# **ETHNOBOTANY**

## [Definitions, Concepts, Subdisciplines & Interdisciplinary approaches]

Ethnobotany is the best word to define the experience of the first humans, who observed birds and animals and tested leaves, fruits and tubers for their ability to satisfy hunger or heal wounds. Plants have always played and continue to play a vital role in the life and culture of human beings. Perhaps it was only the plant kingdom with which primitive man had established his first relationship for his basic needs as food, shelter and clothing etc. This intimate relationship was more pronounced during the Paleolithic of 'Old Stone Age', when farming as such did not exist and the human being had to survive entirely on plants and to some extent on animal world for their existence.

The science of Ethnobotany therefore had its origins during the early period of human history but Ethnobotany as a modern discipline is said to have emerged only during the later part of 19<sup>th</sup> century. With the beginning of the farming system in the Neolithic of 'Middle Stone Age'[12000 to 6000 BC], a shift from food gathering; to food providing habit developed resulting in settlement of different groups in different pockets, which later on gave rise to different cults and each one of these cults evolving in relation to their surrounding flora and fauna.

Thus each group could establish its own knowledge systems, which percolated almost in pure form through oral folklore to the present generation. But the second half of the 20<sup>th</sup> century had to witness a very drastic change in the mindset of people owing to the industrialization. While on one side, forests which are the homes of tribal people have declined and on the other side the tribal have moved out of the forests towards cities attracted by modern amenities. This has resulted in the immense loss of valuable knowledge about plants so for possessed by the tribal people. Hence, there is an urgent need to record the available information before it is completely disappeared.

The term 'Ethnobotany'was first coined by Dr. J. W. Harshberger on 4<sup>th</sup> of December, 1895, at a lecture in Philadelphia, to describe his field of inquiry, which he defined as the study of "plants used by primitive and aboriginal people". In 1896, Harshberger published the term and suggested, "ethnobotany" be a field

which elucidates the "cultural position of the tribes who used the plants for food, shelter or clothing" (Harshberger, 1896).

Ethnobotany has been defined as the study of the past and present interrelations of primitive or aboriginal human societies with the ambient vegetation.

In 1874, Stephen Powers had used the term *ABORIGINAL BOTANY* to refer to a study of "all the forms of the vegetable world which the aborigines used for medicine, food. Textile, fabrics, ornaments, etc."

It was in 1916, that Robbins, Harrington and Marreco promulgated the broad definition of the term ethnobotany which went beyond mere identification and cataloguing of plants used by primitive peoples and attributed to this discipline a study and evaluation of the knowledge of all phases of the plant life amongst primitive societies, and of the effects of the vegetal environment upon the life, customs, believes, and history of the peoples of such societies. Some authors even use this term to include the entire scope of economic botany, but it is more appropriately employed for the relationship between primitive man and plants.

The term quickly began to be used and a new field was opened. Until the turn of the 20<sup>th</sup> century, ethnobotany was primarily the study of of native uses of plants. Prior to this term (ethnobotany), many botanists were already including the use of plants by people within their study. However, it was Harshberger, who proposed that discipline of ethnobotany might be developed with its own definition, scope, objectives and methodologies. Although, Harshberger's definition still provide the root of the ethnobotany, but to describe the field in broader sense ethnobotanists have given their definitions time to time.

- ✤ "The study of interrelationship of primitive men and plants"—Jones (1941);
- ✤ "The total relationship between men and vegetation"—Faulks (1958);
- "The study of relationship which exists between people of primitive society and their plant environment"—Schultes (1968);
- ✤ "The total natural relationship between man and plants"—Jain (1986);
- "Ethnobotany is concerned with a wide range of interest of plants in cultural and ecological context"—Ford (1978);
- "Ethnobotany is the part of ethnoecology which concerns plants"—Martin (1995);

- ✤ "Ethnobotany is the study of contextualized plat use"—Alcorn (1996).
- \* "In broad terms, ethnobotany is the study of the interrelationship between plants and people. The two major parts of ethnobotany are encapsulated in the word itself; ethno, 'the study of people', and botany, 'the study of plants'. However, the field is limited on both sides. On the botanical sides of the field, few ethnobotanical studies are concerned with plants that have no connection to people. On the ethno side, most studies are concerned with the ways indigenous people's use and view plants. And those uses and those views can provide deep insights into the human conditions".—Balick & Cox (1996);
- "Ethnobotany is considered to encompass all studies which concern the mutual relationship between plants and traditional peoples"—Cotton (1996);

Ethnobotany deals with not only the useful relationship between plants and man but also deals with the impact of man on his environment and vegetation.

