

JOURNAL OF BIODIVERSITY AND CONSERVATION

Issues Related to Biodiversity Hotspot in Western Ghats (Kerala)

Padma Mahanti¹ and Sanjeet Kumar^{2, 3*}

¹Directorate of Environment and Climate Change, Trivandrum, Kerala, India- 695 562

²Institute of Bioresources and Sustainable Development, Imphal, Manipur, India

³Ambika Prasad Research Foundation, Odisha, India

* sanjeet.biotech@gmail.com

ARTICLE INFO

Article History

Received: 15 September 2017

Received in revised form: 7 October 2017

Accepted: 22 October 2017

Keywords: Western Ghats, Biodiversity, Deforestation, Conservation

ABSTRACT

Kerala is rich with diverse flora and fauna. It is the major part of the biodiversity hotspot of Western Ghats, which is slowly deteriorating due to extreme human activity and overgrazing of farm animals, deforestation etc. This current situation of devastation and unsustainable situation left unchecked might result in an unalterable consequences which might be threatening to both human as well as wild animals. Thus the current paper provides a short overview on certain issues in relation to biodiversity hotspot of Kerala.

INTRODUCTION

Biodiversity refers to the variety and variability among the living, the ecological complexes in which they occur, and the ways in which they interact with each other and their environment. Recently, biodiversity is a result of a chain of turnovers in the rate of evolution and extinction since the primitive. Evolution and extinction is a natural process in which new species are appearing and some species are disappeared. The literature and geo-biological evidences indicate that number of floral and faunal species have disappeared over the aeons as they failed to adopt to the climatic, and geographical changes. In the present era, the Homo sapiens (Human beings) are the most

powerful agents of environmental change driving the latest wave of extinction. The human activities have already caused the destruction of over third of the world’s forest. The rapidly escalating human demand for natural resources is causing genes, species and habitats to disappear at an unprotected rate. The IUCN Red List of threatened species indicates that species extinction is on an alarming rate. 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 (BH, 2017).

Therefore, we map the area where biodiversity is rich for the conservation. These areas are known as Biodiversity Hotspot (Table 1; Figure 1). In 1988, Norman Myres, a British ecologist defined the parameters to identify the hotspot areas are:

1. Richness in endemic species and
2. Impact by human activities

The floral diversity is the biological basis for hotspot designation. To qualify as a hotspot, a region must support 1,500 endemic plant species, 0.5 % of the global total. As per the modern definition, a biodiversity hotspot is a biogeographic region that is both a significant reservoir of biodiversity and is threatened with

destruction. The term biodiversity hotspot specifically refers to 25 biologically rich areas around the world that have lost at least 70 % of their original habitat.

Table 1: The Major Biodiversity Hotspot in the World

Distribution	Region
North & Central America	California Floristic Province
	Madrean pink-oak woodlands
The Caribbean South America	Mesoamerica
	Caribbean Islands
	Atlantic Forest
	Cerrado
	Chilean Winter Rainfall-Validivian Forests
Europe Africa	Tumbes-Choco-Magdalena
	Tropical Andes
	Mediterranean Basin
	Cape Floristic Region
	Coastal Forests of Eastern Africa
	Eastern Afromontane
	Guinean Forests of West Africa
	Horn of Africa
	Madagascar and the Indian Ocean Islands
	Maputaland-Pondoland-Albany Succulent Karoo
Central Asia	Mountains of Central Asia
	South Asia
South East Asia and Asia-Pacific	Eastern Himalaya
	Indo-Burma
	Western Ghats
	Sri Lanka
	East Melanesian Island
	New Caledonia
	New Zealand
Philippines	
Polynesia-Micronesia	
Eastern Australian Temperate forests	

	Southwest Australia
	Southern Australia
	Sundaland and
	Nicobar Islands
	Wallacea
East Asia	Japan
	Mountains of
	Southwest China
West Asia	Caucasus
	Irano-Anatolian

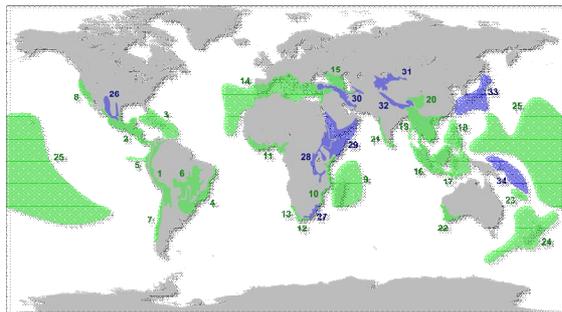


Figure 1: Biodiversity Hotspot region (Blue: added regions as BH)

The remaining natural habitat in these biodiversity hotspots amount to just 1.4 % of the land surface of the planet, yet supports nearly 60 % of the world’s plant, bird, mammal, reptile and amphibian species.

