

CHAPTER VII

MEASURES FOR CONSERVATION OF MEDICINAL PLANTS

7.1. INTRODUCTION

The study showed that continued extraction of commercially important medicinal plants, without management interventions, may lead to substantial changes in various phytosociological attributes of a forest community. The species diversity, density and basal area, and consequently biomass may decline. The present study also showed that the regeneration of most of the medicinal plants in NBR is inadequate to replace the adults. Thus, the present study gives considerable evidence for unsustainable utilization of medicinal plants in the NBR. The study also showed that deciduous forests harbour greater variety of medicinal plants. The results assume greater significance since deciduous forests cover the major portion of forests in NBR and these forests are subjected to frequent fire and other human disturbances.

The forests in the NBR have been subjected to various human pressures for a long time. Collection of forest products, fire and grazing continues in some part of the NBR. Invasion of exotic plants namely *Ageratum conyzoides*, *Chromolaena odorata*, *Lantana camara*, *Mimosa pudica* and *Opuntia dillenii* affects the population of native species. Moreover, habitat destruction and other human pressures have already depleted the medicinal plant populations. Therefore, conservation of medicinal plants is important for the sustainable utilization of these resources. It is suggested that the following measures for the sustainable utilization and conservation of medicinal plants be taken up.

7.2. Measures for conservation of medicinal plants

7.2.1. Guidelines for management

Since, the current intensity of utilization of some medicinal plant is unsustainable, the following steps should be followed to ensure that conservation of medicinal plants is carried out in an efficient and effective manner.

1) There is clearly a need to prevent destruction of medicinal plants and their habitats during activities unconnected to collection as grazing, fire, firewood collection. Daniels (1993b) emphasized the need for giving conservation priority to habitats, which harbour rich medicinal plant wealth, species rich communities and to communities that have restricted range. Tropical deciduous forests in NBR harbours more medicinal plant wealth, moreover lopping, burning, and overgrazing threaten these habitats. So, management plans should be formulated to give more protection to these habitats.

2) Those medicinal plant species, which have narrow distribution or disjunct distribution, less tolerance to habitat change and are likely to be affected by various environmental and anthropogenic factors should be given conservation priority. Based on the present study, medicinal plants such as *Curcuma pseudomontana*, *Cycas circinalis*, *Gloriosa superba*, *Madhuca longifolia*, *Nervilia aragoana*, *Pseudarthria viscida*, *Rauwolfia serpentina*, *Schrebera swietenoides*, *Rotula aquatica*, *Decalepis hamiltonii*, *Costus speciosus* and *Terminalia arjuna* were selected as priority species. The criteria for the selection of these species include habitat loss, population reduction, extent of occurrence and commercial extraction. Among the above 12 species, nine species were also listed in the "red

list" of medicinal plants of south India (Anon. 1997). Ex-situ conservation measures such as micropropagation and germplasm maintenance can also be undertaken for the conservation of these species.

3) Destructive extraction (See Chapter V), less abundance and poor regeneration of many commercially exploited medicinal plants were observed in the present study. This clearly points to the unsustainable utilization of medicinal plants. Hence, suitable management plans should be implemented for the sustainable utilization of medicinal plants. Any management strategy for sustainable harvesting needs to incorporate ways of controlling over-exploitation, while allowing levels of exploitation that are sufficient to meet legitimate needs. Muraleedharan *et al* (1997) have initiated such a work in the Wayanad Wildlife Sanctuary. Most medicinal trees rely on animals to pollinate their flowers and disperse seeds (Peters 1993). Therefore, any serious program of commercial resource exploitation must include measures to conserve viable population of these animals. A team of botanists, medicinal plant specialists and park managers should prepare a plan for each area providing details on how the medicinal plants can be used on a sustainable basis.

4) Destructive collection of medicinal plants is common in the NBR. Nearly 45% of the collections of medicinal plants in NBR are destructive. I also observed that for collecting fruits branches of trees were cut this is mainly done by the tribals. Therefore, the tribals and other local people who are involved in the collection of medicinal plants should be given sufficient training in scientific way of collection. Collection programmes should be planned properly and restricted to

a particular season. Cutting of tree branches to harvest its fruit should be avoided. Annual medicinal herbs can be continued to be collected by leaving enough propagules for next season's growth. So also, flowers and fruits without destroying plants. Thus, by rationalising the collection of medicinal plants, they can provide a sustained yield from the forests.

