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ETHNOBOTANICAL STUDIES ON THE TRIBALS OF PALAKKAD AND MALAPPURAM DISTRICTS OF KERALA, SOUTH INDIA

(Final Report of the project KFRI 411 / 2003)

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ABSTRACT OF THE PROJECT PROPOSAL

Project Number : KFRI 411/2003

Title : Ethnobotanical studies on the tribals of Palakkad and Malappuram Districts of Kerala, South India.

Objectives : To collect information of plants utilized by various tribal groups for edible and non-edible purposes

To study the methods of utilization of each species and their parts

To assess the sustainability of the methods employed

To formulate a strategy and action plan for the conservation and utilization of plant resources in a sustainable manner

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Principal Investigator : K. Yesodharan

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ABSTRACT

As per 1991 census report, the tribal population in Kerala is 320, 967 which represents 1.10% of the total population. Tribals in Kerala belong to 36 communities . They have the monopoly in the collection of Non Wood Forest Products(NWFPs); food gathering, hunting and fishing are other occupations to supplement their income. They have their own indigenous system of medicine and still majority of them have firm belief in their system. Collection of forest produces is the traditional means of livelihood for them. Nowadays hunting is banned in order to save natural resources.

Extensive field surveys were carried out to study the ethnobotany of the tribals of Palakkad and Malappuram districts during the years 2003-2006. The aim of the study was to explore, collect, identify and preserve the wild and domesticated plants used by the tribals as food, fodder, medicine, oil, tannin, gum, small timber, fuel, fibers, furniture, tools, musical instruments, etc. The data were collected from the tribals through participatory rural appraisal, questionnaire survey and interview. The eldest person and also tribal medicine men (Vaidyas) were contacted to collect data. Local names, plant parts used, botanincal names of the plants, etc. are included in the report with regard to each plant. The specimens collected were identified with the help of floras and taxonomic revisions, monographs and other available field keys and incorporated in the herbarium of Kerala Forest Research Institute (KFRI), Peechi, Trissur, Kerala, South India.

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Chapter 1

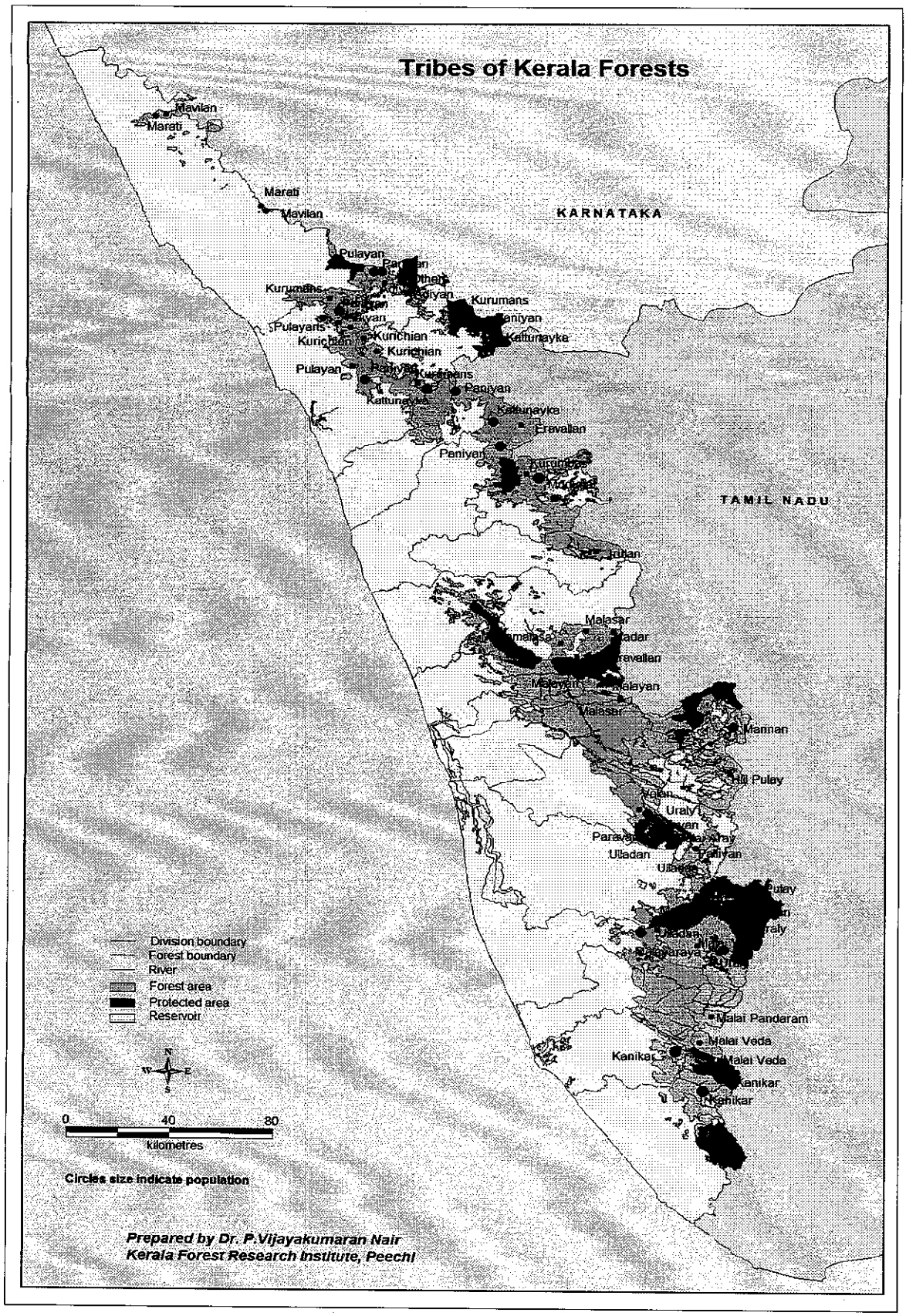
INTRODUCTION

Traditionally, tribals are extremely knowledgeable about local plants and other natural resources, on which they are intimately dependent.Tribals depend on wild plants for food, medicine, construction materials, fuel, wood and nearly for all other material needs. The tribal population in Kerala is respresented by 1.10 per cent of the total population as per 1991 census report. They belong to 36 distinct tribal communities (Appendix 1). Wayanad has the highest tribal concentration with 35.85% of the total tribal population of the state and 17.11 per cent of the total population of the district. As per the survey conducted by the Forest Department in 1992, nearly 23 per cent of the tribal families are living in the forest areas.

Tribals have been living in the forest from time immemorial and they have the monopoly with the collection of Non Wood Forest Products (NWFP), food gathering, hunting and fishing to supplement their income. They have their own indigenous system of medicine and majority of them still have firm belief in them. Hunting and collection of forest produces are their two traditional means of livelihood. In 1974, consequent to the nationalization of forests, hunting was banned in the State and collection of NWFP was entrusted to private agencies, who employed mostly non-tribals for the purpose. However, Government of India stopped this practice of entrusting collection of NWFP to private contractors. The right to collect such produces from forest was exclusively assigned to the

tribal cooperative societies and around 12 per cent of the tribal families are engaged in the forest produce collection.

Among the 36 tribal communities in Kerala (Map 1), five are primitive communities of pre agricultural stage of development, stagnant population and very low literacy. Cholanaikkans, Kattunaikkans, Kadars, Kurumbas and Koragas are the primitive tribes of Kerala and they constitute nearly 4.8 per cent of the total tribal population of the State. Among them, Cholanaikans and Kattunaikans are found in Malappuram District and Kurumbas, Kattunaikans and Kadars live in Palakkad District. Cholanaikkans, the cave dwellers of the dense forest of Nilambur and Manchery mountain ranges, are the most primitive humans known in the Indian sub continent. They are possessing the stone age type of culture and civilization and are leading a hunting and gathering way of life. Ethnically also, they are quite different from all other tribals of Kerala. Kattunaikans, found both in Palakkad and Malappuram districts, are other primitive types of tribals who are semi nomadic in nature. They move in and around the forest areas and occasionally come down to the plains.



Map. 1 Tribes of Kerala Forests

Palakkad District is inhabited by tribal communities such as Irulars, Paniyars, Mudugars, Kurumbas, Malasar, Malamalasar, Malai Aryan, Katunaikans and Kadar. Among them Kurumbas, Kattunaikans and Kadars are primitive groups. Malappuram district is inhabited by Muthuvan, Malamuthan, Paniyan, Aranadan, Kuruman, Kattunaikan and Cholanaikan. Of these, Kattunaikan and Cholanaikkan are primitive communities. Cholanaikan's material requirements are very limited and usually two or three families live together along with a number of dogs. They stay in caves or under over hanging rocks. The present study is confined to the tribal settlements of Malappuram and Palakkad districts of Kerala, South India and the main tribal groups are Muduvas, Irulars, Kurumbars, Malasar, Malamalasar, Paniyars, Kattunaikans, Kadars, Aranadans and Cholannaikans.

