

CHAPTER I

INTRODUCTION AND OBJECTIVES

1.1. INTRODUCTION

Medicinal plants are important as an integral part of traditional therapy of local people and as a possible source of valuable phytochemicals. The World Health Organisation (WHO) has estimated that 80% of the people in developing countries rely on plant based drugs (Farnsworth 1988). Moreover, the resurgence in natural systems of cure all over the world has again brought medicinal plants into forefront. Thus, many people continue to rely on traditional medical practice, using plants, which by trial and error over a period have proved to be effective, safe, cheap and readily available.

To obtain a clear view of the relationship between people and their natural environment and to suggest sustainable management options, it is necessary to gather data on type and source of resources used, their importance within the cultural context and alternatives if the resource is scarce and needs to be conserved for the preservation of genetic diversity and future benefit. There are several other complementary reasons for documenting medicinal plants. The traditional use of a plant may be an indication of the presence of chemicals valuable to medical progress. In fact, 74% of the 121 biologically active plant derived compounds presently in use worldwide, have been discovered through ethnomedical approach (Farnsworth *et al* 1985). However, traditional knowledge is under threat. There is a steady decline in human expertise capable of recognising various medicinal plants. Much of this wealth of knowledge is

becoming lost as traditional culture gradually disappear. Destruction and degradation of high diversity ecosystems not only erode traditional contact which local people have with their native floras, but also reduces the chances of discovering new economically useful plants (Sequeira 1994). In view of the recently emerging controversies related to biopiracy and Intellectual Property Rights (IPR), it is absolutely necessary that proper documentation of ethnomedicinal knowledge is done.

Traditionally the tribals utilize medicinal plants for their use for treating various ailments. However, in the recent past, with increasing commercialisation of the medicinal plants, the practice has become more commercial. Extraction of medicinal plants, like any other form of exogenous disturbance (Clear felling, slash and burn agriculture) may have both short term and long term consequences on the structure and function of forest ecosystems. Over-harvesting may alter population size, growth rates, and reproductive capacity of harvested species, leading to a reduction in the quantities of Non-Timber Forest Products (Hall and Bawa 1993). The impact of extraction on individual medicinal plants may vary depending on the plant part extracted and the intensity of extraction. A general response of over-harvesting is depletion of populations of target plant species (Kahn 1988; Nepstad *et al* 1992; Homma 1992; Peters 1993; Murali *et al* 1996; Uma Shankar *et al* 1998). Unsustainable harvesting of plant products is not restricted to products that are being collected for commercial markets. Medicinal plants used primarily by indigenous communities are also being depleted by unsustainable extraction (Browder 1992). Although, there is considerable evidence for over-harvesting of medicinal plants, quantitative analyses of the

effect of extraction on natural populations are not many (Daniels *et al* 1993a, Murali *et al* 1996, Uma Shankar *et al* 1998). Besides, knowledge of natural distribution, abundance and population structure across a landscape is required for each species to assess the sustainability of utilization. These data are critical to evaluation of the management and conservation potentials of different types of forest cover for medicinal plant resources.

1.2. Studies in India

India, one of the 12 mega biodiversity countries of the world (Myers 1992) has one of the oldest, richest and most diverse cultural traditions associated with the use of medicinal plants. Dr. E.K. Janaki Ammal initiated studies on ethnobotany in 1954, in the country. Since then lot of ethnobotanical studies have been carried out in various parts of the country (Jain 1963 & 1965; Maheshwari and Singh 1984; Pande and Pangtey 1987; Rawat and Pangtey 1987; Viswanathan 1989; Dwarakan and Ansari 1992; Geetha 1995; Gaud and Pullaiah 1996; Vijayakumar and Pullaiah 1998; Balasubramanian and Rajasekaran 1998). Several authors have recorded medicinal plants used by the tribals in the Western Ghats (Nagendra Prasad and Abraham 1984; Pushpangadan and Atal 1986; Pushpangadan *et al* 1988; Hosagoudar and Henry 1996a & b; Radhakrishnan *et al* 1996). Binu *et al* (1992) compiled an outline of ethnobotanical work carried out in India. Lalramnghinglova and Jha (1999) reviewed the ethnobotanical research all over the world. The All India Coordinated Research Project on Ethnobiology (AICREP) conducted a nation-wide ethnobiological investigations and it recorded about 7,500 species of plants used by 465 ethnic communities for human and veterinary health care (Anon. 1994). Although, ethnobotanical information was

extensively collected, quantitative ecological information, particularly on density and distribution (Prasad and Pandey 1987; Pandey and Shrivastava 1989; Shanker and Joshi 1990; Daniels *et al* 1993a; Murali *et al* 1996; Uma Shankar *et al* 1998) is scanty.

