

Conservation and Sustainable uses of Medicinal Plants

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Abstract: India ranks sixth under world's twelve mega bio-diversity zones. Out of these, two of them exist in our country. India possesses tremendous ecological bio-diversity. It contains 5 % of the world's bio-diversity on 2 % of the earth's surface. The biodiversity in our country is unique in nature and its in-situ and ex-situ conservation is very well needed. In recent years, the global demand of herbs has led to a quantum jump in volume of medicinal plants traded within and across the countries. The medicinal plants have been identified as one of the most important plant diversities for rural development. The use of plants as medicine is as old as human civilization itself. India is home to about 15000 to 18000 of flowering plants of which about 8000 plant species are recognized as medicinal plants and are being used by various traditional systems of medicine.

In Uttar Pradesh, Vindhyan and Bundelkhand regions, being native of many important medicinal plants, have a great potential for their conservation and cultivation.

This paper deals with the conservation and nursery technique of some important medicinal plants, their usages and contribution in development of tribal economy in Vindhyan region of U.P. The species selected are of great importance as far as the economics of region is concerned. The nursery techniques as described in this paper can be successfully adopted by the cultivators in order to uplift their economic conditions. By doing so, we will not only be able to conserve the precious wealth of medicinal plants but we will also achieve the goal of conserving the biodiversity of species, which are threatened and at the verge of extinction.

Plants have been used given those historic times to heal and remedy diseases and to enhance the fitness and the well-being of the populations. Medicinal and aromatic flora still structure the basis of standard or indigenous health structures of the populations in most of the creating countries, as mentioned with the aid of the World Health Organization (WHO).

As end result of the increasing interest in medicinal plants, new income generating opportunities are opening up for rural populations. With many of the MAPs gathered from the wild, the recollection and sale of MAPs is offering a complementary supply of earnings for many terrible rural households.

Keywords: Biodiversity, Conservation, Medicinal Plants, WHO.

INTRODUCTION

- Use of medicinal plants is as old as civilization itself. They have been used by mankind for centuries
- The World Health Organization (WHO) estimated that 80% of the population of developing countries realize on traditional medicines, mostly plant drugs, for their primary health care need
- The demand for Medicinal plants is said to be increasing year after year. This necessitates the conservation of Biodiversity
- India is one of the world's top 12 mega diversity countries with 10 bio geographic regions. India alone includes two among the world's eight biodiversity hotspots
- In India, out of 17000-18000 species of flowering plants about 6000 - 7000 are medicinal plants having medicinal usage in folk and documented systems of medicine, like Ayurveda, Siddha, Unani & Homoeopathy that accounts to nearly 35 - 40 %
- The growing demand for medicinal plants is putting a heavy strain on the natural resources. This has resulted in depletion of a number of higher plant species which are categorized as either threatened or endangered.
- Hence conservation of biodiversity is essential not only to maintain ecological process and life support system but also to ensure sustainable utilization of species as well as ecosystem.

NEED FOR CONSERVATION

- Over one and half million practitioners of the Indian systems of medicine, use medicinal plants in preventive, promotive and curative applications

- Medicinal plants are potential renewable natural resources
- Several medicinal plants have been assessed as endangered, vulnerable and threatened due to over harvesting in the wild
- While the demand for medicinal plants is increasing, their survival in their natural habitats is under growing threat

According to World Conservation Strategy (IUCN, UNEP and WWF, 1980) conservation is defined as "the management of human use of the biodiversity so that it may yield the greatest sustainable benefit to the present generation while maintaining its potential to meet the needs and aspirations of future generations" (Udvardy, 1984).

The forest areas in the state of Uttar Pradesh are very rich in variety of medicinal plant species particularly in the Vindhyan region where various medicinal plants grow naturally. According to Planning Commission Report (2000) the primary goal of biodiversity conservation as envisaged in World Conservation Strategy is summarized below:

- 1) Maintaining of essential ecological process and its life support system.
- 2) Preservation of genetic diversity
- 3) Sustainable Management.

The medicinal plants are basic raw material for the production of Ayurveda and Unani medicine & medicines. The bulk of the raw material (about 80% of the demand) is derived from the forests only.

Hence, the forest areas have been over exploited in the past to meet the requirement of the pharmaceutical and allied industries. Consequently, many of the important plant species have been threatened and some of them are on the verge of extinction due to unscientific collection by untrained persons.