The three major regions are identified in India as Biodiversity Hotspot. (Figure 2) These areas are:

1. Indo-Burma Region
2. The Eastern Himalayas
3. Western Ghats

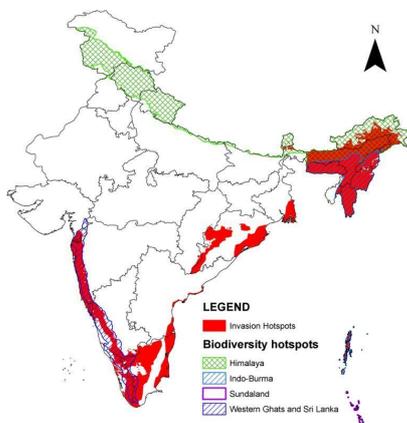


Figure 2: Biodiversity Hotspots in India

Among the above regions, the Western Ghats are a chain of hills that run along the western edge of peninsular India. It is popularly known as Sahyadri Mountains. They enjoy high rainfall. They run parallel to the west coast of India and constitute more than 1600 km strip of forests of Maharashtra, Goa, Karnataka, Tamil Nadu and Kerala. They have moist deciduous forest and rain forest. The region shows high species diversity as well as high levels of endemism. There are about 6000 vascular plants belonging to this hotspot of which over 3000 are endemic. About 77 % of the amphibians and 62 % of the reptile are only found in this region. It also enjoy the about 450 bird species, about 140 mammalian, about 260 reptiles and about 175 amphibians species.

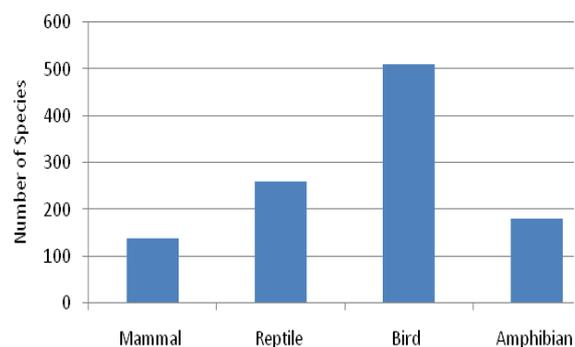


Figure 3: Diversity of species (about) in Western Ghats

In Western Ghats, the state of Kerala represents one of the 25 biodiversity hotspots in the whole

world. The state contains more than 4,500 species of flowering plants of which about 1500 taxa are endemic (Figure 3 & 4). There is also equally rich faunal diversity.

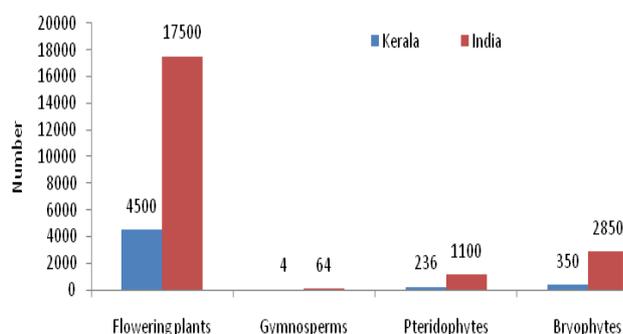


Figure 4: Major Floral wealth of Kerala as compared to India

The diversity of micro-flora, micro-fauna and the marine flora and fauna in particular even though not fully explored and is remarkably rich in the state. Kerala has 25.71 % flowering plants as compared to the total flowering plants of the Country. There are lots of issues and threats on the state as a Biodiversity hotspot of Western Ghats. The major are following:

Encroachments

The state Kerala is one of the land hungry hotspot regions of the country. This issues might have started as early as 1950s due the Government Policies like “ Grow More Food”, “Arable Land” etc. the policy of the State Government is that all encroachments after 01-01-1977 will be evicted.

Fire Wood

The people who stay near / in forest areas used to collect fire wood. The uncontrolled collection of firewood is a threats for the biomass and microhabitat of flora and fauna. It leads to degradation of habitats which subsequently alters the species composition and vegetation types. It is estimated that about 0.8 million cubic meters of firewood is illegally removed from the forest per year.

