Conservation of Medicinal Plants and Poverty Alleviation

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India is one of the twelve mega diverse countries of the world and represents an extremely unique eco-system rich in medicinal plant wealth used in Ayurveda, Folk medicine, Homeopathy, Siddha, Amchi (Tibetan) and Unani system of medicines. It is reported that about 17,000 plants species accounts for its rich ethnic biodiversity. Out of these, about 7500species are known to be used medicinally. Furthermore, formulations of various modern medicines in allopathic as well as homeopathic systems; also based on these flora. In India, the medicinal plants have traditionally occupied an important position in the socio-cultural and medicinal arena of the people. This biodiversity of medicinal plants and its sustainable utilization sustains the health, medicinal, spiritual and other needs. However, this biodiversity is seriously threatened. A number of threats to medicinal plants and habitat have been identified. They include: trampling, overgrazing, vegetation clearance resulting from urbanisation, over-collection of medicinal plants by inhabitants and traditional healers, destructive harvesting, loss of habitat or degradation in its quality and the medicinal plant trade. Due to this extinction of medicinal plants, the knowledge of herbal medicines is gradually perishing. However, rural population is still practicing the knowledge of herbal therapy on routine basis.

Therefore, there is a strong felt need to conserve the biodiversity of overexploited medicinal plant species. In order to fulfill this urgent aim both *in situ* and *ex situ* conservation measures must be taken up immediately. In order to make conservation sustainable, involvement of local communities is an important strategy. The creation of awareness in local communities about richness of their local health traditions, cultivation and harvesting should also be incorporated as an important activity. This will also help in alleviation of economic conditions of local people. This paper deals with the *in situ* and *ex situ* conservation strategies of medicinal plant and creation of awareness about medicinal plants.

Medicinal plants have always been a basic resource for human health. Since time immemorial, plants containing beneficial and medicinal properties have been known and used by human beings.The preventative and therapeutic value of herbal medicines are appreciated due to their strong traditional cultural relevance. The value and importance of herbal medicines are now being increasingly acknowledge all over the world. The pharmaceutical industry are interested to investigate and confirm the scientific efficiency of these medicines.

The forests have been the source of invaluable medicinal plants since the time man realized the preventive and curative properties of plants and started using them for human health care. India is one of the 12-mega biodiversity centres having about 10% of the world's biodiversity wealth, which is distributed across 16 agro-climatic zones. These agro-climatic zones are endowed with a unique wealth of biota which includes a large number of medicinal and aromatic plants. Many of these plants are rare and endemic and found only in wild sources. Out of 17,000 species of higher plants reported to occur within India, 7500 are known to have medicinal uses. Ayurveda, is one of the most ancient medicine practices known to the world, and derives maximum

formulations from plants and plant extracts that exist in the forests. The oldest medical system in the Indian subcontinent. It has alone reported approximately the use of 2000 medicinal plant species in Ayurveda, followed by the Siddha and Unani medical systems.About 75% from tropical and 25% are obtained from temperate forests. More than ninety percent of the herbal industry's requirement is met from the forests and growing demand is putting a heavy strain on the existing natural resources. Over seventy percent of plant collections involve destructive harvesting because of the use of parts like roots, bark, wood, stem and the whole plant in case of herbs. Indiscriminately collection of essential regenerative components of a plant like roots, tubers, fruits, seeds and flowers lead to degradation and depletion and even extinction of particular species. In some of the medicinal plants whole plant is utilized leading to their irreversible damage and accelerated depletion of the natural capital base. 30% of preparations are derived from roots, 14% bark, 16% whole plants, 5% flowers, 10% fruits, 6% leaves, 7% seeds, 3% wood, 4% rhizomes 6% stems and only less than 20% of the species used are cultivated. Due to over exploitation, many important medicinal plants species are becoming rare and some of them are critically endangered. It is estimated that 10% of all plant species are currently endangered in India.