It is estimated that the tribals and the rural poor use one third of about 15,000 higher plant species in India. These wild plants meet most of the requirements of both tribals and their domesticated animals. The various uses of plant resources are as fibres for nets and clothing, vegetable fat as a cooking medium, bows, bow strings, fishing nets, handles and axles, mortars, pole, posts, turnery and combs for musical instruments, etc. Wild plants are used to poison arrows and darts and also being used as spices and condiments and also used as antidote to snake, scorpion, insects and dog bites, in perfumes, dyes, oil and resin, insecticides and fungicides, detergents, cleaning well water; vegetable oil and mucus used to reduce friction, and also in scocio-religious rituals and ceremonies.

However, there had not been any concerted efforts to document the traditional use of plants for food, medicine and other purposes in the State. There is also no information available on the methods of utilization indicating whether the use is sustainable or not. The biodiversity on the earth is said to be declining due to various reasons like loss/fragmentation of habitats, population pressure, shortening resource base, increasing demand, etc. Many species of plants and their products/derivatives are declining gradually and many species are categorized as endangered or threatened. With the opening of new vistas of ethnobotanical studies, its scope has now widened in terms of the theoretical contributions to an understanding of plant-human relationships, as well as for the practical applications of biological knowledge of tribal people in medicine, agriculture, health and

industry. The use of medicinal plants among the tribes in the treatment of various ailments are found very unique in most cases.

The data collected through various ethnobotanical exploration methods and the materials including photographs, films, herbaria, raw drugs, etc. are to be protected from deterioration and also misuse. Simultaneously, the data collected should also be protected through the Intellectuctal Property Rights (IPR).

Briefly, ethnobotanical exploration and documentation among the ethinic groups are the needs of the hour where chances of cultural mixing up and adoption of modern technologies in all fields of life is happening. Due to the rapid globalization it is evident that the erosion rate of knowledge base among the tribal people is also high and chances of loss of the knowledge before it is documented for the welfare of entire humanity is quite possible. With this background ethnobotanical studies were conducted in the tribals of Palakkad and Malappuram Districts with the following specific objectives.

- To collect information of plants utilized by various tribal groups for edible and non-edible purposes.
- To study the methods of utilization of each species and their parts.
- To assess the sustainability of the methods employed.
- To formulate a strategy and action plan for the conservation and utilization of plant resources in a sustainable manner.

Chapter 2

REVIEW OF LITERATURE

Ethnobotany is a rapidly expanding science. In the last nearly three decades it has considerably expanded, both in its concept and scope. Beginning with study of plants used by tribals for food, medicine and shelter it now includes studies like conservational practices of tribals, ethnopharmacology, ethnopharmacognosy, ethnomusicology, ethnogynaecology, etc.

Prior to the coining of the term Ethnobotany, usage of plants by human beings found place in Sanskrit, Greek and Arabic literature, ethnographics, travelogues, herbals, etc. Later, systematic compilation works like *Food and Drinks through Ages, 2500 B.C to 1937* (Anonymous, 1937), *Indo-European Folk Tales & Greek Legends* (Halliday, 1932), *Plants used against Cancer – A Survey* (Hartwell, 1967-71), *Economic Plants of Ancient North China as Mentioned in Shih Ching* (Keng, 1974), *The Economic Plants of the Bible* (Moldenke, 1954). *Flora and Fauna in Sanskrit Literature* (Banerjee, 1980). *Glossary of Vegetable Drugs in Vagbhatta* (Godbole *et al.* 1966), *Food and Crinks in Ancient India* (Ray, 1933) and *Glossary of Vegetable Drugs in Brahttrayi* (Singh and Chunekar, 1972).

The term 'ethnobotany' was coined by Harshberger in 1895 and at this time the subject included mere identification and cataloguing of plants used by the primitive people Harshberger (1896), Robbins, Harrington and Feire-Marreco (1916) promulgated the broad definition of Ethnobotany and considered it as a study and evaluation of the knowledge of all phases of plant life amongst primitive societies and effect of the vegetal environment upon the life, customs, beliefs and history of the people and gave emphasis on the linguistics. Now, Ethnobotany is considered as an interdisciplinary science, in which many subjects like, ethnology, linguistics, archaeology, agriculture, pharmacology, medicine, ecology, etc. are intertwined with anthropological botany, where the works are being taken by variety of groups of workers like the botanists, the anthropologists, the ethnologists, the linguists, the sociologists, the paleobotanists, the archaeologists, the agriculturists, the geneticists, the geographers and several others.

An introduction to Ethnobotany (Faulks, 1958) is the first book on Ethnobotany. It deals with (i) the goods and services obtained from vegetation for food, drink, inhalants,

fumitories, masticatories, shelter, fuel, equipments, medicine, transport, rituals, disposal of wastes, control of pests along with means of production consumables (ii) physical and psychological troubles caused by vegetation i.e. food and drinks spoilage, disease and pests of plants and animals, irritants (iii) influence of man on vegetation by way of destruction, conservation etc. (iv) relationship of vegetation with human civilization i.e. selection of economic species, organized production etc. It includes most of the topics of Economic Botany in general. The knowledge of plants that has come orally through generations and which normally forms the significant subject matter under Ethnobotany was not discussed in this book except a few instances in historical prospective.

The Nature and Status of Ethnobotany (Ford, 1978) contains 17 papers on various issues of Ethnobotany. While the concept of Ethnobotany has been elaborately dealt with in some of the papers, others are mostly of anthropological origin. The empirical knowledge about the plant wealth finds little space in this volume too.

Glimpses of Indian Ethnobotany (Jain, 1981) is the first book dealing with Indian Ethnobotany. It is a compilation of articles on field studies in different phyto-geographical areas of India. The subject has also been dealt in general including historical perspectives of plants in folk life, songs, proverbs and tales. The book contains tribal uses of more than 1500 plants in different parts of our country, mostly recorded during field studies in remote villages and forests. Madhava Menon (1996) edited a monumental work *The encyclopaedia of Dravidian tribes* in three volumes which contains the historical perspective, anthropological as well as linguistic studies of Dravidian tribes. Isthmian ethnobotanical Dictionary by Duke (1986) is a reference book dealing with herbal folklore on tropical plants. *Plants, People and Culture, the Science of Ethnobotany* (Balick and Cox, 1996) is another significant contribution of this field of science.

Considering the variety of interdisciplinary approaches to this subject several thousands of research papers and general articles have appeared in a variety of publications, ranging from popular magazines, semi-scientific journals to the periodicals of very specialized nature, such as in Anthropology, Botany, Pharmacology, Traditional Medicine, Archaeology, Social Sciences, etc.

The tribe or the ethnic region with different tribes or groups of people is studied, e.g., Chippewa Indians (Densmore, 1974); Waorani (Wade Davis and Yost, 1983); Western Washington (Gunther, 1945) for their food, medicine, crafts, etc. The geography,

the history, the vernacular names of the region and the tribes are studied along with this, the various uses of plants and botany of the plants are usually included in this study.

In this a botanical taxon or a class or group such as hallucinogens, poisons, narcotics, food, etc. are studied in any region or tribal groups, e.g. *Hypericum* (Vickery, 1981); Manioc (Dole, 1978); Narcotics (Schultes, 1954, 1963 a); Hallucinogens (Schultes, 1938, 1963 b); Sacred plants and poisons (Wade Davis, 1983 a, b), etc.

Classical ethnobotany is studied with various aspects such as ethnological, anthropological, linguistics, historical, folk taxonomy, etc. with botany. Such studies are undertaken by a team of workers of different relevant subjects. There are only few examples of such work such as, Berlin *et al.* (1974); Brown (1977, 1984); and Conklin (1967).

Paleo ethnobotany is otherwise called as Archaeo-ethnobotany or Ethno-archaeobotany. It deals with the study of the excavations of archaeological remains such as seeds, pollens, wood remains, etc. (Renfrew, 1973; Chowdhury, 1963; Saraswat, 1980; Meyer, 1980)

The ethno-archaeobotany deals with the study of plants in the carvings and sculptures of the archaeological monuments or remains. This study helps in knowing the earliest uses of plants in different era of times. Such works are very few e.g., Mahdi Hasan (1963); Gupta (1971) and Sithole (1976).

Ethnomedicobotany is considered as a part of general Ethnobotany or classical Ethnobotany. When it corresponds to general Ethnobotany it has the pharmacological perspective, which seeks the potential efficacy of the tribal or indigenous herbs in biological terms, e.g., Wade Davis (1983b); and Ortiz de Montellano and Browner (1985). When it corresponds to classical Ethnobotany, it has the symbolic perspective, which views plants as part of a particular cultural system of beliefs and practices surrounding health and healings (Harvey and Armitage, 1961; Kleiman, 1973,).