- E. K. Janaki Ammal started Ethnobotanical study in India and often remembered as, "Mother Of Indian Ethnobotany". She studied the utility of food plants of certain tribals of South India.
- Dr Sudhanshu Kumar Jain is regarded as Father of Indian Ethnobotany.

The Economic Botany deals with the uses of processed, improved or otherwise cultivated plant products and their Commerce; whereas Ethnobotany primarily deals with the uses of unknown or less known useful wild plants.

To distinguish Ethnobotany is presently taken as confined to the relationship with plant life of the people of the past or technologically lesser advanced human societies of today.

According to RR Rao, **Ethnobotany is a field oriented study involving direct relationship of aboriginals with surrounding plants.** 

The man-plant relationship can be broadly classified into two categories, viz.

- (a). Abstract Relationships: Includes faith in the good and bad powers of plants, taboos, avoidances, sacred plants, worship and folklore.
- (b). Concrete Relationships: Includes mainly the material use such as in food, medicine, house building, agricultural operation, other domestic uses, plants in fine arts, and culture and acts of domestication, conservation, improvement, and destruction of plants.

Jain (1989) gave a brief description about all relationship between man and plants can be first divided into *material and cultural* relations, and placed in four categories:

- Relationship useful to both man and plants [+/+].
- Relationship useful to man but harmful to plants [+/-].
- Relationships useful to plants but harmful to man [-/+].
- Relationship harmful to both man and plants [-/-].

#### SUBDISCIPLINES OF ETHNOBOTANY [MULTIDISCIPLINARY SCIENCE]

{As a multidisciplinary field, Ethnobiology integrates Archaeology, Geography, Systematics, Population ecology, Cultural anthropology, Ethnography, Pharmacology, Nutrion, Conservation, and Sustainable development}

Ethnobotany has its roots in botany, the study of plants. Botany, in turn, originated in part from an interest in finding plants to help fight illness. In fact, medicine and botany have always had close ties. Many of today's drugs have been derived from plants. Pharmacognosy is the study of medicinal and toxic products from natural plants sources, so the Ethnobotanical information on the use of plants in various diseases and ailments provide valuable clues to the pharmacologists, chemists, biochemists, and ayurvedic practictioners in the search for new drug resources of herbal origin.

Ethnobotany is a multidisciplinary science mainly concerned with botany, anthropology, linguistics, phytochemistry, pharmacology, archaeology, psychology and palaeobotany.

In interdisciplinary study of ethnobotany, there are always more than one subject involved, extends beyond ordinary realm of botany and has significance input of

another branch of science, archaeology/medicine, the work becomes interdisciplinary.

More and more new lines of interdisciplinary researches are emerging under specialized titles like:

*i.* Ethnopharmacology, *ii.* Ethnomedicine,*iii.* Ethnogynaecology, *iv.* Ethnopaediatrics, *v.* Etno-agriculture, *vi.* Ethnobiology, *vii.* Ethnotoxicology, *viii.* Ethnnarcotic, *ix.* Ethnoorthopedics, *x.* Ethno-ophthamology, *xi.* Ethnohorticulture, *xii.* Ethnolinguistics, *xiii.* Ethnocosmetics, *ivx.* Archaeoethnobotany, *xv.* Ethnomusicology etc.

Ethnopharmacology is interdisciplinary between two subjects, ethnology and pharmacology, similarly Archaeoethnobotany involves three subjects, ethnology, archaeology and botany. This concept has been lucidly illustrated in the most fascinating book on Ethnobotany, "**Evolution of the Discipline**" (Schultes and Von Reis, 1995), published on the 100<sup>th</sup> anniversary of the science of ethnobotany.

