CHAPTER 1

INTRODUCTION

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The association of man with plants is an age-old process. Also the relationship between man and environment in general has never been static and is changing continuously. But this is not the case with tribal/aboriginal communities the world over. The life, culture and traditions of these communities have remained almost undisturbed and static for hundreds of years. The traditional communities in the world over have the wealth of accumulated knowledge and wisdom particularly about the biological resources around them. Often it is said that they are the living archaeological museums of ancient traditions and cultural heritage of a nation (Ghosh & Das 2004).

The Indian subcontinent is inhabited by over 53.8 million tribal people belonging to over 550 communities like *Santal*, *Munda*, *Oraon*, *Naga*, *Mompa*, *Karbis*, *Saora*, *Sarasia*, *Irulus*, *Chenchus*, *Kharia*, *Baigas*, *Bando* etc. with some degenerated communities like *Ongae*, *Great Andamanies*, *Jarawa*, *Sentinelese*, *Shompen*, *Toda*, *Toto*, *Asur*, *Birhore*, *Lodha* etc. that come under 106 different linguistic groups and 227 subsidiary dialects (Rao 1994). They inhabit in varied geographical and climate zones of the 5000 forest villages in the country and are living in complete harmony with the nature. Tribals constitute about 7.5% of India's total population (Jain 1991, Pushpangadan 1994). They can utilize the biological resources without disturbing the delicate balance of the ecosystem. But this peaceful coexistence of the tribal society has been violently shaken in the recent past by the interference in their habitats by so called civilized outsiders. India is very rich for its 16 agro-climatic zones and its old heritage of ancient civilization with old and obsolete literatures like Vedas, Quaran, Puran, Sanhitas, Neghuntus, Nidans, Epics (*Ramayana*, *Mahabharata*), archeological remains and sacred groves and is an unused field for ethnobotanical studies in various aspects to get initial information on inter-disciplinary and intra-disciplinary subjects. However, this subject is newer to Indian science and recognized as a multidisciplinary study (Pal 2000).

In the pre-historic times people used plants quite intuitively for the fulfillment of basic needs. Such as food, clothing, shelter, tools and even for the cure of many of their bodily disorders. The history of medicinal plants is intimately connected with the history of plants.

Primitive man lived at the mercy of nature, in constant terror of diseases. The medicinal plants played a very important role from times immemorial among the illiterates to highly civilized men and women in the folklores, superstitions, traditions, various rituals, witchcraft and incantation connected with healing of diseases and also driving out the evil spirits which they believed to be the cause of the disease. Astonishingly, these magical rites seemed to help. The use of plants for curing various human ailments figured in ancient manuscripts such as *The Bible*, *The Rig-Veda*, *The Iliad* and *The Odyssey* and the History of Herodotus. Over 6000 years ago, the ancient Chinese were using drug plants. The Egyptians, Babylonians, Sumerians, Greeks and Romans, all developed their respective characteristic *Materia Madica*. In India, the ayurvedic system of medicine has been in use for over three thousand years. Charaka and Susruta, two of the earliest Indian authors had sufficient knowledge of the properties of the Indian medicinal plants. Their medical works the *Charaka Samhita* and the *Susruta Samhita* are esteemed even today as treasures of literature on indigenous medicine. This man-plant relationship can be classified into two groups viz. (a) abstract and (b) concrete (Pal 2007).

The abstract relationship includes faith in good and bad power of plants, taboos, sacred plants, worship, folklore and other aesthetic valuable plants. In literature similies and metaphor coming from plants and plant parts are also included within this realm. On the other hand, the concrete relationship includes mainly the materials used such as food, medicine, shelter, etc. In 1989, Jain categorized the *Abstract* and *Concrete* relationship between man and plants under four headings, viz. (i) Relationships useful both to man and plants, cover the realm of domestication of plants, agriculture, development of improved crop varieties, hybridization, creation of hardy, disease-resistant varieties, propagation, sustainable exploitation and conservation of wild plant resources. (ii) Relationships useful to man, harmful to plants, include the areas of the practice of monoculture forestry, silviculture, usage of minor forest produces, etc. (iii) Relationships useful to plants, harmful to man, include obnoxious weeds and the plants in pesticides. (iv) Relationships harmful both to man and plants, come under the purview of damage to environment, environmental pollution, deforestation, creation of waste lands by one way or the other, shifting cultivation, etc (Jain 2004).