The words of Richard Evans Schultes (1963 a) are interesting; "Many of our official drugs have come incidental to the work of individual botanists busy with some larger project, and I am convinced that most of the discoveries will be made by botanists, ethnobotanists or anthropologists engaged in leisurely fashion in their own research rather than by expeditions sent out to find new drugs. And we must not minimise or overlook the role which the layman has played in the past and in the present". Studies by various

national governments and international organizations like World Health Organisation, have shown that for 75-90 percent of the rural populations of the world, the local herbalist alone attends to their medical problems. Some ethnobotanical studies have covered total relationship of the target human society with plants but they have been directed mainly to plants used in medicine and food. Bodding (1927), Aikman (1977), Morton (1975, 1977, 1980). Schultes (1962) and Jain (1965) wrote on medicinal plants in general.

Agricultural practices and harvesting techniques, adopted by a tribal group or in an ethnic region on origin, evolution and domestication of agricultural crops are studied. Ruddle (1979), Phalen (1981) and Barrau (1973) are some contributions in this field of study.

The modern approach to the science of ethnobotany evolved in USA and the foremost centre for the botanical aspects is the Botanical Museum of Harvard University in Massachusetts. Works of Richard Evans Schultes, Richard Girdon Wasson, Siri Von Reis Altschul, Timothy Plowman, E. Wase Davis are some eminent scientists who engaged themselves on researches in various fields of Ethnobotany mainly the general ethnobotany. Richard Evans Schultes conducted ethnobotanical exploration in regions of Oklahoma, Oaxaca, Mexico, Amazon during the mid- 20th century, and worked on hallucinogens, medicinal and toxic plants (Schultes, 1954, 1963 b, c).

Richard Gorden Wasson is well known for his ethnomycological work mainly on the divine mushroom, *Amanita muscaria,* which he claimed to the plant of immortality, the 'soma' (Wasson, 1969). Siri von Reis Altschul searched about 25,00,000 Botanical specimens of Gray Herbarium; out of which she selected 5000 species for compiling 'Drug and Food from little known plants—Notes in Harvard University Herbaria'. On this work, she took the help of two pharmacologists, who decipher the notations of the herbarium sheets into modern pharmacological terms. E. Wade Davis is working in different field of ethnobotany like general ethnobotany, group ethnobotany, ethnomedicine etc. (Wade Davis 1983, a, b,c; Wade Davis *et al.,* 1983).

In 1930, Melvin R. Gilmore founded the first ethnobotanical laboratory in the world at the Museum of Anthropology, University of Michigan. The primary purpose for this laboratory was to identify plant remains from archaeological sites. In 1931, Volney H. Jones joined this laboratory and worked under Dr. Gilmore with the archaeological plant identification and the ethnobotany with living people, in the Great Lakes and on the Hopi

Mesas. Later, Jones trained Richard Yamell Vorsaila Bohrer and Richars I. Ford. Richard Ford is the present Director of the Institute and active work in various fields of ethnobotany is being conducted in this Institute.

In USA the other notable workers in the paleo-ethnobotanical or archeo-ethnobotanical fields are: Frederick G. Meyer of U.S. National Arboretum, Washington, who has worked on carbonised food plants of Pompeii; Hugh D. Wilson of Deptt. of Biology, Texas College Station, Texas working on domesticated chenopods of the Ozark Bluff Dwellers; Lawerence Kaplan of Deptt. of Biology, Roosvelt University, Chicago who has worked on cordova Caves, New Mexico has described 31 plants of prehistoric times and on cultivated beans of prehistoric South West. There are many other workers within and outside USA. From India, Dr. K.A. Chaudhary, Dr. Vishnu Mitre and Dr. K.S. Saraswat need to be mentioned, for their work on prehistoric agriculture, ancient plant economy and beginnings of agriculture in India.

For classical ethnobotany and cross cultural studies of plant terms for a particular plant, or for studies in the classification of plants by native people into folk taxonomic orders and functional categories Brent Berlin, D.E. Breedlove of Dept, of Anthropology, California State University, P.H.Raven of Missouri Botanic Garden, St. Louis, and Cecil H. Brown, Deptt, of Anthropology, Northern Illinois University, Illionois are well known (Berlin et al. 1974; Brown 1977, 1984).

For ethno-agriculture, the group of Jaques Barrau at National Museum of Natural Hisorty at Paris is well known. This school is engaged in origin of cultivated plants and linguistics in South East Asia, etc (Barrau, 1973). In Israel, Daniel zohary of Deptt. of Genetics, the Hebraew University is working on the evolution, domestication and origin of Old World crops.

Indian scenario

Late E.K. Janki Ammal initiated some studies in India on subsistence food and ethnobotany. Now, active ethnobotanical works are being conducted by Botanical Survey of India, Central Council for Research in Ayurveda and Siddha, Central council for Research in Unani Medicine, National botanical Research Institute, Lucknow, National Bureau of Plant Genetic Resources, Delhi, Birbal Sahni Institute of Paleobotany, Lucknow

and Central Institute of Medicinal and Aromatic Plants, Lucknow and a number of colleges and universities.

Since 1960 ethnobotanical research has experienced an upsurge in India. It was S.K. Jain, 'The father of Indian Ethonobotany', who streamlined the subject, trained and prompted a number of students in ethnobotanical research. Ethnobotany of certain ethnically distinct primitive or otherwise interesting human societies, on the Mikir of Assam by Jain and Borthakur(1983), on Bhils of Rajasthan by Joshi(1982), on Tharus of Uttar Pradesh by Maheswari *et al.* (1981), on Boxa tribe of Bijnor and Pauri Garhwal (Maheshwari and Singh,1984).

Ethnobotany of any specific geographical region, which may have one or more distinct ethnic groups, on Central India by Jain (1963,1981), on Kumaon by Shah and Joshi (1971), on Lahul in Punjab by Koeltz (1979), on Araku valley in Andra by Banerjee (1974), on Santal Pargana by Goel *et al.* (1984), on Mirzapur by Maheswari *et al* .(1987), northern India by Shah (1982), Meghalaya by Kumar *et al.*(1980), Koraput (Orissa), by Pal and Mudgal (1985), Rajastan by Singh and Pandey (1982), Kashmir by Dar Virjee *et al.* (1984), Malabar, Kerala by Manilal (1990), Nilgiris , Tamil Nadu by Abraham (1981).

Ethnobotany of particular utility groups of plants, like food, medicine, hallucinogens, etc, is studied by Jain (1964), Bhandari (1974), Arora (1981) and Gaur (1977), and on medicine by Bodding (1925) and Jain (1965). Plants in particular Medicare by ethnogynaecology by Tarafder (1983, 1984), on ethnodermatology by Khan and Chagatai (1982), on rheumatism by Hemadri (1981), on snake bite and ethno-orthopaedics by Jain (1963, 1967), on contraceptive herbs by Billore and Audichya (1978) on plants used against diarrhoea and dysentery (Sahu, 1982, 1983) and as veterinary medicines (Pal, 1980).

Ethnobotany of a particular plant, genus or family of plants, on *Bauhinia* by Jain *et al.* (1973), on *Coptis* by Mudugal and Jain (1980), on *Selaginella* by Dixit (1982) on *Coix* by Jain and Banerjee (1974) and *Ficus* by Chattopadhyaya (1976).

Kamboj and Dhavan (1982) reviewed the work on plants for fertility regulation in India. Ravi Sanker and Henry (1992) studies the ethnobotany of Adilabad District and brought out ethnobotanical information of 30 species used by Gonds, Kolams, Lambadis, Naikponds and Pardhans. Dutta and Nath (1998) described the medicial uses of 63 plant species practised by the Mongoloid aboriginal, the Deories in Assam.

The *Society of Ethnobotanists* is also contributing to the science through its various activities like publishing newsletter, holding seminars and the training course. The present Proceedings volume is the result of its activities. Not only this, the society has brought out a World Directory of Ethnobotanists, which enlists about 500 workers, with their addresses and areas of interest (Jain *et al.* 1986).

Binu (1992) provided a comprehensive summary of ethnobotanical research carried out in different states and union territories of India until 1991. Many ethnobotanical studies have been directed to special ailments. Jain (1967) enumerated about 200 plants associated with healing of broken or damaged bones. Tarafder (1983a, b) wrote on herbs in gynaecological problems and fertility. As the forest dwellers often suffered from snake-bite, remedies for snake-bite were commonly reported. Roots of *Aristolochia indica* are considered antidote to snake venom in Kerala. Some other species of *Aristolochia* having anti poisonous action used among Kani tribes of Kerala was reported by Rajasekharan *et al.* (1989). Handa (1986) and Jana *et al.* (1997) observed the ethnomedical properties of Indian orchids and its Therapeutical applications. Sahoo *et al.* (2005) explains the animal origin products in ethnic medicine.

Jain (2005) describes the dynamism of traditioinal knowledge. Chauhan(2005) explains the traditional jewellery of Pabbar Valley. Chandrasekaran *et al.* (2005) analyses the Indian musical note.