In subdisciplines of ethnobotany, the main subject is botany. Subdisciplines of Ethnobotany includes ethnobotanical work of subgroups of plant kingdom, like fungi, bryophytes, pteridophytes, lichens etc. are subdisciplines and have been named as *Ethnoalgology, Ethnomycology, Ethnobryology* (use of bryophytes among the ethnic groups), *Ethnopteridology, Ethnolichenology* (knowledge of lichens among different etnic groups) etc.

Studies on special aspects of botany, like system of classification, medicinal uses, palaeobotany, ecology, etymology etc are also subdisciplines have been termed as Ethnotaxonomy, Ethnomedicobotany, Palaeoethnobotany, Ethnoecology, Ethnoetymology etc. (Jain, 1989).

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Ethnobotany is the study of hoe people of a particular culture and region make of use of indigenous plants. Ethnobotanists explore how plants are used for such things as food, shelter, medicine, clothing, hunting, and religious ceremonies.

#### **SCOPE OF ETHNOBOTANY**

Ethnobotany is not only a list of plants and their use in tribal, rural and other environments inhabited by aboriginal and other underdeveloped people but due to its interdisciplinary nature and socio-economic impacts, the linkage of Ethnobotany has proliferated and relevance has been established with problem of food, life support species, rural health, drug use, social settlements, cottage industries, economic uplift, conservation of ecosystem and energy etc.

Ethnobotany is a science, consequently scientific method of study and investigation must be adopted and adhered to as in any of the older divisions of scientific work. It is a comparatively easy matter for one to collect plants.

Ethnobotany is a multidisciplinary science and its scope is not confined to one area but it covers a broad range of study areas, which are interconnected to each other in one sense or the other. There is a great scope and opportunities to explore the ethnobotanical approaches towards the present modern societies and giving them a firm task, and challenges to which applied ethnobotany can contribute. It encompasses following points:

- Conservation of plant species, including crop varieties and other forms of biological diversity.
- Botanical inventories and assessment of the conservation status of the species.
- Sustainability in supply of wild plant resources, including non-timber products.
- ✤ Enhanced food security, nutririon and healthcare.
- Preservation, recovery and diffusion of local botanical knowledge and wisdom.
- ✤ Reinforcement of ethnic and national identity.
- ✤ Greater security of land tenure and resource ownership.
- ✤ Assertion of the right of local and indigenous people.
- ✤ Agreements on the rights of communities in protected areas.

- Identification and development of new economic products from plants, for instance food, crafts, herbal formulations, horticultural plants.
- Contribution to new drug development.

Ethnobotany is an interdisciplinary science also, which includes aspects of both the science and humanities [ETHNOLOGY=Study of culture; Botany= Study of Plants].

Ethnobotany can therefore serve as a gateway to many disciplines, such as Botany, Ecology, Medicine, Anthropology, Sociology, Chemistry, Agriculture, Horticulture, Forestry, Agroforestry, Archeology, Systematics, Religious studies to enrich the human knowledge (Balick, 1994). If we take the example of Anthropology, it is used for identification of ethnic race or community, its origin, history and distribution in other geographical areas. Ethnography is used for Linguistics (Science for Language) for identifying the language in jotting down the names of plants, with correct phonetics and etymology. Why this name has been given to a plant? Its correct pronunciation and the ways and means described in detail (Shah, 2008). So anthropological training to understand the cultural concepts around the perception of plants; linguistic training, at least enough to transcribe terms **SYNTAX** and understand native morphology, viz. local and SYMANTIX/SEMANTIC.

[Syntax= The system of rules for the structure of a sentence in a language OR the structure of statement or arrangement of words and phrases to create sentences. .

Symantix/Semantic= Study of the meanings of words and phrases/Relating to meaning in language or logic]

SYNTAX: The structure of statement or Arrangement of words and phrases to create sentence.
SYMANTIX: Relating to meaning in language or logic.

The scope of ethnobotany in drug research is well known. Folk medicine followed by critical scientific evaluation has produced new drugs to fight diseases. Some folk medicines are now in main stream and used for treatment.

