dwellers, farmers, pastoralist etc and making use of locally available biodiversity techniques.

The protection of Plant Varieties and Farmer Rights Bill

Introduced in December 1999, the bill was referred to join parliamentary committee with submitted its report in August 2000, with a revised version of the bill. The bill focuses on the establishment of plant breeders and farmers rights. The bill has been drafted mainly in response to TRIPS obligations and core provisions of the bill stems directly from an international treaty that does not recognize our ground realities.

Conclusion

Finally it goes without saying the conservation of Biological Diversity is prime to the survival of the planet and for the survival of man. And in the wake of biotical resources playing a major role in biotechnology and Medicine, conservation will benefit India in the long ran.

References

1. Gee E P. 1964 The Wildlife of India London: Colling. 177pp.
2. Groombridge, B and Jenckins, MD. 2000 Global Biodiversity: Earth's living resources in the 21st century UK: World Conservation Monotoring Centre. 246pp.
3. IUCN. 2000 Red List of Threatened Species Gland, Switzerland: The World Conservation Union
4. MoEF. 2000 Annual Report 2000-2001 New Dehli: Ministry of Environment and Forests, Government of India
5. Myears, N. 1988 Threatened biotas: 'hotspots' in tropical forests Environmentalist 8: 1-20, 187-208
6. Myers, N., R A Mittermeier, Mittermeier, C.G., da Fonsecs, G A B, Kents, J. 2000. Biodiversity Hotspots for conservation priorities Nature 403: 853-858
7. Rodgers W A and Panwar H S. 1988 Planning a wildlife Protected Area Network in India, (Vol.1) Dehra Dun: Wildlife Institute of India. 341 pp.
8. Terborgh J. 1999 Requiem for Nature Washington, DC: Island Press, USA. 234 pp.
9. Wood, A., Stedman-Edwards, P. And Mang, K (eds.). 2000 The Root causes of biodiversity Loss UK: World Wide fund for Nature. Earthscan Publication. 399 pp.