In Kerala

The documentation of ethnic uses of plant species of Kerala was initiated as early as in 17th century by Van Rheede (1678) followed by subsequant studies conducted by several ethnobotanists. The earlier studies carried out by Pisharoti (1935) Gnanambal (1952) and Mukherjee (1953) mainly with an anthropological point of view. Manilal (1981) reported 26 primitive varieties of rice used by different tribes in Kerala. Radhakrishanan *et al.* (1996a) documented the less known ethnomedicinal plants of Kerala. Radhakrishanan *et al.* (1996b), Raveendran *et al.* (1996) documented the edible wild plants utilised by the tribes of Kerala. Suresh Kumar (2001) conducted the ethnobotanical investigation for aphrodisiac, anticancer activities from wild orchids of Southern Western Ghats.

The Nilgiris of Western Ghats provided an excellent platform to the enthusiastic ethnobotanists because of the age-old tradition of tribes settled in its beautiful valleys. Raghunathan (1976) recorded several ethnic healthcare practices in the tribal pockets of Nilgiris. Rajan (1992) documented the medicinal plants of Ootacamund in Nilgiris. Hosagoudar and Henry (1996a,b) worked the Ethnobotany of Kadars, Malasars and Muthuvans of Anamalais and Irular, Kurumbar and Paniyar of Nilgiris. Namdal and Basu (1996) surveyed the ethnobotanical knowledge of selected tribes in Nilgiris. Henry *et al.* (1996) studied the Ethno-Medico-Botany of the southern Western Ghats of India. The medical lore of 125 potential medicinal species of Todas of Nilgiris is recorded. Ganeshan (1993) in a study from Mudhumalai, with in the Nilgiri Biosphere Reserve in the Tamil Nadu, explains collection and sales of 19 items through LAMPS, a tribal society with an increase in the lease amount paid and number of tribals involved in collection from 1986 – 1992. Rajasekaran (2000) studied the ecology and utilisation of medicinal plants with special reference to selected tribal groups of the Nilgiri Biosphere Reserve. Moorthy *et al,* (2003) describes the collection and marketing of ten NWFPs from three places of Tamil Nadu namely Pollachi, Sathyamangalam and Kolli hills.

Extraction scenario of Kerala is unique and is very different from the rest of the world. High biodiversity rich forests of Kerala as a supply base and a demand for variety of the plants that grow in the forest floor by the popular traditional systems of medicine. The local market offers opportunity for a wide spectrum of trees, herbs, shrubs, climbers etc. The right for collection has been entrusted to the tribal population, living inside or in the forest fringes. They possess skills and traditional knowledge in collection and processing of plant parts. The collection and marketing has been monopolized by the Girijan Co-operative Societies by the Government in 1978 and the control of these bodies by an apex body known as the Federation in 1981.

Patterns in forest-dependent lifestyles of a hunter-gatherer community of Nilambur Valley, known as the Cholanaickans were attempted by Anita (1993). In her work she has compared two settlements in relation to its proximity of external influences with that of foraging group formations foraging efficiency and time budgeting in gathering forest products. Comparison of the settlement inside the forest in relation to its proximity to town or market revealed very interesting results. Change in lifestyle, resource requirements, utilization pattern etc. of settlement were looked at. Farthest settlements depended on

forest to a great extent utilizing the resource more efficiently while the nearer ones had been using items replaced by easily available commodities. Settlements nearer to the town collected more of commercial produce and less of food. While at the farthest settlement gathering food retained its traditional importance. The foraging group size, composition and efficiency for collecting various resources for subsistence and for marketing have been analyzed with respect to the proximity of these settlements to town.

Landuse changes and its impact on the socio-economic conditions of three tribals namely the Kurichiyans, Kattunayackans and the Paniyans in Wayanadu was carried out by Anitha (1996). A study on the economics of collection, marketing and utilization of NWFPs in Kerala was carried out by Shankar, 1999. Muraleedharan *et a.l* (1997) carried out sustainable use of NWFPs in the Western Ghats, Kerala, products collected by the Kattunaickans of Wayanad, the Cholanaickans of Nilambur Valley, and the Irulas of Attapady. Of the 229 NWFP species recorded from the study area, 37 to 43 plant species were commercially exploited.

Ethnobotanical aspects of Chinnar Wildlife Sanctuary were studied by Ramakrishnan *et al.* (2000) where 141 species are reported. Kumar and Madhusoodanan (1998) projected the importance of 4 rare ferns of Chinnar Wildlife Sanctuary. Sajeev and Sasidharan (1997) also worked out the ethnobotany of tribes in the Chinnar Wildlife Sanctuary. Kumar (2004) studied the floristics and tribal usage of shola plants, and identified the usage of 188 species among the *Muthuva* hill tribes. Johncy (2004) studied the ethnobotany of *Muthuva* hill tribes in Devikulam Taluk; noticed the toddy tapping methods of wild palms, 145 single remedies for various ailments, 31 wild food plants etc.

Bhat and Nesamani, (1981) studied the folklore of Idukki District. Pushpangadan (1988) described the astonishing finding of *Arogyappacha* of Kani tribes. Rajasekharan *et al.* (1989) studied the species of *Aristolochia* used by Kani. Rajendran and Henry (1994) reported 41 species of plants used by the Kadars in Anamalai Hills.

The Ethnobotany of Kannur district was studied by Ramachandran and Nair (1981); Thomas and Brit (1999) surveyed the ethnobotanical information of Naduvil Panchayath in Kannur District. Binu (1999) reports the use of 323 ethnobotanically important species from the Pathanamthitta District in which six fern species and a gymnosperm are included. Sankaranarayanan and Sasiraj (1988) investigated

ethnobotanical information of Irula tribes of Sholayur Panchayath of Attappady. Ethnomedicines and tribal health status were dealt with in the study. Several tribal groups in Kerala including selected Kurumba areas in Attappady were studied by Viswanathan (1985). Ganapathy (1980) conducted detailed studies on Man-forest interactions and its implications on ecology and management, in which a brief listing of ethnobotanical uses of plants were provided some folklore medicines of Irula tribes of Attappady were documented by Gopalakrishnan and Prasad (1992). A detailed Ethnobotanical study was conducted among the Irulars of Tamil Nadu by Ramachandran and Nair (1981), in which 138 species of medicinal plants were listed. Muraleedharan and Shankar (1991) describes the human ecology, cultural aspects and eco-restoration of Attapady. Viewed in the light of the above works, it is obvious that ethnobotany of Kerala demands still an elaborative and in-depth study.

Chapter 3

MATERIALS AND METHODS

The materials and methods utilized for the present ethnobotanical investigation among the tribal population of Palakkad and Malappuram districts showing the area of study, methods for data collection, preparation of herbarium and list of selected tribal settlements in Palakkad and Malappuram districts are given below.

3.1 Area of study

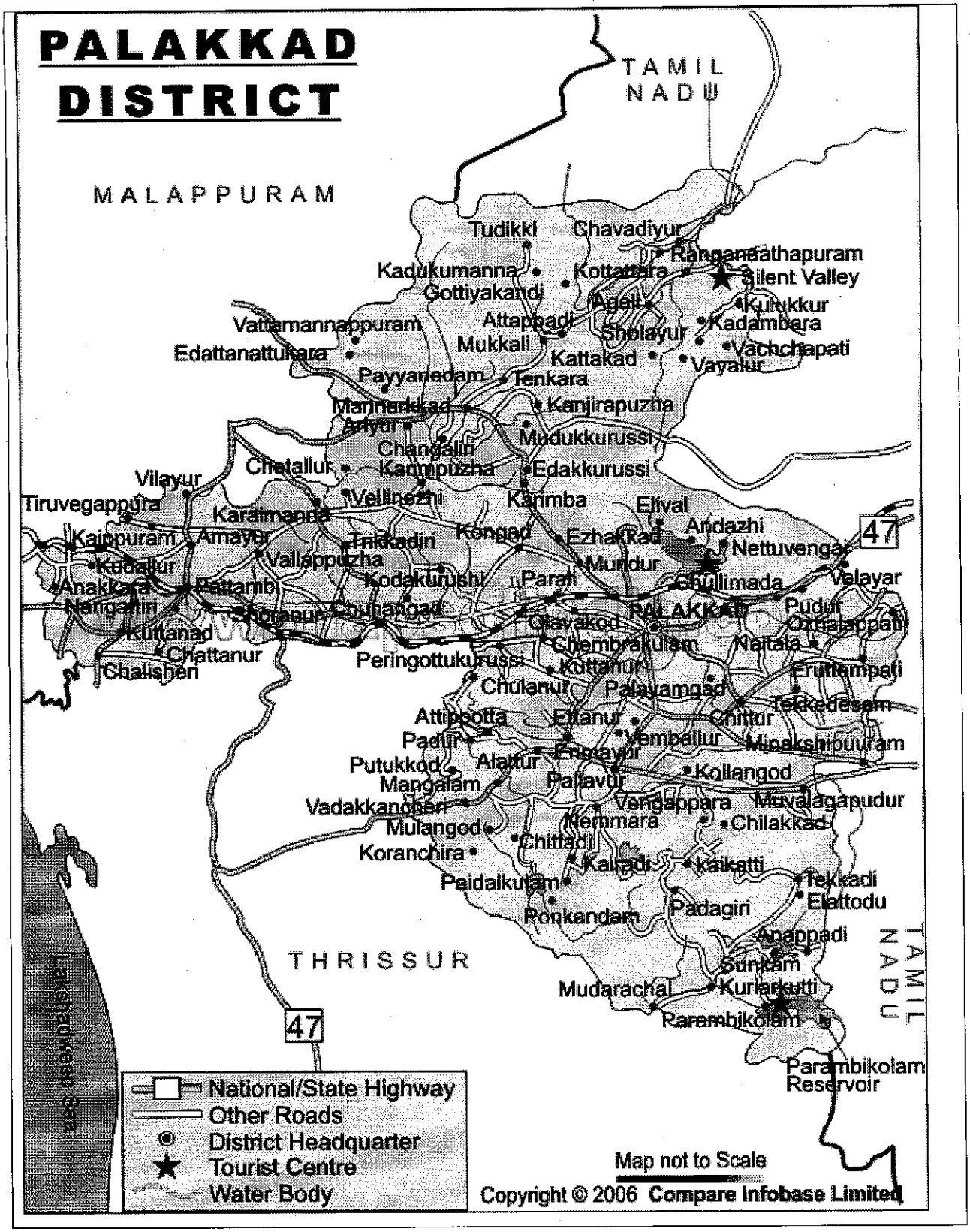
The ethnobotanical data for the present investigation were collected from the selected tribal settlements surveyed taking into consideration a minimum two settlements from each tribal group of the District. Thirty per cent of the total tribal settlements were surveyed in random from each district considering their tribal groups. In a tribal settlement if only 20 families were found, all the families of that settlement were surveyed and if more than 20 families were present only fifty per cent of the families were surveyed.