Discovery of medicinal properties of certain plants, like Artmisia annua for the drug Artimisnine, has antimalarial properties; Reserpine from Rauwolfia serpentine used as tranquilizer; Caffeine from Camellia sinensis used as male contraceptive; Quinine from Conchona officinalis and Vincristine from Catharanthus roseus used as antineoplastic; Jeevaniya from Trichopus zeylanicus have immune enhancing, antistress and antifatigue properties.

In October, 2015, Nobel Prize for Medicine was awarded for discoveries that have led to the development of potent new drugs against parasitic diseases including **Malaria** and **Elephantiasis**. **Youyou Tu**, China's first Nobel Laureate in medicine was awarded half of the prize for discovering **Artemisinin** a drug that has slashed malaria deaths and become the maninstay in fight against this mosquito-born disease. Tu, used Traditional Chinese Medicine formulations from the plant *Artemisia annua* to isolate **Artemisinin**. This award has put the spotlight on the role of both medicinal plants and traditional Chinese medicine in providing an important source of modern medicines.

While the majority of Artemisia annua is now sourced from cultivation-predominantly in Asia and Africaand a switch to synthetically produced active ingredients is expected to reduce reliance on wildsourced material. Conservation of wild populations remains important for ensuring continuous production of important drug.



Artemisinin has saved possibly millions of lives

# <u>YOUYOU TU</u>

Since ancient times new food plants have been discovered and the existing species of food plant have been improved by the process of selection. Arora (1981) mentioned that Chinese helped in the development of courtyard cultigens of *Amorphophallus harmandii*, *A. rivieri* and to some extent also *Eleocharis tuberose* and *Stachys sieboldi* for root and tuber plant. They also domesticated several species of bamboo, e.g. *Phyllostachys aurea*, *P. aureosulcata*, *P. bambusioides* etc. *Malva crispa*, a weed also domesticated for leafy vegetable. People of far-east, near-east, Central Asian Republic of USSR and of Mediterranean region have domesticated several species of pome, stone, soft and nut which include *Duchesnea* filipendula, *Crataegus hupehensis, Prunus pseudocerasus* etc. It is reported that 50 species are new for food value in India following ethnobotanical approaches, e.g. *Abelmoschus moschatus*, roots are cooked and used as vegetable in Bihar, M.P. etc. One hundred wild edible plants have been reported by Prakash et al. (2016) from Terai Region of Uttar Pradesh.

The other major aspects of ethnobotanical work are the findings of new uses or new economic plants which includes less known uses of plants like their use as fodder, fiber, fuel, oil, gum etc.

Impact of ethnobotanical study in conservation of natural resources is direct. On one hand it relates to the beliefs, taboos, avoidance and other constructive approaches of the primitive people and on the other hand cultivation practices of some primitive people, adversely affecting the environment are highlighted. The aboriginals have preserved the forest through mythological associations as sacred groves.

The new areas of observation in the field of ethnobotany are selection of species to be consumed, time of collection or exploitation, the conservation through taboos, manipulation of species and habitat protection through faith, processing of wild foods for making them toxin free, and their preservation, mode of cooking for saving energy and name given to plants.

Today ethnobotany has become an important and crucial area of research and developments in resource management, conservation of biodiversity at genetic, species and ecosystem levels, and socio-economic upliftment of the region. Many plants viz. Maize, Cocoa and Rubber used in industrialized countries today were originally identified and developed through Indigenous Knowledge [IK]. Traditional food plants such as roots and tubers (Cassava, Potatoes, Yams, Taro, Sweet poatao and plantains nourish over 1000 million in the developing countries, providing a significant portion of essential calories to the rural people. Here mention may be made of a rare medicinal plant, *Trichopus zeylanicus* ssp. *Travancoricus*, used by the Kani tribe of Kerela, India as a health food to maintain vitality and increase resistance to disease. **The tonic effect of the plant has been shown to be comparable to that of Korean ginseng** (*Panax ginseng*).