Continuous exploitation of several medicinal plant species from the wild and substantial loss of their habitats during the past 15 years have resulted in the population decline of many high value medicinal plant species over the years. The primary threats to medicinal plants are those that affect any kind of biodiversity used by humans such as trampling, overgrazing, vegetation clearance resulting from urbanization, over-collection of medicinal plants by inhabitants and traditional healers, destructive harvesting, loss of habitat or degradation in its quality. There are many other potential causes also responsible for extinction in medicinal plant species, such as habitat specificity, narrow range of distribution, land-use disturbances, introduction of non-natives, habitat alteration, climatic changes, explosion of human population, fragmentation and degradation of population. The problem becomes more severe due to market-demand driven harvesting without any concern for representation and conservation.

Thus, there is a strong felt need to conserve the biodiversity of overexploited species due to large scale collection from natural habitats. In order to fulfill this urgent aim both *in situ* and *ex situ* conservation measures must be taken up immediately. Special emphasis should be given to evaluation, isolation and characterization of elite germplasm of important endangered and threatened medicinal plant species as there is immediate threat to their existence. An understanding of the biological and ecological back ground of these threatened species in their normal habitat and their reproductive and growth biology are also essential for their conservation.

Strategies for conservation of medicinal plants

Biodiversity Conservation of medicinal plants is an important activity not only for preservation, procurement and sustainability but also for popularization, education and environmental conservation. A scientific approach is required to conserve these threatened species. There are basically two scientific techniques of conservation of genetic diversity of these plants. They are the *in situ* and *ex situ* method of conservation. Subsequently top priority should be accorded to *in situ* conservation of such naturally occurring forest and non-forest areas by clearly demarcating them as Medicinal Plant Conservation Reserves. *Ex situ* conservation should be done preferably within the natural areas of distribution and the selected germplasm should be widely spaced and broad based including all the varieties and strains existing within the entire range spread over the geographical distribution of the particular species.

In situ conservation:

Plant biodiversity at the genetic, species and eco-system level can only be conserved in their natural habitat. Unless plant populations are conserved in natural habitats, in viable breeding populations, they are susceptible to the risk of extinction. Therefore, it is required to conserve these species in their distinct, representative biogeographic zones inter and

intraspecific genetic variation. The *in situ* methodology for conserving the medicinal plant flora is adopted to conserve the flora on a long term sustainable basis for use by future generations. It is undertaken in natural habitat of the species. A holistic approach is required for systematic management of *in situ* conservation zones. The following steps are recommended for establishing and maintaining *in situ* gene banks for conservation of endangered, threatened and value based prioritized medicinal plants.

1. *Threat assessment to identify endangered species:* At the outset, in order to initiate any systematic Biodiversity Conservation Programme, it should be a prerequisite to identify the endangered species and prioritize them on the basis of their therapeutic value, usage and market forces. The IUCN (International Union of Conservation of Nature & Natural Resources) Methodology may preferentially be used. The IUCN has recommended rapid methods to assess threat status of species and assign it with an internationally accepted Red List i.e. an extinction threat category.
2. *Establishing a network of Medicinal Plant Forest Reserves / Medicinal Plant Conservation Area (MPCA):* For *in situ* conservation of the inter and intra-specific diversity of medicinal plants of a region, an important activity is to identify and conserve "A Network of Forest Habitats (200-500 ha size each)" across the forest types, altitudinal zonations and soil and rainfall regimes of the region.
3. *Involving local stake holders in in situ conservation:* In order to make *in situ* conservation sustainable, involvement of local communities in the protection and scientific management of the conservation sites is an important strategy. It should also be ensured that they also receive economic and social benefits for their long term role in facilitating *in situ* conservation of medicinal plants of their region. The creation of awareness in local communities about richness of their local health traditions and need to revitalize them should also be incorpo-rated as an important activity.
4. *Botanical, Ecological, Trade and Ethno-medical surveys of prioritized medicinal plants:* The sufficiency of identified Medicinal Plant Conservation Area (MPCA) through detailed studies related to its floristic diversity, population status and specific ecological parameters has to be assessed.
5. *Assessing intra-specific variability of prioritized species:* Intra-specific variability of prioritized species has to be assessed genetically as well as biochemically.
6. *Designing species recovery programmes:* In the case of species which are under threat of extinction, special studies related to their reproductive biology may have to be carried out in order to attempt a species recovery process.
7. *Establishment of a Medicinal Plant Seed Centre:* The Seed Centre will need to establish protocols for germplasm collection, storage and seed-testing. The seed collected in the initial phase should be that of either highly traded species which need to be brought under cultivation or that of red data list species, which face the danger of extinction. Germplasm, supplied by the seed centre, can be effectively used by plant breeders and by forest managers for agricultural as well as conservation activities.
8. *Extension and Training:* Extension and Training are important components of *in situ* conservation. Training courses for forest department staff should be organized to inform them on *in situ* conservation methodologies and the importance and role played by local communities in such conservation.