Palakkad District lies between North latitude 10° 46` and 10° 59` and East longitude 76° 28` and 76° 39`. It is bounded on the East by the Coimbatore District of Tamil Nadu, on the North and Northwest by Malappuram District and on the South by Thrissur District. The total population of the district according to 2001 census was 2,617,072 of which the male population was 1,265,794 and female population was 1,351,278. The density of population was 584 per km2 .

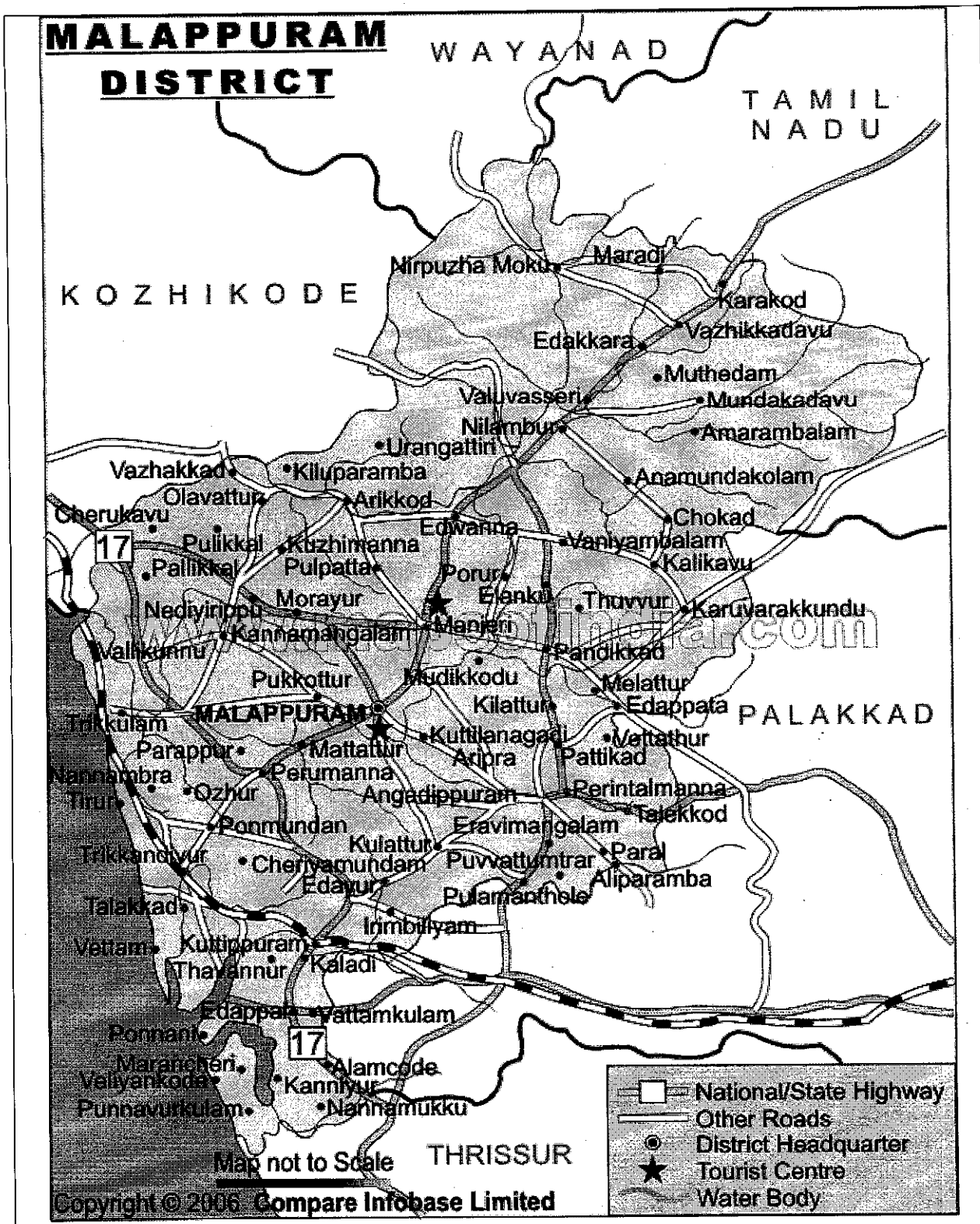
The location of Malappuram District is 75 to 77 East longitude and 10^0-to 12^0-North latitude, in the geographical map. The District has a population of 3,629,640 (2001 census), and an area of 3550 km², with a population density of 1022 persons per km².

Palakkad district is inhabited by various ethnic groups like Malasar, Malamalassar, Kadar, Kattunaikans, Irular, Paniyar, Mudugar, Kurumbas and Malayarayan. Malappuram District is inhabitated by Muthuvan, Malamuthan, Paniyar, Aranadan, Kuruman, Kattunaikan,

Cholanaikkan and Kurunjipaniyar. The area of the study is depicted in Map 1-3. The tribes of Palakkad District are found in 4575 settlements within 26 Panchayats and that of Malappuram district are found in 2902 settlements within 15 Panchayats. Tables 1&2 contain the names of the Panchyats and number of families in each of the settlements in both districts. The investigation has established a good rapport with the tribals of both the districts and this helped a lot in collecting ethnobotanical data during 2003-2006.



Map 2. Palakkad District



Map 3. Malappuram District

3.2 Data collection

Data were generated from tribal settlements, elderly tribal men, tribal physicians, etc. of Palakkad and Malppuram districts based on interview involving questionnaire and Participatory Rural Appraisal. Secondary data were collected from tribal development societies, KIRTADS, Forest Departments, literature, herbaria etc. Evaluating the impact of the method on the species and its populations some changes could be made in methods of utilization of each species and its parts. This evaluation was done by direct observation, population degradation and traditional knowledge from extractors. Based on data generated on sustainable and unsustainable methods of extraction, strategies and action plans were transferred to the stakeholders. Proposals were also made for ban on exploitation of rare and endangered plants, awareness camp, planting medicinally important trees, shrubs and herbs, to set up tribal medicinal plant nurseries in tribal dominated areas, create Panchayat level ethnobotanical gardens by tribals and conduct training activities on sustainable methods of extraction.

Later, plant specimens were collected with the help of informants of the settlements. The plant specimens were brought back and verified for their names and uses with experienced elders and herbalists. On many occasions the investigator had accompanied the tribals during their long forest journeys and had lived with them. This has helped a lot in recording all the aspects of tribal life.

3.3 Herbarium

The plant specimens were made in to herbaria as per the methodology laid down by Jain and Rao (1977) and Martin (1995). The specimens were tentavely identified with the help of floras and later confirmed with the help of authentically identified specimens of the herbarium of Kerala Forest Research Institute, Peechi, Thrissur, Kerala. The specimens were labelled with field data recorded during the field visits and the botanical names were worked out as per the ICBN. Local names used by the tribals which were recorded from the field were incorporated. All the herbarium specimens are deposited in the herbarium of KFRI, Peechi, Thrissur.