1.1. Definition

The term "*Ethnobotany*" is derived from two Greek syllables *Othnikos* or *ethnos*, meaning nation or race, and *botanikos* or *botane*, meaning plant. The term "Ethnobotany" refers to the study of the relationship of botany with primitive human race. Dr. John W. Harshberger first coined the term in 1895, under the heading "... some new ideas" in The Daily Evening Telegraph,

Philadelphia. But in some details it was published in *Botanical Gazette* in 1896. Subsequent workers have defined and interpreted the subject. Jones (1941) defined the subject as the study of the interrelations of primitive man and plants. Faulks (1958) considered that Ethnobotany encompassed the entire realm of "Economic Botany", including the modern use of plants. Later on, Jones (1952) revised his concept and considered that Ethnobotany is a unit of ecological studies with special reference to the interaction of man and the phytoworld. Schultes (1962) interpreted ethnobotany as the study of existing relationship between people of a primitive society and their plant environment. Ford in 1978, for the first time disapproved the use of the word 'primitive' before human. Vartak & Gadgil (1980) clearly stated that the ethnobotany is a branch of economic botany. Jain (1986) applied ethnobotany to total and direct relationship of plants with man. Manilal (1988) stated, "Ethnobotany denotes the entire realm of useful relationship between plant and man". Ethnobotany is now regarded as distinct and independent subject in science.

1.2. Ethnobotany – A Multidisciplinary Science

It has been recognized as a multidisciplinary subject comprising many interesting and useful aspects of other subjects, like Botany, Anthropology, Sociology, Agriculture, Horticulture, History, Archeology, Medicines, Ecology, Geography, Linguistics, etc. A comprehensive study combining all the above disciplines could provide clue to the origin of cultivated plants, distribution of wild relatives, history, names, migration of human races, phonetics, etc. A French botanist, De Candolle (1886) and a Russian geneticist and agronomist, Vavilov (1926, 1951) took the aid of Ethnobotany to ascertain the center of origin of economic plants in the world.

1.3. Interdisciplinary Applications of Ethnobotany

Various inter-disciplinary aspects of Ethnobotany are ethnometeorology (the weather forecasting through plant behaviour), ethnocosmetics (traditional cosmetics), ethnodieteics (the study of food during sufferings and restrictions on consumption of edible plants in different seasons), ethnomusicology (related to plant used in instruments, referred to music), ethnotoxicology, ethnonarcotics (referred to plants used by ethnic groups for hallucination and narcotic purposes), ethnopharmacology (the pharmacology of ethnobotanical species), ethnoorthopedics (the study of traditional methods for healing of fractured bones and setting of dislocated joints), ethnoophthalmology (the study of plants used for curing eye diseases), ethnogynaecology (the traditional methods of treatment of female diseases), ethnopaediatrics (the study of plants used for diseases amongst children), and so on. The prefix "Ethno", in general, is used to indicate inter-disciplinary and intra-disciplinary branches or areas of Ethnobotany (Pal 2000).

1.4. Sub-disciplines of Ethnobotany

Ethnobotany deals with the relationship of man with various subgroups of plant kingdom, like algae, fungi, bryophytes, pteridophytes, lichens, etc. are called subdisciplines of ethnobotany and have been termed as ethnoalgology, ethnomycology, ethnobryology, ethnopteridology, ethnolichenology, ethnotaxonomy, ethnopalaeobotany, etc. (Pal 2000). Different branches of ethnobotany also named from utilitarian points of view like ethnomedicine, ethnopharmacognosy, ethnoveterinary, etc.

1.5. Knowledge Generation

Knowledge comes from knowing and learning. And, to know means "to have in one's mind or memory". This generally comes through practice and experience. Practice can be a trial and error method and its result is the experience. So, tribal people, when settling in a new area they will then start generating a new series of knowledge (Goel 2007).

This they do using own perception and understanding with the nature. Thus, they acquire new knowledge and that they transfer to next generation for use and further refinement if necessary. The knowledge generating system is still a living tradition in many poor and developing countries, particularly in biodiversity rich third world nations. A study of such knowledge system of traditional communities about the plant world is the subject of ethnobotany. During past 100 years, the *Ethnic* as well as *Folklore Knowledge Based Systems* have expanded well and established closer linkages with many disciplines of knowledge with numerous aspects of socio-economic development of human race. Experience in the traditional as well as modern societies is ones personal acquirement. Experiences both in ethnic and folklore knowledge bases have been different from each other but sometimes go as overlapping.

1.6. Ethnic Knowledge

The term Ethnic concerns with the varieties of human races more specifically the tribals. Their tribal status is regulated by their customs or traditions or special rules and regulations. Ethnic knowledge is generally employed for innovations and practices of indigenous communities embodying ethnic life styles mainly nature dependent. One such important ethnic knowledge is the use of *Tricopus zeylanica* by the *Kani* tribe from the Agastyamalai hills in Western Ghats (Pushpangadan 2002, Pushpangadan *et al* 1997).

