

## Biodiversity Census and its significance in India: A scrutiny

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### *Abstract*

Conservation of Biodiversity is an activity must carry out by all individuals in the world to share the benefits derived from biodiversity. It is a critical task to conduct the biodiversity census and conservation (Biodiversity C & C or Biodiversity C2). Throughout the world several Government and Non-Governmental organizations work together as a unit to maintain our biodiversity in safe mode. India is a mega diverse country with rich biodiversity. The development of modern science and technologies have increased the value of biodiversity and associated traditional knowledge. To save valuable biodiversity and traditional knowledge of our country, National biodiversity board and State biodiversity board constantly involved in this approach and biodiversity law's support to conserve the living diversity.

**Keywords :** Biodeversity, Census, Conservation, significance, Karnataka, India

### **Introduction :**

Biodiversity is the unpredictability among living organisms between and within species and different ecosystems. The Biodiversity is nothing but the variation in the species of organisms (plants, animals and microbes collectives) at a given location. In order to protect the environment and biodiversity, the precautionary approach shall be widely applied by mankind. All life form (Biodiversity) on earth is dependent on a healthy environment. The development of modern science and technologies have increased the value of biodiversity and associated traditional knowledge (TK). The growing importance of biodiversity, bio-resources and associated knowledge is fairly well understood. The first step towards conservation is sustainable utilization of biodiversity and its documentation. Biodiversity and associated knowledge are found in different ecosystems, hence the results and manner of documentation will also differ. The documentation of biodiversity and prescription listed will go a long way in proper management, conservation and sustainable use of biodiversity will allow us to use the benefits and also future generation able to get benefits from it. Surveys can be very expensive, particularly in respect of the time required, manpower utilization and economic point of view. Monitoring, inspection and recording are all activities concerned with the collection and management of information. The collection of information about wildlife is the

first activity that engages many individuals and it is the only way to successfully initiate the record of biodiversity.

### **Biodiversity of India:**

India is a mega diverse country with only 2.4% of the world's land area, accounts for 7-8% of all recorded species, including over 45,000 species of plants and 91,000 species of animals. The diverse physical features and climatic conditions have resulted in a variety of ecosystems such as forests, grasslands, wetlands, deserts, coastal and marine ecosystems which sustain high biodiversity and contribute to human well-being. Being one of the 17 identified mega diverse countries, India has 10 biogeographic zones and is home to 8.58% of the mammalian species documented so far, with the corresponding figures for avian species being 13.66%, for reptiles 7.91%, for amphibians 4.66%, for fishes 11.72% and for plants 11.80%. Four of the 34 globally identified biodiversity hotspots, namely the Himalaya, Indo-Burma, the Western Ghats-Sri Lanka and Sundaland, are represented in India.

### **Biodiversity of Karnataka:**

Karnataka state is comprised of 6000 villages and each place is unique in terms of biodiversity. It is thus essential to know each place by their uniqueness to put forth the measures for conservation, sustainable utilization. The Western Ghats is part of the Western Ghats-Sri Lanka global hotspot, running roughly in a North-south direction for about 1500 kilometres parallel to the coast bordering the Arabian Sea. The importance of the Western Ghats in terms of their biodiversity can be seen from the known inventory of their plant and animal groups and the



levels of endemism in these taxa. Western Ghats harbours 7388 species of flowering plants. Of these, 5584 species are indigenous, 377 are exotic naturalised and 1427 are cultivated or planted. Of the indigenous 5584 species, 2242 species are Indian endemics (found only in India) and 1261 are the Western Ghats endemics. Apart from the above, there are 586 taxa with subspecies and variety status, bringing total taxa in the Western Ghats to 7974 (Nayar, et. al., 2014). Over 500 species of birds and 120 species of mammals are also known from this region.

### **Biodiversity Census and Conservation in India :**

Our ecosystem fundamentally depends on biodiversity, different kinds of ecosystem consists of different levels of species, which are of high value due to the life-supporting services they provide that meet human needs like food, fuel, medicine, regulating services, such as carbon sequestration and prevention of soil erosion etc. Environment protection needs to be a mass movement as the governments can't do it alone. Participation of government departments, civil society, local citizens, students and teachers from schools, NGOs and sustainable institutions to carry out census under the supervision of forest departments is mandatory (Fig). In the Indian circumstance especially, a range of socio-cultural values are derived from biodiversity that is philosophical, cultural and religious. India's many traditional knowledge systems and ethnomedicinal practices are based on a close understanding of and dependence on biodiversity (MoEF, 2014a).