Uncontrolled collection of Non-Timber Forest Produce (NTFP)

NTFP is the livelihood of the tribal communities of any forest areas but the unsustainable harvesting of NTFP collection in the state drawn the many floral species in the RET (rare, endangered and threatened) categories. Kerala is rich of NTFP and about 120 items are listed as commercially important by the Kerala Forest Department. Need training on the sustainable harvesting of NTFP in Kerala.

Forest Fires

The forest fire is one of the most important threats and issues for the Forest and Forest Department of Kerala. The communities who are engaged in grazing livestock often burn the area to get fresh shoots for the cattle and also who involved in illicit activities like Ganja cultivation, Poaching, Tree cutting, NTFP collection etc. Need proper enforcement and awareness programme / training.

Cattle grazing & Man-Animal Conflict

Cattle grazing in forest are one of the major threat and issues to Biodiversity in Kerala which also leads to the Man-Animal conflict. The grazing removes the biomass and creates problems for the wild herbivores and spread the contagious diseases to wild animals. The trampling leads to soil erosion and also make the region to domination of a single or 2-3 floral species. It should be checked as soon as possible. Most of times wild mega fauna and other faunal and avifaunal species come near the habitat of human and destroy the crops. These events create Man-Animal conflict in Kerala. As a result, the people tend to kill the animals either by poisoning or by other means, like keeping crackers in fruits. This problem is very severe in northern Kerala where cultivation of paddy is extensive. Needful strategies should be adopted soon for this issue.

Poaching

As the state enjoys the charm of Western Ghats having abundance of wild animals, it is a highly suitable areas for poaching and for making the products of faunal species. Some faunal species are being poached for meat. It is a burning issue for the state and creates loss of species from the Biodiversity hotspots.

Mining

The Biodiversity Hotspots of Kerala represent the sound riparian species. Mining is a threats to the stability of a landscape, which results in landslides and lowering of water table and it harm the riparian ecology which is found

in a very narrow habitat niche in this Biodiversity hotspots of the State.

Tourism & Pilgrimage

The mass tourism and pilgrimage are the major issues of the Biodiversity hotspot of Kerala. About 13 million enter into forest. It makes severe changes in the Biodiversity hotspot which leads to loss of the biodiversity.

Invasive species

The species does not belongs to this Biodiversity Hotspot is damaging to the native species. The most invasive species are *Eichornia crassipes*, *Lantana camara*, *Oreochromis mossambica* (Tilapia fish), *Plecostomus multiradiatus* (sucker catfish), *Achatina fulica* (African Giant Snail) etc. *A. fulica* is native of East Africa which had created serious pest menace in many parts of the state in the year 2010 which damaged about 500 plant species including vegetables, rubber and coffee plant.

Plantations

In order to meet the timber and pulpwood requirements of the State, in the forested zone of the Highlands, more than 70000 ha of natural forests are converted into forest plantations, mainly of teak and eucalypts. Even though plantations of teak, which is an indigenous species, allow the sustenance of certain amount of plant diversity and provide habitats for less characteristic wild fauna, there is substantial reduction in both the components

of natural biodiversity, due to the intense silvicultural operations carried out in such plantations. In the case of Eucalypts, which is an exotic species of very short rotation period, the growth and survival of wild flora and fauna in these plantations is very poor. Also, Eucalypt plantations, raised in the higher altitude grasslands of the State with unique biodiversity, are very harmful to the overall wealth of indigenous biological resources of the State.

Conservation strategies for the endemic taxa to this Biodiversity Hotspot in Kerala

The most important issues of this Biodiversity Hotspot are to develop an advanced conservation protocol for the conservation and restoration of endemic taxa to this region. The most common endemic taxa which come under the threatened categories are:

1. Wayanad day gecko
2. Indian kangaroo lizard
3. Sispara day gecko
4. Pookode lake barb
5. Periyar latia
6. Periyar garra
7. Malabar swamp
8. Kerala loach
9. Malabar civet
10. Chalazodes bubble nest frog
11. Small bush frog
12. Green eyed bush frog
13. Munnar bush frog
14. Resplendent shrub frog
15. Niligiri wood-pigeon

16. Nilgiri flycatcher
17. Nilgiri pipit
18. Nilgiri tahr
19. Lion tailed macaque
20. Nilgiri marten
21. Indian purple frog etc.