The Winged Bean (Psophocarpus tetragonolobus), a crop native to South-East Asia, has great potential for feeding many in the Third World. The popular name for the winged bean is the,"supermarket in the stalk", since one can eat almost every part of it. The leaf, rich in vitamin-a, taste like spinach; the shoot, like asparagus; the flowers, like mushroom. The seed virtually duplicates soybeans in nutritional value, while the tuber contains two to four times protein of a potato. Currently there are known 2000 varieties of the wimged bean, which is a potential money maker. One hectare of winged bean produces nourishment equal to five or six hectare of most other crops. Some of the so called 'New Crops' whose commercial production has been developed in the 20<sup>th</sup> century, such as African Oil Palm, Para Rubber, Robusta Coffee, Tepary Bean, Guayule Rubber and Jojoba were previously known and used locally by indigenous people. During the last few decades, successions of so called "Wonder Drugs", (e.g. Reserpine, Quinine, Ephedrine, Cocaine, Emetin, Khellin, Colchicine, Digoxin, Dtubocurarine, Artimisinine and Gugullipid) have been discovered from plants with rich Ethnobotanical role in tribal societies. The Indian Tobacco (*Lobelia inflata*) used as a tobacco substitute by the Amerindians contains LOBELINE, now commercially used as a smoking deterrent. The May-apple (*Podophyllum*) *peltatum*) has a toxic resin, PODOPHYLLOTOXIN formerly used by Amerindians to remove worts; its cytotoxin action has led to its modern use to treat uterine warts. Which formerly required surgery. The cardiotonic STROPHANTINE, comes from seeds of a species of *Strophanthus* that is used by African tribes as the source of its arrow poison. The tranquilizers, Rescinnamine and Reserpine, have been obtained from the roots of *Rauwolfia serpentine*, used in India for more than a thousand years in folk medicine for snake bite, indsanity,

epilepsy and high blood pressure. Similarly *R. vomitoria* of Africa and *R. tetraphylla* of America are found new source of Reserpine at commercial level. The natives of Madagascar valued the rosy-periwinkle (*Catharanthus roseus*) as an oral hypoglycemic (Reduction of the sugar content of the blood) agent; it yielded two powerful drugs, VINBLASTIN and VINCRISTIN, effective against Hodgkin's Disease and Childhood Leukaemia. Hypertensive agents from *Veratrum viride* used by natives of America, Khellin from *Ammi visnaga* of the ancients, and many psychoactive agents developed from the Hallucinogenic plants of the New World Indians.



Mushroom collection in forest



Wild Mushroom in local market



Nymphaea nouchali



Physalis minima



Nelumbo nucifera



Helminthostachys zeylanica





Wild Edible plants

In a recent case, Ethiopian villagers living down river from a communal washing site were surprisingly found to be virtually free of **BILHARZIA** or **SCHISTOSOMIASIS**, a parasitic disease which affects more than 200 million Africans. The reason was that the women upstream washed their cloths with dried and powdered berries of the endod (**soapberry**) plant (*Phytolacca dodecandra*) which killed the disease-carrying snails. This observation led to the discovery of a MOLLUSCICIDE (Bayluscide) to destroy the snails that transmit Schistosomiasis. The documentation of the available folk knowledge of endod is, therefore, crucial to health care, industries and agriculture.

The extinct *Silphion* plant embossed on the coins minted in Cyrenaika (Libya), has been mentioned in classical literature by Pliny, Hippocrates, Dioscorides, Herodotus, Theophrastus and others. The perennial roots and annual stems were eaten in fresh state and were regarded as a perfume, flavouring agent and spice. The juice was used in medicine against a wide range of symptoms and diseases, especially gynaecological, ailments. As demand in the Greek and Roman worlds was great, and the supply limited, *Silphion* gained high prices on the International markets. There was gradual vanishing of the *Silphion* due to unsustainable harvesting practices. Several names like *Thapsia silphium*, *T. garganica, Ferula tingitana, F. marmarica* and *Prangos ferulacea* have been suggested for *Silphion*, but it is said to have close affinities to *Ferula tingitana*, a species which is rare in Cyrenaika today. This is example of an ancient medicinal plant which became extinct almost 2000 years ago.