There is an urgent necessitate of a comprehensive study on the biodiversity hotspots in India, which could address the questions by providing accurate and up-to-date estimates of vegetation types, plant species richness, endemism, anthropogenic disturbance and future predictions of climate change induced species shifts, which could help in effective conservation prioritization of the biodiversity hotspots in the country and maintenance of human benefits (Chitale *et. al.*, 2015). IUCN categories threatened organisms as Extinct (EX), Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) and

Least Concern (LC). Taking into account the urgent need to protect endemic species and to spread awareness about their conservation, Department of Posts in collaboration with Ministry of Environment and Forests (MoEF), issued stamps on key endemic species of the four Indian biodiversity hotspots. The conservation of endemic flora of biodiversity hotspots we must identify areas that need to be protected. The predictions based on the species distribution models (SDMs) play a crucial role in conservation and planning, considering the projected impacts of climate change on the endemic flora. Prediction accuracy of the SDMs depends on the factors like spatial resolution, size of the study area, method of choice, and quality of input datasets (Kriticos *et. al.*, 2012; Hijmans *et. al.*, 2005; Pineda and Lobo, 2012 and Syfert *et. al.*, 2013). Similar models for other taxonomic groups would be useful for the conservation of whole biogeographic region to benefit our future generations need them to make their lives as beautiful as ours.

Following conservation implications to address climate change induced alterations in the species distribution :

- a) Assisted migration to support better survival of species into suitable habitats
- b) Expansion of protected area network in the areas of future distribution
- c) Promote landscape connectivity.

In addition to that, there are many people available across our villages with greater traditional knowledge about the various facets of biodiversity. We need to know them as well to protect our ancient knowledge, protect and nurture our aesthetically valued traditions. In the backdrop of recent developments in the change of climate that may probably lead to another extinction event on the earth, it is our immediate need to support this task of biodiversity conservation. Biodiversity loss continues because of the anthropogenic activities (increasing requirements of the burgeoning human population and land use change) and spread of invasive alien species. The extent and loss of biodiversity must be continuously monitored and people attracted to participate in biodiversity conservation on a massive

scale are the only key to successfully conserve and record the biodiversity (Singh and Kushwaha, 2008). In this approach, the environment ministry conduct India's first tree census, a move aimed at taking stock of the country's biodiversity and ensuring protection of its green areas. The census is also aimed at encouraging community awareness of the need for tree conservation, regulating pruning and felling and increasing green cover with people's participation. Similar work carried out in Chandigarh and the census report was released today and makes a case for the importance of Sukhna and its biodiversity. The first ever census in the Sukhna Wildlife Sanctuary in Chandigarh has revealed significant biodiversity. Nine species of mammals and 63 species of birds have been identified (MoEF, 2014). Asian Waterbird Census is an annual event in which thousands of volunteers across Asia and Australasia count waterbirds in the wetlands of their country. This event is coordinated by wetlands International and forms part of global waterbird monitoring programme called the International Water bird Census (IWC). Asian Waterbird Census (AWC) was started in the year 1987. Its main focus is to monitor the status of waterbirds and the wetlands and create public awareness on various issues concerning wetlands and waterbird conservation. In India, the AWC is annually coordinated by the Bombay Natural history Society (BNHS) and Wetlands International.

The Karnataka Biodiversity Board was created by Government of India in 2003 to conduct biodiversity census and to conserve biodiversity of Karnataka under the Biodiversity Act and other aspects of biodiversity. The Board has taken up the activities such as formation of Biodiversity Management Committees (BMCs) at the level of local bodies in all the districts of Karnataka, documentation of biodiversity and preparation of People's Biodiversity Registers (PBR's) carried out as per the methodology suggested by Prof. Madhav Gadgil and the National Biodiversity Authority. The documentation work has been taken up in all the districts of Karnataka at the Gram Panchayat level through the Biodiversity Management Committees with the technical advice and guidance by the Non-Governmental organization (NGOs), Universities, Colleges, Deputy Conservator of Forests – Social Forestry (DCF-SF) and other experts of various line departments. Unique biodiversity sites are being identified through various agencies with the involvement of BMCs and NGOs for declaring such sites as heritage sites as per the guidelines of National Biodiversity Authority. The documentation work can proceed smoothly in order to save the local knowledge for the benefit of the society present as well as future and to ensure that the local knowledge should not disappear (MoEF, 2014b).