Chapter 4

RESULTS

4.1 ETHNOMEDICINAL PLANTS

Ethnomedicinal plants are moving from fringe to mainstream use with an increase in number of people seeking safer remedies for health problems. Recently, considerable attention has been paid to utilize eco-friendly and biofriendly plant-based products for the prevention and cure of different human diseases. Considering the adverse effects of synthetic drugs the Western population is looking for natural remedies which are safe and effective. It is documented that 80% of the worlds population has faith in traditional medicine, particularly plant drugs for their primary healthcare.

India is sitting on a gold mine of well-recorded and traditionally well-practised knowledge of herbal medicine. This country is perhaps the largest producer of medicinal herbs and is rightly called the botanical garden of the world. There are very few medicinal herbs of commercial importance which are not found in this Country. India officially recognizes over 3000 plants for their medicinal value. It is generally estimated that over 6000 plants in India are in use in traditional, folk and herbal medicine, representing about 75% of the medicinal needs of the Third World countries (Rajasekharan, 2002) . Three of the ten most widely selling herbal medicines in the developed countries, namely preparations of *Allium sativum*, *Aloe barbedensis* and *Panax* sp. are available in India. There are about 7000 firms manufacturing traditional medicines with or without standardization. Medicinal herbs have been in use in one form or another, under indigenous systems of medicine like Ayurveda, Sidha and Unani. India, with its traditional background, needs to increase its share in the world market.

Adulteration in market samples is one of the greatest draw-backs in promotion of herbal products from India. Plant samples in the market are stored under undesirable conditions over the years, and often contain a mixture of other plant species, thus adversely affecting their bioefficacy (Dubey *et al.*, 2004).

The efficacy of many of drugs is fading because of the adulterated, dried raw materials profusely available in the indigenous market (Anon., 1996). Due to this adulteration and altered efficacy, the faith in crude drug promotion has declined (Gupta *et al.,* 1998). Desire for quick returns by some of the pharmaceutical firms by not processing the herbal materials in a proper way, is the major cause of decline of Ayurveda in India. It also adversely affects the global promotion of Indian herbal products. Workers in these firms frequently lack the knowledge and skill required in processing. The common examples which are well known are substitution of the bark of *Holarrhena antidysenterica, Wrightia tinctoria*, *Saraca indica* and *Trema orientalis* (Dubey *et al.,* 2004).

Another major issue requiring immediate attention concerns the harvest of medicinal plants in appropriate seasons. The medicinal properties of plants vary with respect to different seasons. These properties may be restricted to one particular part of the plant. The age of the plant also decides its medicinal potency. Therefore, the authentic part of medicinal plants of a particular age should be harvested in a particular season before processing for drug manufacture, to avoid any alteration in its medicinal potency. The medicinal potency of an angiospermic taxon also varies among its populations occurring in different geographical localities. Besides, the period of storage in sun or shade conditions also affects medicinal properties of the plants (Dubey *et al.,* 2004). Precautions during harvestation of medicinal plants are not observed by most of the firms and it ultimately results in decline in efficacy of the herbal drug plants of the area. Training the youth of the Country in taxonomy of ethnomedicinal plants would help in developing such databases.

It has been reported that the stored drug samples harbour mycotoxin-producing fungi in high frequency (Roy, 2003). Degradation of alkaloids and medicinally valuable secondary metabolites of stored plant drugs due to fungal infestations has been reported. WHO has also paid serious attention on mycotoxin contamination in herbal drugs, considering it has a global problem.

Research needs to be enhanced to identify plants with potential medicinal value and to isolate compounds of medicinal importance. Every plant-based product should be documented properly with regard to the identification of species and utilization of specific parts of the plant. Some of the common medicinal plants are known in different parts of

the Country by different names. 'Shankhpuspi' is an important medicinal plant. Different plants, viz. *Clitoria ternatea* Linn. in Kerala, *Canscora decussate* Schult. in Bengal, and *Convolvulus pluricaulis* Chois. and *Evolvulus alsinoides* Linn. in other parts of India are known as Shankhpuspi (Dubey *et al.*, 2004). This type of confusion is also met with other medicinal plants. There is an urgent need of taxonomic databases of ethnomedicinal plants prepared in joint collaboration by Ayurvedic practitioners and experienced plant taxonomists. Correct taxonomic identification of medicinal plants before their processing for drug manufacture is an important aspect. Wrong identification of herbs has led to many cases of poisoning. *Boerhaavia diffusa* is used widely as a 'quality of life enhancer'in the traditional system of medicine. However, both *B. diffusa* and the plant *Trianthema portulacastrum* are known as 'Punarva'; so both the plants may be collected at the same time (Shah, 1997).

The season at which each drug is collected is a matter of considerable importance. The amount and nature of active constituents is not constant throughout the year. The age of the plant is also of considerable importance and governs not only the total quantity of the active constituents produced, but also the relative proportions of the active principles. Duration of the drying conditions of the harvested medicinal herb also varies from a few hours to many weeks (Evans, 2002; Handa, 1992) . If enzyme action is to be encouraged, slow drying at moderate temperatures is necessary. Storage of the harvested plant parts under hygienic conditions is another important factor to be considered during processing of the drug.

Although the tribal people atribute most of the ills of life to spirits and often seek the aid of magical practices and religious rites or sacrifices to get rid of such ills, they do not disregard the curative properties of fruits, flowers, barks, leaves and roots of plants and other natural products. In fact the use of medicinal plants in the treatment of diseases was conceived by the tribals thousands of years ago. Even Rigveda speakes of sages escorting the wandering Aryan tribes with a bagful of healing herbs. Practically nothing is known regarding the origin of the large number of medicinal plants. The native concept of health, disease, treatment, and of life and death is unique as their culture. The usual theory of disease in tribal society is that disease is caused by the breach of some taboo or by hostile spirits. As a matter of fact, disease to a tribal mind is like another phenomenon of the

natural world, is many faceted and essentially incomprehensible in the sense that no single theory will perfectly cover all the known facts.

The following are the plant species / parts used in tribal medicine.

1. ***Abrus precatorius*** L.**(Papilionaceae) Kunni:** An aqueous extract of root is administered for stomach pain especially in children. Grind well a piece of root, about 3- 5" length, in water, filter and consume. Single dose application is usually suggested. The seeds are used as abortifacient. The pounded leaves are widely used to relieve coughs, colds and colic.
2. ***Abutilon hirtum*** (Lam.) Sweet **(Malvaceae) Tuthi:** Leaves are used in the treatment of piles. Fresh leaves are cleaned in water, sun dried and powdered; one teaspoon powder is taken on a banana leaf, diluted in onion juice and pressed into the bulged rectum of the anus. The same mixture is suggested to administer for a week, one spoon per day in empty stomach.
3. ***Acacia catechu*** (L.f.) Willd.**(Mimosaceae)Khadiram:** Bark decoction is used internally to treat leprosy
4. ***Acacia leucophloea*** (Roxb.) Willd.**(Mimosaceae)Vela Maram, Vellavel:** For treating fracture and muscular sprain in cattle or goats, the crushed bark is applied over the affected area. A cloth piece immersed in gingilly oil is wrapped over the affected part. For treating fracture, sliced bamboo pieces placed in the area and tightly wrapped with the ropes taken from the bark of *Aacha*. Keep the animal stall-fed for 21 days for complete cure. Take three litres of water in an earthen pot and put one kg of crushed bark into it. Tightly close the mouth with cloth pieces and keep the pot in a dark place for nine days. Smash two bananas (*Poovanpazham*) into the pot and keep it in the same way for three days. Administer one ounce each to goat / calf and two ounce to cattle during the treatment period. The bark is used for brewing alcohol. Consumption of this gives relief from muscular as well as rheumatic pain and sprain. The powdered stem bark is used as a tooth powder to cure severe toothache.
5. ***Acacia nilotica*** (L.) Willd. ex Del., ssp. ***indica*** (Benth.) Brenan **(Mimosaceae) Karuvelam:** Small bark pieces are chewed for curing toothache and related

inflammation. The bark piece is collected from a mature tree after scraping the outer skin. The bark is used in brewing alcohol, consuming of the same is considered as a general tonic for health. The gum exuding from the cut bark is used as an astringent and styptic.

