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Evaluation of Importance and Conservation Strategies of Forest Biodiversity

Science

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ABSTRACT

Forest cover is defined as an area more than 1 ha in extent and having tree canopy density of 10 percent and above. Forest biodiversity is highly valued at all three levels for providing products and commodities, amenities and services and aesthetic beauty and natural settings for moral contemplation and spiritual uplifting. But due to insufficient care and protection they are loosing their vigour and being trapped and diminished by human beings' selfish and greedy attitude. Here in this review paper it has been tried to explain the forest cover of India in its different parts, importance of forest biodiversity to human beings and some strategies to rejuvenate it at this step of destruction.

Introduction

Forests contain a greater range of biodiversity than any other ecosystem on the earth. However, only a fraction of the species found in the forests has been examined and studied. A single massive tree in the forest can be home for thousands of species of biota. Forest provides various chemicals which play important role in pharmaceutical. As medicines prepared from Annatto is used as insect repellent and to treat heartburn. Similarly, the liquid obtained from Trumpt treats rheumatism and respiratory illness and from Clavillia to kill viruses, bacteria, fungi and parasites (Nautiyal *et. al,* 2005). Forest covers maintain the fertility of soil, consumes surplus CO2 and produces fuel wood.

The National Forest Policy of India in 1952—laid stress for the first time on having at least 33% of the national land area under forest cover. This policy also identified vital national needs, which included a system of balanced and complementary land use, with control over denudation in mountainous regions, erosion of river banks, invasion of sea-sands on coastal tracts, and shifting of sand dunes in desert areas. The National Wasteland Development Board (NWDB) was created in 1986 with an aim to afforest wasteland outside forest areas through various schemes **(**Ministry of Environment and Forest - Intreme country report, 2007).

Forest cover is shown in three density classes' viz., very dense forest (VDF) with more than 70% canopy density, moderately dense forests (MDF) with canopy density between 40% and open forests (OF) with canopy density between 10% (Table 1)

After agriculture, forestry represents the major land use in the country **(**Indian State of Forest Report (ISFR), 2009).Very dense forest cover is found maximally in Arunachal Pradesh (20,858 Km2), followed by Uttarakhand (4,762 Km2) and least at Tripura (111Km2). Similarly, moderately dense forest is reported maximum in Arunachal Pradesh (31,556Km2), followed by Uttarakhand (14,165 Km2) while minimum at Sikkim (2,161Km2).

However, the open forest occupies maximum geographic area in Arunachal Pradesh (14,939Km2), followed by Assam (14,673 Km2) and minimum in Sikkim (696 Km2). Total forest area out of total geographical area is found maximum at Mizoram (91.27%), followed by Nagaland (81.21%) and least at Jammu Kashmir (10.21%). This trend of decrease in forest cover is consequence of excessive industrialization and urbanization due to population explosion **(**Joshi *et al*., 2011).

Role of forest biodiversity to human-beings

Conservation strategies of forest biological diversity

Conservation involves the maintenance of viable population of species or identifiable population. This includes extensive exploration and quantification of the biodiversity potential of the forest by the staff equipped with minimum training and education, monitoring equipments (such as computer models and GIS tools etc.) (Trees and Evans, 1972) Simultaneously, in planning and management traditional forestry, impact of myths, totems and taboos observed by rural people and tribals should be considered **(**Dhar *et. al.*, 2000). To foster public co-operation, organization of credit, insurance, extension and marketing systems, promotion of nutrition security at the household and individual level through both protective and productive social-security measures should be taken. A regular survey (such as folklore/contacts with local/religious leaders/ tribes on the spot visits and consultations of literature) should be done to get the updated information of endangered and extinct species. In India it is improvised in marginal areas such as mountains, uplands etc. where traditional varieties are still grown by locals who conserve them and facilitate moderate or low grazing **(**Singh and Misri, 1995).

There should be development of a new type of legally recognized reserve, other than national parks and sanctuaries, where sustainable utilization and community involvement should be the norm (community reserves, conservation reserves etc.) Similarly, there should be identification of critical habitat of the species (i.e. the feeding, breeding, nursery and resting areas etc. and safeguard measures should be available. At the International level, conventions such as Ramsar Convention on wetlands, World Heritage convention and the recent Biodiversity treaty should be followed strictly.

Along with this there should be insurance for conserving biodiversity and rich ecosystem outside the network of protected areas. Likewise, creation and demarcation of biosphere reserve and construction of field gene bank, Seed bank, cryopreservation, construction of genomic DNA libraries, tissue culture (micropopagation) techniques should be encouraged. Other approaches involve the construction of open space, where, land that is valued for natural processes and wildlife, agricultural and forest production, aesthetic beauty, active and passive recreation, and other public benefits are preserved and kept naturally (United States Department of Agriculture Forest, 2007).