Fig: Working plan to conserve the biodiversity

The function of Biodiversity Management Committees is to prepare People's Biodiversity Registers (PBR's) in consultation with the local people. The Register shall contain comprehensive information on availability, knowledge of local biological resources, their medicinal or any other use or any other traditional knowledge associated with them.

The PBR will be the document to serve the following objectives:

1. Community regulation of access to biodiversity resources related to sustainable harvests.
2. Promoting knowledge – based sustainable management of agriculture, livestock, fish, forest and public health so as to enhance the quality of life of the community members.
3. Opportunities to generate funds through the imposition of collection fees for access to biodiversity resources.
4. Conserving valuable Resources.
5. Value addition to biodiversity resources.
6. Recording of biodiversity related knowledge, coupled with opportunities to generate funds through imposition of collection fees for access to local knowledge.
7. Sharing the benefits of commercial application of local knowledge.
8. Help people access information of significance in management of their crops and livestock, availability of seeds of various traditional crop cultivars and special properties of these cultivars
9. Help people share their special knowledge of uses and management of biodiversity resources, access information on technologies of relevance for better management of biodiversity resources, provide information on prevalent prices and quantities of that species to help estimate the level of commercial demand for the species.
10. Help continuation of traditional practices of conservation and sustainable use of biodiversity by facilitating their recognition and incorporation. In the Biodiversity Management plans of local Biodiversity Management Committees.

11. Help empower women and other weaker sections of communities intimately linked to biodiversity by involving them in the process of documentation and development of the Biodiversity Management Plans of local Biodiversity Management Committees.
12. Help local communities claim rewards in national conservation programmes and management, sustainable utilization and stopping of illegal and irregular harvesting of bio resources.

#### **Role of Teachers and Scientific Communities:**

1. Identification of components of biodiversity for its conservation and sustainable use.
2. Monitor, through sampling and other techniques, the components, paying particular attention to those requiring urgent conservation measures and those which offer great potential for sustainable use.
3. Identify processes and categories of activities which have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity and monitor their effects through sampling and other techniques.
4. Identify and assist in establishing protected areas by developing necessary guidelines.
5. Identify and prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitat or species.
6. Designing and assisting in ex-situ conservation by research on plants, animals and microorganisms.
7. Identification of threatened species and to find ways and means to reintroduce them in their native condition.
8. Programming Scientific and technical education and training in measures for identification, conservation and sustainable use of biological diversity.
9. Promote, design and assist in national programmes of awareness on biological diversity.

10. Maintaining records of the changing scenario in the form of proceedings of debates, workshops, symposia, scientific interactions etc and popularize.

### **Biodiversity Law's in India :**

Many people are under the impression that India does not have strong wildlife conservation laws. On the contrary, we have some of the most stringent legislations to protect wildlife and habitats. National Biodiversity Authority (Central Government), State Biodiversity Boards (State Government) and Biodiversity Management Committees (Local bodies) work as a unit organization to conserve the biodiversity. The Government of India has introduced various types of legislation in response to the growing destruction of wildlife and forests. These are:

1. The Wildlife (Protection) Act, 1972 (Last amended in 2006) - Establishment of protected areas Regulation and control of trade in parts and products derived from wildlife Management of zoos.  
The WLPA provides for several categories of Protected Areas/Reserves:
  - a) National Parks
  - b) Wildlife Sanctuaries
  - c) Tiger Reserves
  - d) Conservation Reserves
  - e) Community Reserves
2. The Indian Forest Act (1927) and Forest Acts of State Governments- The main objective of the Indian Forest Act (1927) was to secure exclusive state control over forests to meet the demand for timber. Most of these untitled lands had traditionally belonged to the forest dwelling communities.  
The Act facilitates three categories of forests, namely
  - a) Reserved forests
  - b) Village forests
  - c) Protected forests
3. The Forest Conservation Act (1980) - In order to check rapid deforestation due to forest lands being released by state governments for agriculture, industry and other development

projects (allowed under the Indian Forest Act)