6. ***Acacia pennata*** (L.) Willd. **(Mimosaceae) Kareenga, Eenge**: Tender leaves are ground well and made into a poultice on the forehead for curing frequent headache. This is also effective for migraine, when applied in the early morning, while the initial symptoms expressed. Leaves are crushed and applied in stagnant water to stupefy fishes enabling easy catch. The leaves are chewed to relieve bleeding gums.
7. ***Acacia sinuata*** (Lour.) Merr.**(Mimosaceae) Sinikkai:** Mature fruits are collected and sold. Crushed fruits are used as substitute for soap to wash hair.
8. ***Acalypha alnifolia*** Klein et al Willd. **(Euphorbiaceae) Chinne maram**: To cure summer-boils in children, apply the paste of shoots during bath time, for one-week duration. The leaf paste is applied to the scalp of babies as a hair wash for increased hair growth. Paste of roots, approximately 10 g, diluted in water and given internally, two times a day cures stomach ache in adults.
9. ***Achyranthes aspera*** **L. (Amarantaceae) Irumuli, Erumbuly**: Roots ground well into a paste and administered for asthma. When symptoms are seen, take a small quantity of this paste and mix with water and administer orally. This helps the patient to reduce the affliction. *Irulas* use the whole plant for limb pain. A single plant is collected, chopped and boiled in two glasses of water, reduced into half and administered in empty stomach during morning and evening, for seven days to cure limb pain. A pinch of the powdered root mixed with an equal amount of black pepper is given with honey as a remedy for cough.
10. ***Actinopteris radiata*** (Sw.) Link **(Actinopteridaceae) Siru kallu paste:** An aquous paste is prepared with the tender shoots along with *Periya kallu paste* and applied externally during bed time over the reddish boils appearing on the skin of infants / babies. Application may take three days for complete cure.
11. ***Ageratum conyzoides*** **L. (Asteraceae) Appe chedi**: Shoots of *Appechedi* are crushed and the juice is applied several times over all types of wounds for fast healing.

12. ***Ailanthus triphysa*** (Dennst.) Alston **(Simaroubaceae) Matti, Mattipal, Pongalliyamsage**: Resin used in the treatment of dysentery and bronchitis

13. ***Albizia amara*** (Roxb.) Boivin **(Mimosaceae) Oonchal** : The tender leaves are collected during February- March, dried in sunlight and powdered in wooden mortar and stored for the whole year. This powder is used as hair and body wash. Apply this powder over scalp as a hair-wash during bath, which gives coolness to head, cures dandruff and promotes hair growth. During excessive heat in summer, crushed bark is wrapped around the head for cooling effect and to prevent sudden hair loss. Continuous application of this for three days cures the summer-boils. The flowers are considered as a cooling medicine and are applied externally to boils and skin eruptions. Bark of this tree is crushed and tied externally for limp due to any damage of bone in goats. The broken portion of leg of goats/ calves wrapped with the crushed bark is tightly covered by a cloth piece immersed in gingili oil. If required, a support with thin Bamboo pieces is also given. The goat is stall-fed for 21 days.

14. ***Aloe vera*** (L) Burm. f. **(Liliaceae) Chothukathale**: The fresh juice is good to health. The fresh juice is used by the tribals to treat insect bites, boils, burns and swellings. To cure boils and abscesses on skin, the pulp of leaves is applied over the affected area. This makes the boils mature and burst. To cure stomach pain, a gooseberry-size of leaf pulp mixed with same quantity of jaggery is administered once in empty stomach. The pulp applied on burns helps fast healing.

15. ***Alstonia scholaris*** (L.) R.Br. **(Apocynaceae) Pala:** Latex obtained from the plant is applied on wounds caused by burns and boils by the tribals.

16. ***Anacardium occidentale*** L. **(Anacardiaceae) Parankimavu:** Bark juice used to treat toothache. Oil obtained from the nuts is a useful remedy to ringworm infection.

17. ***Andrographis paniculata*** (Burm. f.) Wall. ex Nees **(Acanthaceae) Sirunangai, Nilavepu , Kiriyatha :** A plant with all parts is chopped and a handful is boiled in one glass of water and reduced to half. This decoction is administered as a first-aid for snakebite. The bite mouth is widened immediately after the incident to allow the impure blood to flow. The whole plant well ground to a paste is applied thickly over the bite and wrapped with a cloth. Intake of the decoction

has to be continued for a week. Efficiency of the treatment, as most of the tribal healers claim, will depend on some mantras and spiritual effects. The leaf juice is taken orally to treat jaundice also.

18. ***Anogeissus latifolia*** (Roxb. ex DC.) Wall.**(Combretaceae) Vecha**: The gum exuding from the cut bark, is given mixed with water to treat leucorrhoea

19. ***Areca catechu*** L. **(Arecaceae) Adakkai:** Young fruit paste is applied on boils to relive burning sensations.

20. ***Aristolochia indica*** L. **(Aristolochiaceae) Irukodi, Urikodi:** Crush the roots with onion and inhale several times through a cloth piece to get relief from headache. A piece of crushed root chewed and held at the aching tooth. This treatment reduces the pain gradually and inflammation and cures the problem when used daily for a week period. During the spread of Malaria, a decoction of the root is given in empty stomach to the suspected patients for three days, as a curative medicine. The leaf paste is applied over wounds and swelling by wasp stings, ulcers on legs etc. for speedy healing.

21. ***Artabotrys hexapetalus*** (L.f.) Bhandari **(Annonaceae) Manoranjitham**: Flowers used to make a stimulating drink.

22. ***Atalantia monophylla*** (Roxb.) DC. **(Rutaceae) Kuruntha maram:** Boil the water with a small piece, about 10" long, of crushed root. Use this water for bathing. Continue this for one week for subsiding heat sores and one month for itches on the skin. A decoction of roots and leaves taken in equal quantity is administered three times a day for continuous three days. This will help in subsiding heartburn. Roots and leaves crushed (to a gooseberry-size) is boiled in two glasses of water, reduced to half.

23. ***Azadirachta indica*** A. Juss. **(Meliaceae) Veppe maram, Kariveppu, Aaryaveppu**: Bark, leaves and seeds have been used to treat skin deseases and rheumatism. In case of severe stomach pain, fresh leaves are ground to a paste and a gooseberry-size is taken along with a crushed onion and half a teaspoon of turmeric powder as a single dose. During the outbreak of chicken pox the branches are spread and the patient is instructed to lie on this for initial three days. The leaf paste is also applied all over the body.

24. ***Baccaurea courtallensis*** (Wight) Muell.-Arg. **(Euphorbiaceae) Uvane** : A

decoction of the bark is administered for stomach ulcer. Use of fresh bark pieces is suggested. About six square inches of fresh bark is collected from a mature tree, crushed and boiled in two glasses of water and reduced to half. The decoction shall be taken in empty stomach, during early morning and evening for a week.

25. ***Bambusa arundinacea*** (Retz.) Roxb. **(Poaceae) Mulla:** A poultice prepared from the pounded young shoots is applied to infected wounds to dislodge worms
26. ***Bauhinia racemosa*** Lam. **(Caesalpiniaceae) Aacha maram, Arampuli**: Juice expelled from the fresh leaves (about 30 ml) is administered in complicated delivery. After delivery of foetus, a decoction made out of a handful of *Kore* powder is also provided for expelling the placenta.
27. ***Benkara malabarica*** (Lam.) Tirveng. **(Rubiaceae) Ketturangi:** Pieces of bark tied to the cradle induces deep sleep in children. Applying the shoot juice externally over the head and shoulders of babies also procides deep sleep.
28. ***Biophytum sensitivum*** DC. **(Geraniaceae) Nilathengu:** Root paste is applied as a wound healing agent
29. ***Blepharis maderaspatensis*** (L.) Roth **(Acanthaceae) Palavan Chedi**: Shoots ground and applied over abscessed boils cause easily break open y to expel puss abscesses.
30. ***Blumea mollis*** (D. Don) Merr. **(Asteraceae) Miche**: Leaves are crushed along with equal quantity of *Appe* leaves and a pinch of lime. Apply this mixture over scorpion bite for curing pain and inflammation.
31. ***Bombax ceiba*** L. **(Bombacaceae) Mullilavu:** Seed oil is used treat skin diseases and gum is used to treat diarrhoea.
32. ***Brassica juncea*** (L.) Czern. **(Brassicaceae) Kadugu :** Cultivated for its seeds; threshed, sun dried and sold to co-operative society. Leaf paste is a very good remedy for headache.
33. ***Breynia retusa*** (Dennst.) Alston **(Euphorbiaceae) Tannithalangu, Kodiveeti** : An aqueous paste of stem bark is prepared and rubbed gently over the small reddish boils in children. It is washed after an hour. Repeat the procedure for three days for total cure. The shoot as its name indicates, is used as a 'shock-absorber' while carrying water pots, from river to the hamlet. A bundle of fresh

ground shoots are collected, ground well and made into a loose paste by adding water. This is applied externally over the abdomen of cows during delivery to remove obstructions thus assisting easy delivery.

34. ***Bridelia retusa*** Spreng. **(Euphorbiaceae) Mullu gonge:** An aqueous extract of leaves used to treat skin infections

35. ***Bridelia scandens*** (Roxb.) Willd. **(Euphorbiaceae)Valli mullankaini, Kodigonge**: Leaves crushed and tied on the knee joints with a cloth piece during bedtime, regularly for a month cures pain and inflammation related with Rheumatism.

36. ***Buchnania lanzan*** Spreng. **(Anacardiaceae) Murasi:** Fruit edible when ripe, usually consumed by children of shepherds.

