

## Biodiversity wealth of Eastern Ghats\*\*

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### Introduction

India with a total geographical area of 329 million hectares is the second largest nation in Asia and seventh in the world. The great diversity of habitats owing to varied climates and altitudes endorsed India's rich and diverse flora. India is fortunately endowed with a wide range of agro-climatic conditions that support the growth of an equally diverse range of plant and animal species. But the loss of Biodiversity is a very serious problem of the country. Several species of the living organism are disappearing and biodiversity is more threatened now than at any time in the past. It is generally believed that deforestation is the main cause behind the current crisis and along with this global climatic change, shifting cultivation, soil erosion, unchecked expansion of urban areas etc are the other main causes of this problem. The current rate of extinction demands immediate concerted efforts for conservation of biodiversity for future generations. Conservation of biodiversity could be accomplished using both *in situ* and *ex situ* methods.

It has been well recongnized that valuable and productive biological resources are crucial for sustainable economic development. The rural populations always believes that biodiversity is important for their livelihood and survival. Protecting and conserving biodiversity is our own interest and industries such as pharmaceuticals, cosmetics, pulp and paper, construction, Agriculture and agro industries, Horticulture and waste treatment are dependent on biological resources. Between 70-80% of the population in developing countries relies on plants as the only source of medicine.

The Eastern Ghats are endowed with an extensively rich variety of biological species, **geological formations and different ethnic tribes**. More than **2,600 plant species of angiosperms, gymnosperms and pteridophytes including 160 species of cultivated plants**, are reported to occur in the Eastern Ghats region which includes 454 endemic species belonging to 243 genera and 78 families. The region is also enriched with agri-horticultural diversity including valuable diversity in paddy, millets, pigeonpea, cowpea, hyacinth bean, ricebean, niger, brinjal, cucurbits, yams, banana, mango, custard apple, ginger, turmeric etc. The rich and diverse heritage of traditional indigenous floristic wealth in Eastern Ghats needs to be conserved as the fragile ecosystem is highly threatened due to various factors. With increasing interest in



herbal medicines worldwide, conservation of medicinal plants in Eastern Ghats has assumed considerable importance. The Eastern Ghats region is being exploited in an unregulated manner for its natural wealth. Conservation efforts including documentation of the available medicinal plant diversity and other floristic wealth is the need of the hour. In this regard, National Bureau of Plant Genetic Resources, Indian Council of Agricultural Research, Govt. of India has initiated efforts in the form of collection, conservation and documentation of agro biodiversity, including medicinal plant wealth of Eastern Ghats.

### **Geography and climate:**

The Eastern Ghats one of the major hill ranges of India and these hill ranges form an assembly of discontinuous ranges, hills, plateaus and narrow basin and spread an area of 75,000 km<sup>2</sup>. The Eastern Ghats cover parts of Orissa, Andhra Pradesh, Tamil Nadu and smaller area of Chattisgarh, Maharashtra and Karnataka states. The Mahanadi basin marks the north boundary while southern boundary lies in the Nilgiri hills. In the west lie the tips of Bastar, Telengana and Karnataka plateaus and Tamil Nadu uplands. The Coastal belt forms the boundary in the east.

According to the latitude, the Eastern Ghats fall in the tropical climatic zone. Humid climate prevails in the higher altitudes while semi-arid climate is experienced at the foothills in majority region of the Eastern ghats. Hence, the hill peaks of Eastern Ghats and its foothill experience a contrasting climate.

Air temperature in January ranges between 20° and 25°C and shoots upto 41°C during hot summer months and goes down to 2°C during winter months. South-west and north-east monsoons contribute rain to the Eastern Ghats and the average annual rainfall ranges from 120' to 150' mm in the northern region and 60' to 100' mm in the central and southern parts, indicating sub-humid and semi-arid climates respectively. Heavy rains with cyclonic storms characterize the coastal plains. The humidity usually ranges from 65-75%.

### **Ethnic diversity:**

The Eastern Ghats region is inhabited by nearly 54 tribal communities, which constitute nearly 30% of total population. Most of the tribal inhabitants are small and marginal farmers and are engaged in slash and burn, and shifting cultivation which is not at all productive or sustainable because of the short cycle. The tribals living in the Eastern Ghats depend mostly on various forest products but their careless collection resulted in much damage to



the forest wealth, particularly rare and endangered medicinal plant species. Many tribal communities are practicing their local health on traditional methods using medicinal herbs to cure various ailments.

### Medicinal and aromatic plants

Out of an estimated and 7,500 plants of medicinal value reported in India, about 1,800 species are known to occur in the region. At least 50 dye yielding and 40 aromatic plant species are also known to occur in the region. In medicinal and aromatic plants rich variability occurs and some species are endemic/occur in greater population in this part of the country. Plants such as *Bixa oreliana*, *Mallotus philippensis* are some of the dye yielding plants and *Artemisia vulgaris*, *Cymbopogon citrates*, *Ocimum basilicum*, *Vetiveria zizanioides* etc., are other aromatic plants that occur in this region. Threat status of some of the important medicinal plant species occurring in the Eastern Ghats region is *Acorus calamus*, *Aegle marmelos*, *Costus speciosus*, *Gloriosa superba*, *Gymnema sylvestre*, *Mucuna pruriens*, *Plumbago indica*, *Rauvolfia serpentine*, *Piper nigrum*, *Terminallia pallida*, *Stemona tuberosa*.