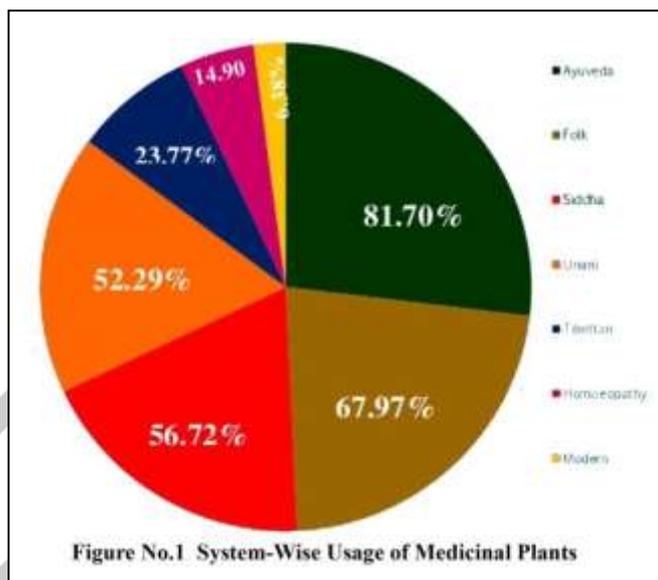
In recent years, medicinal plants have also been gaining immense popularity not only in developing countries but also in developed countries due to various well-known reasons like side effects of synthetic drugs. Therefore, the demand for the basic raw material has been further increased and forest areas are hardly able to meet this increasing demand of industries. In view of the aforesaid reasons, there is an urgent need to conserve and to propagate some important medicinal plants species so as to save them from extinction and also to ensure greater availability of raw material.

MAJOR CAUSES OF MEDICINAL PLANTS DEPLETION

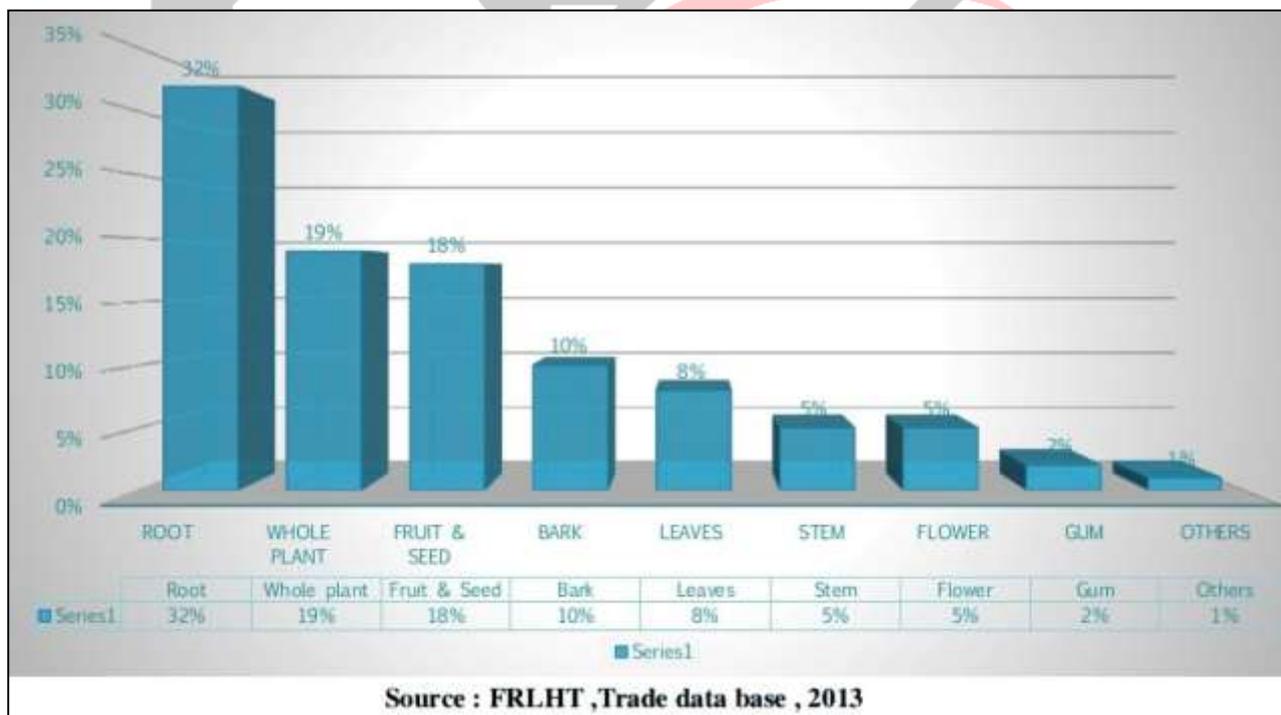
- ✓ Non - sustainable, destructive, high density harvesting by plant collectors
- ✓ Declination in traditional knowledge of local communities regarding use of medicinal plants
- ✓ Over harvesting of the material due to low income of collectors & low prices paid to them
- ✓ Increased international demand for medicinal plants
- ✓ Commercialization of medicinal plants & increased accessibility of traders to remote forest areas
- ✓ Over deforestation
- ✓ Natural phenomenon (Landslides, Forest fire, Global warming, Drought)