Some of the plant derived modern medicine are listed in following table:

## PLANT DERIVED MODERN MEDICINE

Drug	Medicinal use	Plant Name
Aspirin	Analgesic, Antiinflamatory	Filipendula ulmeria
Atropin	Pupil dilator	Atropa belladona
Benjoin	Oral disinfectant	Styrax tonkinensis
Caffeine	Stimulant	Camellia sinensis
Camphor	Rheumatic pain	Cinnamomum camphora
Cascora	Purgative	Rhamnus purshina
Cocaine	Ophthalmic anaesthetic	Erythroxylum coca
Codeine	Analgesic antitussive	Papaver somniferum
Colchicine	Gout	Colchicium autumnale
Deserpidine	Antihypertensive	Rauwolfia tetraphylla
Dicoumarol	Antithrombotic	Melilotus officinalis
Digitoxin	Cardiotonic	Digitalis purpurea
Ephedrine	Broncholidator	Ephedra sinica
Pseudoephedrine	Rhinitis	Ephedra sinica
Eugenol	Toothache	Syzygium aromaticum
Hyoscymine	Anticholinergic	Hyoscymous niger
Ipratroplum	Broncholidator	Hyoscymous niger
Morphine	Analgesic	Papaver somniferum
Papaverine	Antispasmodic	Papaver somniferum
Podophyllotoxin	Antiviral and antitumor	Podophyllum peltatum
Psoralin	Vitiligo	Psoralea corylifolia
Quinine	Malaria	Cinchona pubescens
Reserpine	Antihypertensive	Rauwolfia serpentina
Sennoside	Laxative	Cassia angustifolia
Artimisinine	Antimalarial	Artimisia annua
L'Dopa	Antiparkinsonian	Mucuna prurience
Vinblastin	Hodgkins disease	Catharanthus roseus
Vincristin	Paediatric leukaemia	Catharanthus roseus
Picrolive	Chronic hepatitis	Picrorhiza kurro
Gugulipid	Hyperlipidemic	Commiphora wightii
Forskoline	Antiglaucoma	Coleus forskohlii
Taxol	Ovarian cancer	Taxus baccata
Jeevaniya	Antifatigue	Trichopus zeylanicus

With the opening of new vistas of ethnobotanical studies, the scope of ethnobotany has now greatly enlarged; both in terms of its theoretical contributions to an understanding of plant human relationships, as well as practical applications of the biological knowledge of the tribal people in medicine, agriculture, health and industry. Recent developments in Ethnobotany in different countries including India have been strongly oriented towards the promotion of traditional herbal medicine, sustainable use of plant resources, rural development and biodiversity conservation, with applied approaches in the field.

There are four major interrelated fields of study in ethnobotany:



The tribal people and ethnic races throughout the world have developed their own cultures, customs, cults, religious rites, taboos, totems, legends and myths, folk tales and songs, witch –craft, foods, medical practices etc. Numerous wild and cultivated plants play a very important and vital role among these cultures and this interrelationship has evolved over generations of experience and practice. These studies have therefore also been used in tracing human and plant migrations; origin, dispersal and domestication of cultivated plants like maize, tepary beans, squash,

pumpkin, watermelon, bottle guard, jack bean, sword bean, common bean, foxtail millet, sunflower, amaranth, chenopod, sorghum etc.; in linguistic analysis; in archaeological identifications; agricultural techniques and agronomy, horticulture, pharmacopoeia etc. Practically all cultivated plants were originally domesticated by primitive people. The tribal belt is more often the cemtre of diversity and origin of our crop plants (Wheat, Rice, Maize). The ancestors of many of our crops and landraces are interwoven with tribal cultures.

Harshberger (1896) for the first time out line the purpose of <u>ETHNOBOTANIC GARDENS</u>. The plants of ethnobotanical importance like Rice, Tobacco, Yam, Arrowroot, Manioc, Sweet potato, Quinoa etc. associated with tribal people were grown over the ages, as part of the life support system for survival, substance and livehood. In modern times, these gardens should play a major role in the conservation of rare and endangered ethnobotanicals, by providing insurance against extinction of the world.

The Ethnobotanical Literature has been growing rapidly over the last hundred years. Many important documents exist as Ethnographies, Archaeological accounts, Travelogues, Gazetteers, Herbals, Materia medica, Unpublished papers, Manuscripts and theses, and reports of the tribal development projects etc. intended for local distribution. There are number of medical manuscripts of traditional medicine lying in oriental libraries and private collections. An old record about herbal medicines written on palm leaves about 1710 AD was discovered in South Bastar, MP, India. This document records 93 types of herbal medicines used in the district. The traditional medicine databases (TRAMED, NAPRALERT, PHARMEL, AYURBASE, NORISTAN and INMEDPLAN) have been making the information on medicinal plants available to the interested parties, including traditional healers.