5) To reduce the pressure of commercial exploitation on wild medicinal plants and to avoid adulteration of crude drugs, cultivation of medicinal plants can be encouraged with the participation of local tribes. Judicious harvesting of NTFP's can enhance the rural incomes. Moreover, local communities can be involved in conservation because of the economic interest they are likely to have in sustainable use of natural resources. Tribals (Irulas) in the NBR are willing to participate in cultivation of medicinal plants. Therefore, tribals can be involved in the cultivation.

7.2.2. Management oriented research

The following are the areas of research that could identify management requirements, and improve our understanding of the conservation of medicinal plants.

1) Commercial harvesting of reproductive parts of medicinal plants not only effect the wild population but also affect the genetic composition of the plant being exploited (Peters 1993). Genetic diversity of most of the medicinal plants are unknown. Therefore, the genetic diversity of medicinal plants should be studied for germplasm preservation and conservation of medicinal plants.

2) Autecological information (seed dispersal, germination, phenology, propagation methods, habitats in which they occur, their distribution and microhabitat requirements) of important medicinal plants are very helpful in designing appropriate conservation and management plans. Autecological information are valuable aid to germplasm collection and exchange. Hence, autecological information of medicinal plants should be studied for better management of the resources.

3) The present study shows that the current intensity of exploitation of medicinal plants is unsustainable as the density and regeneration of some medicinal plants were very low in the harvested area compared to least harvested area. Sustainable utilization is defined here as the level of utilization that does not impair the ability of the harvested population to replace itself. Moreover, sustainable harvest should have no discernible adverse effect on other species in the community, or an ecosystem structure and function (Hall and Bawa 1993). Although, the present study indicates the unsustainable utilization of NTFP's in the NBR, populations change over time and sampling must continue to determine patterns of natural change in population structure. Similarly decline in population and regeneration can occur due to a number biotic and abiotic causes and population dynamics of a given species is influenced by other species in the community.

Need for productivity studies

Unless levels of harvests are linked with total productivity, a sustainable level of extraction may be difficult to achieve. Phillips (1993) assessed the

productivity of forest products in Amazon. Uma Shankar *et al* (1996) assessed the productivity and extraction of *Phyllanthus emblica* in Biligiri Rangan Hills, India. However, productivity levels for most NTFP's per unit area are unknown. In the absence of such data, the notion that extraction of NTFP's is compatible with sustained use and conservation of forest resources remains untenable (Godoy and Bawa 1993). Productivity of resources such as fruit is affected by several factors (Phillips 1993), moreover, productivity may vary from one year to another and vary from one forest to another (Phillips 1993). Productivity of fruits can be affected by parasitic plants also. During my field visits, I found two common parasitic plants, *Taxillus tomentosus* and *Dendrophthoe falcata* affected the fruit production of *Phyllanthus emblica* (Amla). However, productivity studies of medicinal plants are beyond the scope of this study because of time constraints.

The exact percentage of resources that must be left to enable a maximum sustainable yield is difficult to estimate and varies from one species to another. Uma Shankar *et al* (1996) showed that harvesting 60 to 80% of *Phyllanthus emblica* had a negative effect on new recruitment in the Biligiri Rangan Hills, India. Hence, harvesting below 50% of the total productivity could be sustainable way to use this species. Muraleedharan *et al* (1997) showed that harvesting 95% population of *Asparagus racemosus*, *Curcuma aromatica* and *Hemidesmus indicus* not affected their regeneration. However, a precise calculation of the maximum level of sustainable harvesting would require monitoring the population over a number of years, a technique which require much time and work. Therefore, for the sustainable use of a given species, apart from density and

distribution patterns, its regeneration potential in different levels of harvest and level of productivity should be assessed.

4) Vegetation and land use maps, species distribution patterns, identification of zones of speciation and demarcation of hotspots of biological diversity (Gentry 1992) globally aid conservation efforts. Hence, formation of a database of medicinal plants of NBR will not only help in understanding the distribution pattern and ecology of medicinal plants but also helps in conservation of medicinal plants. Guidelines for the establishment of medicinal plant database are discussed in Synge and Heywood (1991). French Institute, Pondicherry, India has already formed an ecological database of some south Indian medicinal plants (Rani *et al* 1997). Adding species based information from various fields in basic and applied sciences can enlarge the scope of such database.

5) Medicinal plant populations may change over time and sampling must continue for long time to find out patterns of natural change in population structure. Similarly, decline in population and regeneration can occur due to many biotic and abiotic factors and population dynamics of a given species is influenced by other species in the community. Therefore, long term monitoring of medicinal plant population is recommended. Besides, the above areas research could be undertaken on minimum effective population size of medicinal plants, relationship of soil chemistry to active compounds in medicinal plants, effects of exotics and parasitic plants on the medicinal plant population.