SYSTEM-WISE USAGE OF MEDICINAL PLANTS

SYSTEM	APPROX. % PERCENTAGE
Ayurveda	81.70 %
Folk	67.97 %
Homoeopathy	14.90 %
Modern	06.38 %
Siddha	56.72 %
Tibetan	23.77 %
Unani	52.29 %

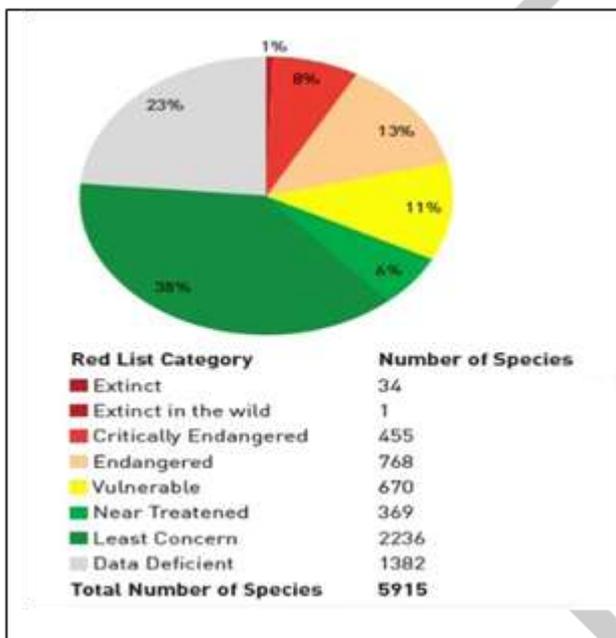


USAGE OF MEDICINAL PLANTS BY PARTS



IUCN (INTERNATIONAL UNION FOR CONSERVATION OF NATURE SPECIES) has Classified plant species into nine categories.

1. Extinct
2. Extinct in the wild (EW)
3. Critically endangered(CR)
4. Endangered (EN)
5. Vulnerable (VU)
6. Near threatened(NT)
7. Least concern (LC)
8. Data deficient (DD)
9. Not evaluated (NE)



RARE SPECIES

Species with small population restricted geographically with localized habitats. They are not in immediate danger of extinction e.g. *Saraca indica* (Asoka)

VULNERABLE

Species are under threat of or actually declining in number. e.g. *Aegle marmelos* (Bilwa), *Baliospermum montanum* (Danti)

ENDANGERED

Species with low population number that are in considerable danger of becoming extinct e.g. *Bacopa monnieri* (Brahmi)

CRITICALLY ENDANGERED

When a species is facing an extremely high risk of extinction in wild in the immediate future e.g. *Inula racemosa* (Pushkarmool)

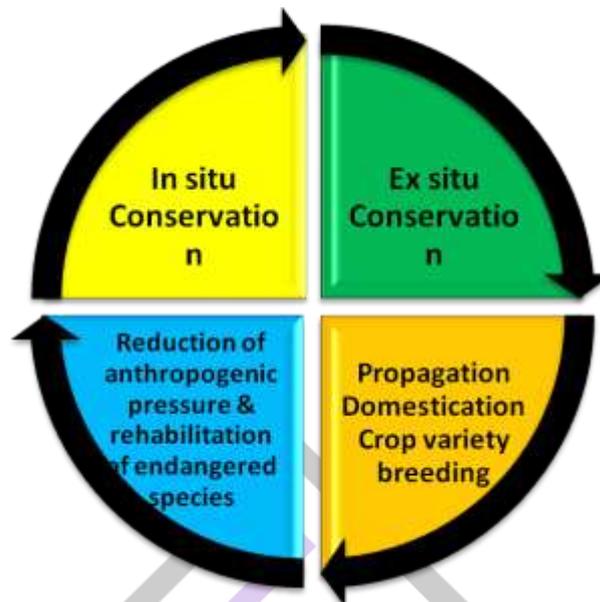
EXTINCT

Species which cannot be found in areas where they recently been inhabited e.g. *Drosera indica*, *Aerva wightii*, *Asparagus rotteri*, *Madhuca insignis*