1.7. Folklore Knowledge

Folklore comprises of two words: *Folk* meaning people in general or of a specified class and the *Lore* means knowledge and both the words together depict traditional belief among people or

society as well as their study. In other words, *Folklore* is tradition based, collectively held, orally transmitted in a local dialect and an important source of cultural identity. Its forms include language, literature, music, dance, games, mythology, rituals, customs, handicrafts, architecture and arts (Seital 2001; Goel 2007).

1.8. Life of Early Men and the Use of Plant Resources

Evolution of early men started about 5 million years ago. These early men evolved from apes, which were tree dwellers, and they too lived in caves, as a result of overall interaction with their local environment, including plants and animals. This trend has continued to the present times where people obtain much of their basic needs, mainly the food and medicine from biological resources. As a result of such continuous association during the past several millennia, information on various aspects of natural resources has accumulated (Jain 1991).

It is now believed that humans in preceding millions of years have influenced the most pristine natural habitats in some way. The forcible intent and the concern of human society have been to fulfill their hunger. Since the time immemorial, to overcome this, people carried out experimentation, selection, domestication and the improvement in economically important plants and animals. For their survival, primitive man started to interlink natural impulse without disturbing the biological resources and continuously selected a large number of plants in first instance and then animals as his food items. During selection of foodstuff, man utilized his intuition and also observed the animals eating and behaving with plants. Every animal including man cannot remain alive without the help of natural resources (Shah 2002). In different regions of the world, aboriginal people have revealed the incredible uses of their natural resources around them.

Pre-historic man started cultivation nearly 12,000 years ago in forests. Most probably womenfolk in the vicinity of their dwellings initiated farming of plants, when men used to remain engaged in hunting and searching food inside the forests. During hunting and food gathering, primitive man observed and understood how plants generate seeds those grow into the seedlings (Arora 1995; Goel 2007).

1.9. Loss of Knowledge

The knowledge gathered by tribes and early men, were obtained through trial and error processes and evolved during practice of this knowledge for generations. Thousands of years ago, native people had great centers of learning due to the presence of oldest civilizations on this planet. Over a period of time, with decline of these civilizations and arrival of invaders, several of them

existing cultural practices including the teaching of information decline or were banned entirely. At that time, intergenerational transmission of information about useful plant species generated from written to oral traditions. Such patterns are prevalent among many ethnic societies all over the world. But they are generally hesitant to divulge or share indigenous knowledge with the outside world without persuasion. So, this knowledge may not be relayed properly to the younger generations.

On the other hand, cultural evolution is the most vital source of future development and the conservation of natural resources. Cultural systems are more dynamic than biological ones. In many parts of the world traditional conservation practices have weakened by cultural changes due to increased human needs. Some resources are being over exploited due to fast cultural and economic transformations (Laird 2002). With these modernizations, younger generations have little or no inclination towards their cultural heritage and exhibit ignorance and no interest in learning and continuing these systems.

1.10. Importance of Documenting Traditional Knowledge

Ethnobotany deals with the studies among the tribal and rural people for recording their unique knowledge about plant wealth. It has been recognized as a multidisciplinary study that plays a major role in the advancement of many aspects of scientific, sociological and historical studies. The wealth of knowledge is generally shifted orally from one generation to the other. Even today, lots of such knowledge remains undocumented those urgently require immediate attention, scientific evaluation and validation for the benefit of mankind (Goel 2004).

Over a period of time, ethnic people have acquired vast knowledge of activities and products related with plants and their uses. Some ethnobotanists are spending several years among the ethnic societies; they have opined that their knowledge about nature is far more than all our knowledge (Pushpangadan 2003). Interestingly Ethnobotany traces and unfolds diverse cultures among the ethnic societies. This rich heritage of knowledge and age old wisdom should be well documented for future use and conservation. In absence of proper care, this knowledge is bound to be lost, creating an unfulfilling damage to various aspects of conservation.