# There are several journals, bulletins, magazines and newsletters like

Economic Botany	Journal of Ethnobiology	
Journal of Ethnopharmacology	Journal of Ethnobotany Research & Applications	
Jour. Trop. Med. Plants	African Diversity	
Journal of Ethnobiology	Australian Tree Resources News	
J. Ethnobiology& Ethnomedicine	Ethnomedicine	
Lloydia	Studies in Third World Society	
National Geographic	Bulletin de Liason de la Societe d' Ethnozoologie et d' Ethnobotanique,	
Eastern Pharmacist	Afr. Jour. Traditional Medicine	
Science, Quart J. Crud Drug Res.	Complementary & Alternative Medicine	
The Latin American and Caribbean Bulletin of Medicinal and Arometic Plants	Int. Jour. Sustainable Dev. & World Ecology	
Anthropos	Pharmaceutical Biology	
Filoterapia	Curare	
Ethnographia	Ethnos	
L' Ethnographie	Ethnographica et Folkloristica Carpathica	
Emllio Goldi	Asian Folklore Studies	
American Antiquity	American Ethnologist	
The Journal of the Polinesian Soc.	Ethnologiska	
Jour. Of American Folklore	Human Ecology	
The Cerealist	Jour. of Agriculture Traditionnelle et de Botanique Applique	
Studier	Jour. Pacific History	
Acta Ethnographica	Primitive Man	
Ceres	Jour. of Plant Foods	
Social Pharmacology	Diversity Current Anthropology	
Planta Medica	Jour. Psychoactive Drugs	
Ethnology	Ethnohistory	
Anthropos	Ethnographia	

Asian Folklore Studies	Journal d'Agriculture
	Traditionnelle et de Botanique
	Appliquee
American Antiquity	American Ethnologist
The Journal of Pacific History	Acta Ethnographica
L'Ethnographie	Bulletin on Narcotics
Botanical Museum Leaflets	Advances in Economic Botany
(Harvard University)	
Heritage Seed Program	Ethnoecologica
Archaeology	Medical Anthropology
Journal of Psyactive Drugs	Plant Genetic Resources
	Newsletter
Australian Tree Resources News	Trees and People Newsletter
ILEIA Newsletter	

A series of Manuals are designed specifially for the use of Ethnobotanists and Plant Conservationists, particularly in developing countries are:

- 1. Techniques and Methods of Ethnobotany-Given & Harris, 1994.
- 2. Ethnobotany: a methods manual-Gary J. Martin, 1995.
- 3. Plant Invaders: the threat to natural ecosystems-Cronk & Fuller, 1995.
- 4. People and Wild Plant use-A. B. Cunningham, 1996.
- 5. Botanical Surveys for Conservation and Land Management-Stern & Ashton, 1995.

Botanical Databases for Conservation and Development provide basic concepts, skills and methods for collection and documentation of quality data in the field.

#### Some major books on Ethnobotany are:

- a. Plants, People & Culture: The Science of Ethnobotany-MJ Balick,
- b. Native American Ethnobotany-Denial E. Moerman,
- c. Ethnobotany: A Reader-Paul E, Minnis,
- d. *Chumas Ethnobotany: Plant Knowledge among the Chumas People of South California-* Jan Timbrook,
- e. Ethnobotany: The Evolution of a Discipline-RE Schultes & SV Reis,
- f. Ethnobotany (The Green World)-Kim J. Young,
- g. *Cultural Uses of Plants: A Guide to learning about Ethnobotany*-Gabriell D. Paye,