1.3. Nilgiri Biosphere Reserve

The Nilgiri Biosphere Reserve (NBR) situated in the Western Ghats and one of the biodiversity 'hot spots' (Khoshoo 1995), was chosen for the present study for several reasons. First, it harbours enormous floristic diversity: of the 4000 flowering plants found in the Western Ghats, 3187 species have been recorded from this reserve, of which 135 are endemic to this area (Balakrishnan and Ansari 1990). Secondly, these forests harbour tremendous wealth of wild relatives of cultivated, medicinal and other economically important plants. Thirdly, presence of rich ethnic diversity; NBR harbours about 26 tribal groups, most of them are still dependent on local plants for their day today life (Anon. 1992) and are involved in large scale commercial exploitation of medicinal plants. Finally, it is expected that management of Nilgiri Biosphere Reserve for the conservation of medicinal plants would also ensure the survival of other taxa of flora and fauna.

1.3.1. Studies in the NBR

In NBR, most of the botanical studies were concentrated on the flora of various areas (Subramanyam 1959; Subramanian 1966; Naithani 1966; Sharma *et al* 1978; Stephen 1994; Manilal 1988; Vajravelu 1992). Several authors documented the ethnobotanical knowledge of the tribals in NBR (Ragunathan 1976; Anon.1980; Bhatt *et al* 1980; Abraham 1981, 1990; Pushpangadan and Atal

1984; Sankaranarayanan 1988; Lakshmanan and Sankaranarayanan 1988, 1990; Ramachandran and Maniyan 1989; Rajan and Sethuraman 1991, 1993; Gopalakrishnan and Krishnaprasad 1992; Balasubramanian and Prasad 1996; Mandal and Basu 1996; Hosagoudar and Henry 1996c; Rajan *et al* 1997) and they reported only 373 medicinal plants used by the tribals (Prasad *et al* 1999). In spite of the above studies, considering the diversity of plants and rich ethnic communities of NBR, informations about the ethnomedicinal uses of plants is meagre and still some of the tribal groups, namely Irulas and Kattunaickans are less studied. Moreover, ecological information on medicinal plants, which are important for conservation and sustainable utilization are lacking. Puyravaud *et al* (1995) studied the impact of fire on a dry deciduous forest in the Bandipur National Park. Although, phytosociological studies carried out in different forest plant communities (George and Varghese 1984; Sharma *et al* 1983, 1986; Manilal *et al* 1986, 1989; Singh *et al* 1988; Sukumar *et al* 1992) showed the status of some plant species in the NBR, the present status of medicinal plants in different habitats of NBR and the impact of commercial exploitation on the medicinal plant population are lacking. The present study is the first of the kind to compare quantitatively the species richness, density, and size class distribution of medicinal plants found in various habitats of the NBR. The present study also assessed the regeneration of medicinal woody species in the NBR.

1.4. OBJECTIVES

The specific objectives of this study were as follows;

- i. to document ethnomedicinal uses of plants by surveying a few less studied tribal groups of NBR and to initiate preliminary

phytochemical screening of selected medicinal plant species hitherto not investigated.

- ii. to assess the status of species richness, density and regeneration of medicinal plants in different habitats of NBR and to
- iii. assess the impact of commercial harvesting on the abundance and regeneration of medicinal plants.

Fieldwork was conducted between May 1994 and November 1998 in selected forest localities in the NBR. After reconnaissance surveys, intensive study sites and local tribal groups were selected. For documentation of tribal knowledge, Irulas, Kurumbas, Kattunaickans and Mudugas were given major focus. The status and distribution of medicinal plants were examined in dry deciduous, moist deciduous and riverine habitats and old teak plantations.

The thesis is divided into seven chapters, Chapters I and II give introduction, objectives and study area, Chapter III discusses the medicinal uses of plants by selected tribal groups and preliminary phytochemical screening of medicinal plants, Chapter IV deals with the status, distribution and regeneration of medicinal plants in different habitats of the NBR, Chapter V examines the commercial exploitation of medicinal plants, Chapter VI assesses the impact of fire on the abundance, distribution and regeneration of medicinal plant populations, and Chapter VII presents the research and management programme for conservation of medicinal plants.