1.11. Need of Ethnobotanical Studies

During initial years, ethnobotany referred to the study of plants used by ethnic societies. However, its scope has widened constantly in the recent years. Currently it is employed to include the total relationship of plants and the people and is often encircled by rich biodiversity coupled

with ethnic diversity. Ethnobiological studies can help considerably the ethnic communities to define their requirements for natural resources more clearly (Jain 1981). Thus assisting them to advocate their cases for continual access to certain areas of land or habitats or for the provision of alternatives to wild gathering if required and also bring to light entirely new or little known uses of bio-resources. Ethnobotany represents best avenues for screening new economic plants for food, medicine, etc as well as for gene pool source for the development of agricultural and medicinal crops. For this purpose, a close collaboration is required among agriculturists, phytochemists, pharmacologists, nutritionists and ethnobotanists. This will not only lead to the discovery of new economic plants but also result in better understanding the relationship between primitive societies and modern science. However, the significance of Ethnobotany is multifaceted and multi-dimensional in nature. The following may be included under its coverage (Goel 2007):

a) Man-plant interaction in human society.
b) Historical understanding based on existing human culture.
c) Genetic pool for resistant crops and for development of hybrid plant species.
d) Scientific investigation of herbal practices exists among different ethnic communities and tribal groups to discover new medicinal plant species, new area of knowledge, treatment, therapies and drug development.
e) Development of traditional technologies with scientific imputes for the benefit of artisan classes and for sustainable utilization of natural resources.

1.12. Organized Studies on Ethnobotany

1.12.1. Ethnobotanical Studies in the World: Ethnobotany beyond its ordinary realm of botany has great significance for other branches of science, like meteorology, cosmetics, dietetics, music, toxicology, narcotics, pharmacology, orthopedics, gynecology, pediatrics, ophthalmology, phytochemistry etc. Hence, it has received wonderful attention throughout the world. In USA, Ethnobotany has a rich history. Harvard University is a leading centre of ethnobotanical studies, while University of Michigan has established an ethnobotanical laboratory and many other universities of USA have included ethnobotany as a subject of study and research. Canada has instituted "Canadian Ethnobiology Service". It has become a major subject in Mexico, Brazil and other countries of South America. In 1987, the department of Ethnobotany has been established at the Kunming Institute of Botany, Academia Sinicia. Ethnobotany has also been introduced as a subject of study along with Economic Botany in the University of Murcia, Spain. The subject has received considerable importance in Ethiopia, Ghana, Uganda, Kenya, South Africa, West Indies, Indonesia, Australia, New Zealand etc. It is the thrust area of research in Bangladesh and Nepal.

In December 1994, an International Conference on Ethnobotany was held at Dhaka. The subject is receiving increasing attention in European countries as well, like UK, France, Denmark, Portugal and others (Pal 2000).

1.12.2. Ethnobotanical Studies in India: India with its diverse flora coupled with large number of aboriginal tribes, inhabiting different pockets in the country, offer immense scope to the Ethnobotanists. This wealthy inheritance of knowledge and age old wisdom of India might well be among the earliest in the world. From the period of *'Vedas' Rigveda* (2500 B.C. – 1600 B.C.), *Atharva veda* (1500 B.C. – 500 B.C.), *Kautilya's Arthashastra* (321 B.C. – 186 B.C.), *Vishnu Puran* (500 A.D.), *Agni Puran* (500 A.D. – 700 A.D.), *Vishnudharmottara Mahapuran* (500 A.D. – 700 A.D.), *Apstanga Smriti* (200 B.C. – 200 A.D.), *Brihat Samhita* (500 A.D.), *Upavananavinoda* (1120 A.D. – 1330 A.D.), etc, and with medieval literature in Sanskrit, Pali, Tamil, Persian and other regional languages, posses huge wealth of ethnobotanical information. Ascertaining of the botanical identity of large number of plants in ancient literature is one of the branches of investigation in ethnobotany. Starting from "*Vishalyakarani*" in Hindu epic Ramayana and "*Soma*" in Vedas, more than one and a half dozen of plants have been attributed with important medicinal properties (Pal 2000). Bodding (1925 – 1940) perhaps sowed the seed of field investigation in ethnobotany through his pioneering contribution on "*Studies in Santal Medicine and Folklore*". This was followed by an equally important contribution by late Prof. G.P. Majumdar (1938) through his publication – "Some Aspects of Indian culture (in plant perspective)". The Bulletin of Botanical Society of Bengal added the sub-title "Ethnobotanical studies in India" to it. Kirtikar & Basu (1933) stated, "Ethnobotany is virtually a new field of research in India". They further remarked that ethnobotany would become a more important subject when its study would progress to a point where results could be studied comparatively. De (1968) also supported Kirtikar & Basu's view and stated that ethnobotany was a new science in India. Since 1960, Dr. S.K. Jain from Botanical Survey of India started intensive field study among the tribals of Central India. He has instituted (i) one Ethnobotanical Institute, (ii) one Society of Ethnobotanists and (iii) one *Ethnobotany* journal, and these have, certainly promoted the subject at least in this country (Pal 2000).