4. The Environment (Protection) Act (1986) - The Environment Protection Act is an important legislation that provides for coordination of activities of the various regulatory agencies, creation of authorities with adequate powers for environmental protection, regulation of the discharge of environmental pollutants, handling of hazardous substances, etc.
5. The Biological Diversity Act, 2002 (No. 18 of 2003) was notified by Government of India on 5th February, 2003. The Act extends to the whole of India and reaffirms the sovereign rights of the state over its biological resources. Subsequently the government of India published Biological diversity Rules, 2004 (15th April, 2004).
6. National Wildlife Action Plan (2002-2016) replaces the earlier Plan adopted in 1983 and was introduced in response to the need for a change in priorities given the increased commercial use of natural resources, continued growth of human and livestock populations, and changes in consumption patterns.
7. National Forest Policy (1988) - The National Forest Policy, 1988, (NFP) is primarily concerned with the sustainable use and conservation of forests, and further strengthens the Forest Conservation Act (1980).

People face lot of problems regarding conservation, because of there is no proper planning in their role to conserve biodiversity. But with a proper preparation and a carefully thought out tactic, you will be surprised by what you can achieve. There are numerous examples which show that determined individuals acting alone or working as a group can win conservation battles. To quote renowned anthropologist Margaret Mead, "never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has".

### **Examples from India :**

2003 - Karnataka: a group of NGOs led by

Wildlife First and Kudremukh Wildlife Foundation successfully campaigned to close down a huge iron ore mining operation in the heart of the Kudremukh National Park.

2005 - Tamil Nadu: a small group of individuals successfully campaigned to restore sea turtle nesting beaches from encroachment by coastal Casuarina plantations raised by the Tamil Nadu Forest Department with funding from the World Bank. Simply visiting wildlife reserves or talking about conservation is of little use. With India's wildlife under tremendous pressure, the need of the hour is concerted, well-thought out action.

#### Reference :

- BSI (2013). *Official communication from Botanical Survey of India*, Kolkata, India.
- Chitale V. S., Behera M. D. and Roy P. S. (2015). Global biodiversity hotspots in India: significant yet under studied, *Current science*, 108(2).
- FSI (2011). India state of forest report-2011, *Forests Survey of India*, Ministry of Environment and Forests, Government of India, Dehradun.
- Hijmans R.J., Cameron S.E., Parra J.L., Jones P.G. and Jarvis A. (2005). Very high resolution interpolated climate surfaces for global land areas. *International Journal of Climatology*, 25:1965–1978.
- Kriticos D.J., Webber B.L., Leriche A., Ota N. and Macadam I. (2012). CliMond: global high resolution historical and future scenario climate surfaces for bioclimatic modelling. *Methods in Ecology and Evolution*, 3:53–64.
- MOEF (2014a). *An update on biodiversity status, trends and threats in India and implications for human well-being; In: India's fifth National report to the convention on biological diversity*: Ministry of Environment and Forests, Government of India New Delhi-110 003
- MOEF (2014b). *India's fifth national report to the convention on biological diversity*: Ministry of Environment and Forests, Government of India New Delhi-110 003.
- Nayar T.S., Beegam A. and Sibi M. (2014). *Flowering Plants of the Western Ghats, India*. Tropical Botanic Garden and Research Institute, Thiruvananthapuram, Palode, Kerala, India.
- Pineda E. and Lobo J.M. (2012). The performance of range maps and species distribution models representing the geographic variation of species richness at different resolutions. *Global Ecology and Biogeography*, 21:935–944.
- Singh J.S. and Kushwaha S.P.S. (2008). Forest Biodiversity and Its Conservation in India. *International Forestry Review*, 10(2):292-304.
- Syfert M.M., Smith M.J. and Coomes D.A. (2013). The effects of sampling bias and model complexity on the predictive performance of Max Ent species distribution models. *PloS one* 8(2): 55158.
- ZSI (2014). *Official communication From Zoological Survey of India*, Kolkata, India.