The following floras are also endemic to this region and facing serious problems to become extinction to this Biodiversity Hotspot:

1. *Buchanania beriberi*
2. *Phaeanthus malabaricus*
3. *Sageraea grandiflora*
4. *Ceropegia beddomei*
5. *Toxocarpus palghatensis*
6. *Impatiens johnii*
7. *Dictyospermum ovalifolium*
8. *Syzygium palghatense*
9. *Pophiopedilum druryi*
10. *Ophiorrhiza brunonis*
11. *Vateria macrocarpa*
12. *Aglaia malabarica* etc.

Measures for minimizing the impacts

The government's announcement that the proposed protected area of the Western Ghats will be reduced by over 3,100 square kilometers mostly in Kerala through a draft notification issued ahead of the general elections seems to be driven by political, rather than ecological, considerations. For the same reason, the environment ministry has invited suggestions from the other states to redraw the boundaries of the ecologically sensitive zone of this mountain range falling in their

territories. This has, obviously, reopened the whole issue of safeguarding the brittle ecology of the Western Ghats, the world's second-richest biodiversity hot spot. Conservation of Biodiversity hotspots in the Western Ghats implies a comprehensive planning in sustainable resource management with special attention to the livelihood development of the aborigines. In the planning procedures the following objectives may be given focal attention.

- Maintenance of ecological balance essential for the life support system.
- Preservation of the genetic diversity.
- Restoration of the ecological damage caused by human interactions.
- Creation of awareness among the people and educating them on the far reaching implications of ecological degradation and securing their active participation for the eco-development schemes.

Western Ghats can be considered as an extensive ecosystem comprising of various levels of interactions. An integrated approach is needed for developing an effective methodology in minimizing the impacts in the ecological hotspots. The major measures that can be incorporated while developing a comprehensive management plan are:

- To prepare a comprehensive Perspective Plan for the development of the Western Ghats Region in consultation with State Governments.

- To identify the direct and indirect environmental variables that are having interactions with the ecological system of Western Ghats.
- Measures have to be taken for the assessment of carrying capacity of the ecosystem with special reference to livelihood of the people
- To initiate action and collect data/information on bio-diversity, flora and fauna and other information on Western Ghats and to have a network of Researchers in the field.
- Conduct a cross impact analysis based on advanced anticipatory management systems for the climatological interventions in this frame of reference
- Integrated GIS mapping with the help of modern remote sensing facilities to prepare thematic maps for decision making process.
- Extensive awareness campaigns and capacity building procedures among the local level people and proper feedback assessment mechanism can be established and maintained.
- Integration and co ordination of stakeholder departments for ferreting out issues and resolutions regarding the ecological hotspots of the region.
- Proper documentation and entries in the visual media may be ensured to

propagate the significance of the conservation strategies.

- More public consultation meetings are required for evolving a comprehensive action plan in this regard.
- Proper demarcation of No go areas and the zoning atlas can be enunciated and the enforcement of legal measures have to be ensured against the violations.

Since the Western Ghats is considered as a predominant entity in maintaining the climatic equilibrium of the state, extensive conservation mechanism are highly essential as an exigent need of the current scenario. Hence this is the high time for initiating appropriate conservation strategies for the ecological hotspots of Western Ghats with integrated approach and public participation.

REFERENCES

1. Biodiversity Hotspot. (2017). Envis Centre, Ministry of Environment & Forest, Government of India. pp. 1-7.
2. Conservation with communities in the biodiversity hotspots of India. (2005). Forest & Biodiversity Conservation Programme, World Wide Fund for Nature-India. pp. 46-49.
3. Ecosystem Profile. (2007). Western Ghats and Sri Lanka Biodiversity Hotspot. pp. 1-80.
4. Mayers, N. (1988). Threatened biotas: "Hotspot" in tropical forests. *Environmentalist*. 8, 1-20.
5. Menon, S. and Bawa, K. S. (1997). Applications of geographic information systems, remote-sensing and a landscape ecology approach to biodiversity conservation in the Western Ghats. *Curr. Sci.* 73, 134-145.
6. Ramesh, R. R. (2003). Biodiversity conservation and management. *Trop. Ecol.* 44(1), 85-91.
7. Shreedharan, T. P. (2004). Biological diversity of Kerala: A survey of Kelliasseri panchayat, Kannur district. Kerala Research Programme on local level development. Thiruvananthapuram. pp. 2-176.
8. www.cepf.net
9. www.conservation.org
10. www.wikipedia.com