Very little organized ethnobotanical work had been done in the country till about 20 years ago. Organized fieldwork and other studies in the subject were started in the Botanical Survey of India. Studies on ethnobotany were undertaken as an official program in the Economic Botany Section, since its very inception. Dr. E.K. Janaki Ammal initiated researches on ethnobotany in Botanical Survey of India. She studied subsistence food plants of certain tribals of south India.

The publications for this group in the early 1960s triggered the ethnobotanical activity in many other centers, particularly among botanists, anthropologists and medical practitioners, etc in India. During the last two decades similar work has now been initiated at various institutions such as National Botanical Research Institute (NBRI) at Lucknow, National Bureau of Plant Genetic Resources (NBPGR) at Delhi; Central Council for Research in Ayurveda and Siddha (CCRAS); Central Council for Research in Unani Medicine, (CCRUM); Central Council for Research in Homeopathy (CCRH) and Tropical Botanic Garden and Research Institute (TBGRI) at Thiruvananthapuram. In 1974 Dr. T.N. Khoshoo, the then Director of National Botanical Research Institute, proposed an "All India Co-ordinated research Project on Ethnobiology" (AICRPE) under "Man and Biosphere" program of the Department of Science and Technology, Government of India. It took some years to finalize the work program and the project came into operation from 1982. This project is in operation at NBRI, Lucknow, and four centers of Botanical Survey of India (Shillong, Howrah, Coimbatore and Port Blair) and some other institutions. Followed by special session on ethnobotany in Botanical conferences and the organization of a Seminar of "Plants in Folklore and Folklife" on the occasion of X^{th} International Congress of Anthropological and Ethnological Sciences, a Society of Ethnobotanists was established in India in 1981 and 1982, respectively. Several papers presented in these symposia and seminars have been compiled and edited by Dr. S.K. Jain under the title "Glimpses of Indian Ethnobotany" (1981). This indicates the increasing interest developed in various institutions in the country for ethnobotanical studies. Botany Departments of several Indian Universities now have also initiated ethnobotanical work. Another noteworthy aspect is the recognition of ethnobotany as an organized scientific discipline even for the doctoral and post-doctoral work by academic institutions in India.

Apart from several institutions and Universities, many scientists in different Regional circles of Botanical Survey of India have undertaken ethnobotanical studies in some areas of Andaman & Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Bihar, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal among the tribes. They have so far recorded about two thousand plants used as medicine, food, fodder, fiber, house building materials, musical instruments, fuel, oil, seeds, narcotics, beverage, in material culture and for magico-religious purposes. Some studies on plant used in veterinary medicines have also been made. Indian Institute of Ecology and Environment, New Delhi has proposed to make a herbarium of medicinal plants at New Delhi Administration.

1.13. Scope of Ethnobotanical Studies in North Bengal

North Bengal comprises of six districts of the Indian state of West Bengal and exhibits contrasting climate, hot and humid in plains and cold in the hills. The Himalayan portion that passes through the state lies in this region. Districts of North Bengal are bounded by various foreign countries viz. Nepal, Bhutan, Bangladesh and China. Thus, infiltration of different tribes has occurred at different times to this land since the time immemorial. They include *Lepcha*, *Rabha*, *Mech*, *Toto*, *Santal*, *Oraon*, *Baraik*, *Kharia* and others. These tribes have markedly different origins but now share common homeland, mainly Duars and Terai in North Bengal. Since, in course of time, they have become native or local to this area; they also share cordial relationship with local Bengalese inhabitants. With the passage of time, their tribal culture is being contaminated with Bengali culture. Thus, for proper conservation of traditional knowledge of these tribes, extensive and intrinsic studies about these communities are essential. Since this region is homeland of various tribes, selection of this study area is thought to be appropriate (Anonymous 2001a).

The facilities of civilization were only in their dreams and were surviving in very close harmony with the local resources, mainly plants. They arrived here with different habit, practice, knowledge and culture in their mind and then started using the local resources. This has resulted in the generation and accumulation of new knowledge within their societies. But, the overall causes or conditions are also prevailing in this region and threatening the continuation of the use of such knowledge among the younger generation. So, this is the prime time to prepare documents on their Ethnobotanical knowledge (Das *et al* 2007).

These may include the following areas:

1. Identification and documentation of ethnobotanical plants used by the tribal inhabitants of North Bengal
2. Inventorying of genetic resources of economic utility
3. To implicit planning and development of biodiversity conservation
4. Providing basic information i.e. distribution and status of floral species of North Bengal
5. To understand the demography of population, pattern of utilization of flora and their impact on the environment
6. Try to understand and recognize and evaluate plant related folklores and myths.