As a prelude step to conserve medicinal plant diversity ideally, *in situ* measures have been initiated by the Government of India. The Ministry of Environment and Forests has established a Protected Area Network of around 150,000 square kilometres established under the Wildlife (Protection) Act, 1972. In addition, "Sacred Groves", dedicated to particular local deities, play a very useful tool to conserve medicinal plant diversity *in situ*. These "Sacred

Groves" are protected and maintained by the local communities themselves.

Development of community based enterprises for social upliftment:

There are 9493 manufacturing units, 22,635 dispensaries and 1355 hospitals of the Indian Systems of Medicine. Approximately, 800 species of medicinal plants are in active trade and still there is a gap of 40,000 metric tonnes in the demand and supply of medicinal plants. The income generated by the traditional medicine industry benefits small section of the society. A strong case exists for promotion of community level enterprises for value addition to medicinal plants through simple, on site techniques like drying, cleaning, crushing, powdering, grading, packaging etc. This will also increase the stake of rural communities in conservation and change the skewed nature of income distribution of the industry. Domestication of medicinal herbs will certainly constitute a potential component of sustainable rural development in the villages. Cultivation of medicinal and aromatic plants promises good returns. Even poor people with small holdings can be benefitted by the cultivation of different medicinal plant species suited to different soil types and in different agro forestry models leading to their poverty reduction. However, in view of the increasing demand for medicinal herbs in the near future, it will be necessary to organize current cultivation practices and improve them by using more technical and scientific inputs. The local villagers also felt that the absence of proper marketing strategies was an obstacle to obtaining the right price for their produce. The productivity of medicinal herbs could be substantially increased by more advanced techniques and proper management which ensure great economic returns .

Dissemination and extension:

To promote the development of the medicinal plants sector in the country, the National Medicinal Plant Board (NMPB) formulated various promotional schemes. These schemes mainly aim to disseminate awareness about the importance of medicinal plants and the medicinal plants sector as a whole.

Various demonstrations plots of important medicinal plants are established by different research organizations and universities with an aim to educate the people regarding the cultivation, harvesting techniques of medicinal plants and extension and dissemination of research results to beneficiaries and end users through several training cum demonstration programmes.

Recently, under a promotional scheme the NMPB has launched a new activity with a view to educate and sensitize students about conservation, cultivation and indigenous uses of medicinal plant species. It is planned to provide financial assistance for setting up herbal gardens in schools on a pilot basis. Since schools may not have much area for cultivation, it is proposed to provide funding for raising herbal gardens of about one-tenth of a hectare in each school. For developing one herbal garden of about 1000 sq. m, financial assistance will be limited to Rs 10,000 for setting it up and Rs 4000 for maintenance during the second year. The cost of establishing herbal gardens will include land development, irrigation, transportation of planting material, organic manure, barbed wire fencing, etc.

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