- h. Applied Ethnobotany: People, Wild Plant Uses & Conservation-Anthony Cunninghum,
- i. CRC Ethnobotany Desk Reference-Tim Jhonson,
- j. Mayo Ethnobotany: Land History & Traditional Knowledge in Northeast Mexico-David Yetman,
- k. *Medicinal plants in Folk Tradition: Ethnobotany of Britain & Ireland*-David E. Allen,
- 1. *The healing Forests: Medicinal & Toxic Plants of Northwest Amazonia*-RE Schultes,
- m. Ethnobotany of hill Tribes of Northern Thailand-Edward F. Anderson,
- n. Ethnoboatney of Nepal-KR Raajbhandari,
- o. Ethnobotany: Principles and Applications-CM Cotton,
- p. *Plants of the Gods: Their sacred healings and hallucinogenic Powers*-RE Schultes,

# Some Societies have also been established to promote the science of Ethnobotany and its related fields:

- Ethnographic and Folk Culture Society;
- Indian Folklore Society;
- ➤ The American Ethnological Society;
- Society of Ethnobotanists;
- ➤ The Polynesian Society;
- National Society of Ethnopharmacology, India;
- French Society of Ethnopharmacology;
- Society of Ethnobiology;
- International Society of Ethnobiology;
- > Indian Association for the Study of the Traditional Asian Medicine.

Over the ages, indigenous peoples have developed innumerable arts, crafts and Technologies. Their cultures, economies and identities are inextricably tied to their traditional land and forest resources. Forests have sustained the culture, spiritual and economic needs of many of the indigenous peoples. Deforestation, semi-modernization, transmigration and colonization have threatened the survival of traditional cultures.

The State of the Peoples Report (1993) published by Cultural Survival, Inc. Cambridge, Mass, USA presents innovative solutions to the challenges confronting endangered societies. It makes a compelling case that defending endangered peoples is an essential step toward a peaceful and environmentally sound globe. Many national languages are becoming acculturated and extinct and, therefore, folk taxonomy must be preserved and properly documented. The declarations, especially the "Declaration of Belem", the "Kunming Action Plan" and "Manila Declaration" call for the compensation of indigenous people for their knowledge and their natural resources. The growing markets in forest foods, medicines, cosmetics, lotions, balms and other natural products signal increased research activities with Indigenous Knowledge System (IKS). Many UN agencies and other organizations realize the significance of indigenous knowledge in science, agriculture and drug development. The convention on Biological Diversity signed by 167 states and the European Community at Rio on 5<sup>th</sup> June, 1992 is a good start in this direction. It accepts the idea that the first beneficiaries of the conservation and sustainable use of wild plant species should be the Indigenous People whose traditional knowledge and respect for those resources has preserved them for centuries. In recent years concern has grown worldwide that the natural genetic variability and traditional uses of plants be safeguarded with an eye to potential future use.

#### The flagship programmes like the:

- \* Biological Diversity and Genetic Resources Programmes of the Commonwealth Science Council;
- The People and Plants initiative Programme of the WWF, UNESCO and the Royal Botanic Gardens, Kew;
- The Indigenous Food Plants Programmes in Kenya;
- \* The International Cooperative Biodiversity Groups Programme of the NIH, NSF and USAID;
- The Biodiversity Support Programm of the USAID,WWF the Nature Conservancy and World Resources Institute;
- The "Seeds of Survival" Pragramme of the USC, Canada;

have provided the stimulus to acieve sustainable economic growth, and maintain and enhance the natural resource base.

The UNDP's Workshop on "Ethnobotanical Exchange between Asia and Amazonia" held at Belem, Brazil in 1991 recommends a three-pronged strategy to strengthen ethnobotanical research throughout the world:

- > To support ethnobotanical field research training programmes,
- > To strengthen information networks linking field ethnobotanists, and
- To apply ethnobotanical knowledge to achieve local and regional socioeconomic and environmental gains.

In relatively new scientific field of Ethnobotany, Botanists work with Tribes, Peasants, local herbal doctors and in tribal markets to study how local plants are used by the people. While they have been concerned mainly with cataloguing the plants used by the people around the world, contemporary ethnobotanists are increasingly collaborating with chemists to analyze the compounds in medicinal plants; with agriculturists and foresters to introduce new crops; and with anthropologists to gather more information on traditional cultures. The new synthesis in ethnobotany has generated a vast array of indigenous knowledge that is very much relevant to the conservation of biodiversity and the sustainable use of plant resources.

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