### Agrobiodiversity:

The farming community in the Eastern Ghats constitutes only the tribal population initially. Their contribution in the domestication and enrichment of the genetic variability is immense. They selected plants of their interest through trial and error. Permutations and combinations of culinary processes were perfected over a period of time. Such variability has become indispensable in the present crop improvement programmes being carried out now. The diversity of plants under cultivation includes an array of crops belonging to cereals, millets, pulses, tubers, fruits, vegetables and spices. Eastern Ghats farming communities including tribes, significantly contributed to the development of several landraces / primitive cultivars / folk varieties. These landraces represent food preferences, cultural heritage and local health traditions. Enumeration and registration of landraces is an important activity in the light of global developments related to rights, conservation and utilization of plant genetic resources. Further landraces and germplasm collected from farming communities are essential building blocks for developing modern high yielding varieties. National Bureau of Plant Genetic Resources (NBPGR) is the nodal organization for the *ex-situ* collection, conservation and utilization of agrobiodiversity.



Significant ethnic diversity is reported in rice (*Oryza sativa*), sorghum (*Sorghum vulgare*), pearl millet (*Pennisetum typhoides*), finger millet (*Eleusine coracana*), Italian millet, proso millet, little millet, kodo millet and barnyard millet from Eastern Ghats. Tremendous diversity in both the cultivated and wild *Oryza* species occur in Koraput (Orissa), which could be the place of origin and domestication for the Asian rices. Important known landraces of crops from the Eastern Ghats are recorded.

### **Wild relatives of crop plants**

The wild relatives of crop plants and related species are gaining significance in crop improvement and evolutionary studies. Atleast, 91 wild related species of crop plants are reported in the region. They occur as members of disturbed, bio-edaphic communities within the major vegetation types throughout the Eastern Ghats. Many wild species are distributed in this region, which are the sources of genes for different biotic / abiotic stresses.

### **Landraces**

Landraces evolve over thousands of years in ecosystems designed/ modified through a selection pressure operated by the native communities. Invasion of culture and advancements in agriculture as a motive for development of tribal groups interfered with the natural evolutionary process of landrace development. In view of the importance of the landraces, global awareness on biodiversity, environment and plant variety rights on commercial exploitation, it has become necessary to identify natural ecosystems, hotspots and heritage sites etc. of agrobiodiversity for effective conservation and utilization. The issues involved in the process have social, economic, legal and scientific dimensions. Culture, traditions, food preferences, life style and habitats, available income options, influence of leadership and connectivity (transport and information technology) etc. pertaining to tribal communities, naturally occurring populations of plant species and their wild relatives, associated organisms including microbes and pollinators need to be taken into consideration while identifying agrobiodiversity hotspots. Selection criteria might vary in different ecosystems and in different crops, which primarily depends upon the breeding system involved.

### **Biodiversity Act – 2002:**

The National legislation – The Biodiversity Act – 2002 passed in Parliament during December-2002 is being implemented by the National Biodiversity Authority (NBA) which primarily deals with all matters relating to requests for access by foreign individuals, Institutions



or Companies and all matters relating to transfer of results of research to any foreigner and approval of IPR related Bioresources. The State Biodiversity Boards (SBB) deals with all matters relating to access by Indians for commercial purposes. The Biodiversity Management Committee (BMC) are set up by the State Biodiversity Boards at local level in every Panchayat in their respective areas for conservation, sustainable use, documentation of biodiversity and creating awareness among the local people on the importance of conservation and sustainable use of Biodiversity. The primary objectives of the Biological Diversity Act is i) Conservation ii) Sustainable use iii) Fair and equitable sharing of benefits arising out of the use of these genetic resources and associated traditional knowledge to the country and the people.

### **Conclusion:**

Several categories of agrobiodiversity exists in the Eastern Ghats viz., landraces, traditional /folk/primitive variety, near domesticated species, and wild and weedy relatives. These categories are nurtured by the tribal communities for over several generations in this region and needs to be conserved for posterity.

*In-situ* Conservation is a process by which farmers maintain the traditional crop varieties that they have developed and which they continue to manage and improve. Thus the conservation of specific genes or genotypes is secondary to the continuation of the processes that allow the material to evolve and change over time. Identification of hotspot area/s is a diverse and complex process and different sources need to be concerned as key factors.

The need for critical diversity in crop improvement like the novel traits in terms of sources for resistance or qualitative / quantitative traits lacking in the present accessions, which are well adapted in an ecosystem. It also include material which may get generated through natural hybridization / introgression through *in-situ* conservation and also development of precious material by purification / crossing without using alien parents viz., Identification of traits vs crops.

The Eastern Ghats is an important area in India and the rich diversity of floristic wealth including with potential Agrobiodiversity and Conservation of these biodiversity and sustainable use and protecting the environment is the need of the hour.