Small stations should be established and the responsibility should be fixed to the centers to take care of forest region to conserve the biodiversity along with the developmental activities. The NGO's and other self regulated/ financed bodies should come forth for collection, identification and documentation of fodder/ pasture and other associated species in the ecosystem. Likewise, a regular watch should be done by legislation on the impact of nomadic grazers /pastoral communities on vegetation; and also their traditional grazing management. An Eco-geographical survey of gene pool of crops and

related species should be practiced. Similarly, international trade in wild plants and animals (or their body parts) should to be tackled with thorough investigation and effective implementation of legislative and administrative measures.

Conclusions

It can be concluded from the above review that forest cover in Indian covers a very broad range affecting the ecology and economy of various states. It is enriched with the biota (flora and fauna) which can uplift human life economically, aesthetically and ecologically. Population growth, urbanization and industrialization have put pressure on its un-sustained consumption which would lead to deficient it for future generation. Therefore, various cost effective techniques should be used to conserve it such as-

- Habitat protection, Biosphere construction, field gene bank.
- Construction of Seed bank, cryopreservation and genomic DNA library formation
- Construction of open space
- Strict enforcement of Environmental laws, international trade law.
- construction of check-post along the way of Himalaya to keep an eye on conservation of species along with developmental activities
- Active involvement of NGOs, benefits for environmentalist in political constituencies.
- An Eco-geographical survey by use of modern techniques such as LIDAR, GIS, Remote sensing etc.
- Active involvement of the local people/tribes in the protection and management programs, and benefit of food and fodder obtained from the forest should be offered to them.

Table 1: Status of various forest and non forest cover in India

Class	Area (Km^2)	Percent of Geographic area
Forest cover		
Very dense forest	51, 285	1.56
Moderately dense forest	339,279	10.32
Open forest	287,769	8.76
Total forest cover	678,333	20.64
Non-forest cover		
Scrub	40,269	1.23
Non-forest	2,568,661	78.13
Total geographic area	3,287,263	100.00

Table 2: Total forest cover of India

	Forest cover as per ISFR 2009 (FSI 2009)						
States	Geographic area(Km^2)	VDF (Km^2)	MDF (Km^2)	OF (Km^2)	Total (Km^2)	Percent	Classification
Jammu &Kashmir	222,236	4,298	8,977	9,411	22,686	10.21	x
Himachal	55,673	3,224	6,383	5,061	14,668	26.35	x
Uttarakhand	53,483	4,762	14,165	5.568	24,495	45.80	x
Sikkim	7,096	500	2,161	696	3,357	47.31	x
Arunachal Pradesh	83,743	20,858	31,556	14,939	67,353	80.43	+
Meghalaya	22,429	410	9,501	7,410	17,321	77.23	+
Manipur	22,327	701	5,474	11,105	17,280	77.40	+
Nagaland	16,579	1,274	4,897	7,293	13,464	81.21	+
Mizoram	21,081	134	6,251	12,855	19,240	91.27	+
Tripura	10,486	111	4,770	3,192	8,073	76.95	+
Assam	78,438	1,461	11,558	14,673	27,692	35.30	+
West Bengal	88,752	2,987	4,644	5,363	12,994	14.64	x

VDF= Very dense forest, MDF= moderately dense forest, OF= Open forest

+ meaning states meeting the criteria of 33% forest cover,
x = states not meeting the criteria of 33% forest cover

Table 3: Values of Biodiversity to the society

Values to society	Roles
Environmental values	1. Conservation of biodiversity 2. Soil conservation 3. CO_2 Sequestration 4. Water conservation 5. Energy production
Socio-culture and socio-historical values	Giving better understanding of cultural and historical status
Psychological and therapeutic values	Black Mesa Mountain and Mount Everest act as a focal point for rituals and as religions while Ficus religiosa is valued to the Buddhist.
Research and educational values	Wild species contribute to anthropology, biology, geology and for medicinal studies.
Recreational and tourism	Watching of soaring birds give inspiration and intellectual achievement which uplifts the mental peace and strength
Monetary- economic and utilitarian	Products and commodities, amenities and services provided by forest plant and animals
Ecological and evolutionary values	Wild plants, microbes and animals play important role in nutrient cycling, forest regeneration and biomass production (Kunwar and Bussmann, 2008)

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