IMPORTANT MEDICINAL PLANTS OF INDIA, THEIR USES AND CONSERVATION STATUS

Species	Common Name	Medicinal Uses	Habitat	Causes of Extinction	Red List Category	Conservation Category
Acorus calamus	Vacha	Root - Memory loss anxiety. Mental fatigue. Sinusitis	Grows on the margins of standing or slow-flowing water	No information available on threats to the species or its habitats	Least concern	No Conservation measures have been undertaken specifically for this species
Adhaatoda beddomei	Vasa	Root, leaves and flowers of vasa of is used in the form of juice & decoction to treat fever, cough, asthma, skin diseases	Travancore hills South Western Ghats, Akkamalai (Coimbatore Dist), Mahendragiri (Kanniyakumari Dist)	No information available	Critically Endangered	Conservation status unknown
Boerhaavia diffusa	Punarnava	Root Diuretic, laxative anemia. Expectorant used in asthma, bronchitis waste land of India	Perennial creeping herb found throughout the india	No information available	Not Accessed	Conserved at several MPCAs
Picrorhiza kurroa	Katuki	Roots are used in stomach pain, fever and dyspepsia	Distributed in Himalayas from Kashmir to Sikkim at an elevation of 2700-4500 m	No information available	Endangered	Conservation status unknown
Piper longum	Pippali	Roots & Fruits are used in cough, fever, cold carminative	Lowland tropical rainforest	Habitat loss	Endangered	Conservation status unknown
Rauwolfia serpentina	Sarpagandha	Roots – reduce high blood pressure & hyper tension	Growing in abundance in shade of dense vegetation	Habitat destruction	Extinct in wild	Conservation status unknown
Withania somnifera	Ashwagandha	Roots - effective in painful swelling, fever the whole plant is used in leucorrhoea in females & impotence in males	Alluvial soil rich in humus and nitrogen with pH ranging between 6 - 8	Over exploitation for preparation of medicines on large scale	Extinct in wild	Conservation status unknown

MEDICINAL PLANT CONSERVATION STRATEGIES



IN-SITU CONSERVATION

- Conservation at the site of their occurrence
- Achieved through establishment of a number of MPCAs in biogeographic zones of India in co-operation with the State Forest Dept.
- It includes - Biosphere reserves, national parks, sacred sites, Sacred groves etc
- Most medicinal plants are endemic species, and their medicinal properties are mainly because of the presence of secondary metabolites that respond to stimuli in natural environments, and that may not be expressed under culture conditions.

EX-SITU CONSERVATION

Conservation is done outside of the natural habitat Achieved by,

- Raising nurseries
- Seedling supply
- Plantation material
- By establishing Botanical garden, Medicinal plant garden
- Seed banks
- In-vitro methods like tissue culture

SUSTAINABLE USE

- For Sustainable utilization of medicinal plants, the Departments/Institutions/Agencies must be identified for preparation of document on various aspects of cultivation & conservation covering availability of planting material, agro-practices, protocol, status of technology, ex-situ & in-situ conservation etc..
- Various issues to be addressed for sustainable utilization of Medicinal plants are,
- Identify the medicinally important species & study their biology
- Identify the therapeutically important ingredients and set up pharmaceutical industry
- Develop scope for their commercial exploitation
- Set up artificial propagation methods to fulfill the demand

- Maintain the germplasm through conserving the species in-situ & ex situ

DISCUSSION

- Harvesting of medicinal plants is less costly than artificial drug synthesis. Reserpine is a good example of this. The synthesis of the drug costs approximately \$ 1.25/g; whereas commercial extraction from the plant cost \$ 0.75/g
- Heavy demand of some of the plants has threatened some species and put them to the level of extinction. 70 % of plant collections involve destructive harvesting because of use of parts like roots, bark, stems & whole plant
- There are no regular developmental programmes in the forestry & agriculture sector to promote regeneration and revival of endangered species

WHAT CAN WE DO?

- Awareness of new species varieties
- Educate the drug collectors
- Substitution of plant or with other parts of plant
- Programmers to promote a herbal garden in & around public places like schools, roadside, worship places of all religions
- Facilitate link between farmers and manufacturers
- Conserve the existing forest
- Reduce dependence on wild for collection of drugs
- Biodiversity areas must be identified and conserved

CONCLUSION

- A large number of Medicinal plant species in India are threatened
- Over exploitation & habitat destruction are the most serious proximate threats to Medicinal plants. Hence in-situ conservation alone cannot be successful in conservation, other ex-situ methods need to be employed
- Traditional knowledge can also play important role in medicinal plant conservation
- Strategies need to be developed for conserving the available biodiversity, so that the natural wealth is preserved and multiplied to be used for the benefit of humankind and the future generations. It needs only a sincere effort and the mother nature will reward us with abundance

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