37. ***Butea monosperma*** (Lam.) Taub. **(Papilionaceae) Saanthuviri, Plassu, Chamatha:** The filtrate of boiled stem bark is used as a bath for patients suffering from jaundice. The root bark paste is used to treat piles. The raw leaf extract is used internally to treat diarrhoea. The red juice exuded from the cut bark is applied to treat fresh wounds

38. ***Cajanus cajan*** (L.) Mills. **(Papilionaceae) Tumare, Thuvara:** The seeds and leaves, made into a paste and warmed, are applied over the mammae to check milk secretion and a poultice prepared from pounded leaves is used to relieve swelling.

39. ***Callicarpa tomentosa*** L. **(Verbenaceae) Cheruthekku**: An aqueous extract of the leaves is used as an antiseptic to dress wounds and boils, and to relieve itches.

40. ***Calophyllum calaba*** L. **(Clusiaceae) Naipunna:** The seed kernels have strong antibacterial properties and are useful for treating cuts and wounds.

41. ***Calophyllum inophyllum*** L. **(Clusiaceae) Punna**: Seed oil used to treat scabies and bark juice used as purgative.

42. ***Calotropis gigantia*** (L) R.Br. **(Asclepiadaceae) Erukkile, Erukku**:The latex is applied over the wounds caused by dog bites. This is said to help the patient to escape from Rabies infection. The latex is mixed with the leaf juice of *Veppe maram* and applied over the snakebite. This is a first aid for all types of snakebites.

43. ***Calycopteris floribunda*** (Roxb. *et al* DC.) Wall. **(Combretaceae) Pullani**: Jucie inside the stem has the property to depress thirst.

44. ***Canaga odorata*** (Lam.) Hook.f.&Thom. **(Annonaceae) Kattuchampagam**: The flowers are rubbed on the skin to prevent skin itching.

45. ***Canarium strictum*** Roxb. **(Burseraceae) Kungilyam:** With gingili oil resin used in the treatment various skin diseases.

46. ***Canthium coromandelicum*** (Burm.f.) Alston **(Rubiaceae) Kaare**: The bark is ground well and applied externally to cure muscular pain. Taking bath in hot water after one hour of application is also suggested.

47. ***Canthium dicoccum*** (Gaertn.) Teys.& Binn. **(Rubiaceae) Oppemaram**: Leaves crushed and wrapped in a cloth to the loins, after delivery for easy dropping of placenta.

48. ***Capsicum fruitescens*** L. **(Solanaceae) Cheeni mulakai**: Fresh leaves are ground well along with the excreta of goat and applied over a particular kind of skin disease characterized by blackish scales. Take bath in hot water after one hour. This procedure is continued for about one week for complete releif.

49. ***Caralluma attenuata*** Wight **(Asclepiadaceae) Kallekku**: A shoot piece of about 3" length is ground and mixed in half a glass of water. This is administered in empty stomach, possibly in the morning, to typhoid patients for three consecutive days. This is also a remedy for bleeding piles. A small quantity, (the size of a gooseberry), of ground shoot is administered in the morning, in empty stomach for a week. The stem is cut into small pieces and fried in castor oil with a pinch of salt and crushed onion, which is administered for debility and also considered as a general medicine for all ailments.

50. ***Cardiospermum halicacabum*** L. **(Sapindaceae) Chadukku pidukku chedi, Pokkanamthooki, Valliyuzhinja:** During the last months of pregnancy rice is boiled with some shoots of this plant and eaten. This is said to aid easy delivery. Leaf juice applied to treat earache. Leaf paste in coconut oil is very good remedy for falling off of hair. Fresh latex applied to treat wounds.

51. ***Cassia fistula*** L. **(Caesalpiniaceae) Kondai, Konna**: The dried pulp are valued for their laxative properties. A decoction of the pods is prescribed for pneumonia

and common fever. The fresh leave juice cures amenorrhoea. A decoction of the flowers is pprescribed for stomach ailments.

52. ***Cassia occidentalis*** L. **(Caesalpiniaceae) Ponnaviram, Thakara**: The leaves are used both externally and internally to treat various skin diseases. The leaf paste applied externally to promote healing of bone fractures. Root paste is used as a remedy for stomach disorder found in children.

53. ***Cassia tora*** L. **(Caesalpiniaceae) Thakara**:They are extremely useful for curing ring worm as a leaf paste. Pounded with eggwhite and applied as a plaster to heal bone fracture. The pounded leaves are applied as a poultice on cuts and wounds to promote healing and extremely useful for ringworm and other skin diseases.

54. ***Centella asiatica*** (L.) Urban **(Apiaceae) Varache:** Whole plant is made to a paste and administered in the morning and evening continuously for 1 week for curing leucorrhoea.

55. ***Cereus pterogonus*** Lam.**(Cactaceae) Kallichedi:** A piece of the stem is hung over the roof in front of house to expel evil spirits.

56. ***Chromolaena odorata*** (L.) King & Robinson **(Asteraceae) Kaattappe, Communist Chedi**

57. ***Cinnamomum zeylanicum*** Blume **(Lauraceae) Karukapatta:** Bark paste with honey is used to treat breathing troubles

58. ***Cissampelos pariera*** L. **(Menispermaceae) Padathali:** Root paste is used to treat stomach disorder

59. ***Cissus quadrangularis*** L. **(Vitaceae) Narale, Changalamparanda:** The tribal healer takes some water in a pot, puts a few fresh shoots of plant in it, chants some prayers by touching the water and sprinkles it over the cattle. Stem is placed over fire and ground along with coconut for making chutney. Stem and roots yield a fibrous material. The tender stems used to making curries.

60. ***Citrullus colocynthis*** (L.) Schrad. **(Cucurbitaceae) Methukkumkai**: In abnormal stomach bulging (tumor formation?) a fruit of the plant is sliced, fried with few drops of coconut oil and administered in empty stomach regularly for a month. The healer also chants several mantras, offerings to God, etc. which assists in curing the disease.

61. ***Clematis gouriana*** Roxb. **(Ranunculaceae) Nikadikodi, Cheerappu** : A decoction of whole plant along with *Eetty* and *Aame* prescribed for blood cancer. The fresh leaf juice is applied to cut wounds.

62. ***Clerodendrum phlomides*** L.f. **(Verbenaceae) Daggichedi:** Root paste used in the treatment of stomach disorder.

63. ***Clitoria ternatea*** L. **(Papilionaceae) Sangu pushpam: A** decoction of root bark is given as demulcent for relieving irritation of bladder and urethra. The seeds are powerful purgative. Flower paste used as external application to treat eye infections and also the whole plant as antidote for snake bite.

64. ***Coccinia grandis*** (L.) Voigt **(Cucurbitaceae) Tonde kodi**: A piece of the stem, about 6" in length is sliced and boiled in two glasses of water reduced to half. Administer the same in the morning time regularly for one month to reduce obesity.

65. ***Cochlospermum religiosum*** (L.) Alston **(Cochlospermceae) Murissichedi, Appakudukka**: The gum exuding from the cut bark is used to relieve coughs.

66. ***Cocos nucifera*** L. **(Arecaceae) Tenge maram :** Coconut milk used as refreshing agent at the time of vomiting and dysentry.

67. ***Commelina benghalensis*** L. **(Commelinaceae) Kaini, Kaine:** The leaf-paste is applied for the removal of sting of *Kulavi* insect[i] from the bite mouth. Root portion of this plant is collected, dried and powdered. One spoon powder is mixed in a glass of water and administered in the early morning to cure piles. This powder taken in a banana leaf is employed to push inwards the protruded portion of rectum, a stage of piles.

68. ***Commiphora caudata*** (Wight & Arn.) Engl. **(Burseraceae) Kiluva, Gulgulu:** A gum resin is extracted from the trunk is diuretic and antiseptic.

69. ***Coscinium fenestratum*** (Gaertn.) Colebr. **(Menisprmaceae) Maramanjal:** Stem paste applied to treat skin diseases

70. ***Costus speciosus*** (Koen.) Smith **(Zingiberaceae) Sullithandu**: The stem is pressed and the juice is dripped on the crown of head for relief from fever and shivering. Single application is normally advised.

71. ***Curculigo orchioides*** Gaertn. **(Amaryllidaceae) Nilappanai, Ponne ::** *Mudugas* apply the paste of rhizomes all over the body of children below three

years for increasing weight and improving health. The ground rhizomes are applied externally over insect stings regularly for three days. A piece of rhizome, about 2" in size is crushed, mixed with half a glass of milk and administered. This is said to be a strong anti-poisonous agent.

72. ***Cycas circinalis*** L. **(Cycadaceae) Eenthal maram**: A piece of bark is crushed and ground well along with a small piece of the root of *Erukku.* This mixture is applied externally over sides of forehead for curing migraine. Continuous application for prolonged days is not suggested. A piece of bark ground in water to make a paste is applied externally all over the body, one hour before bath for two continuous weeks. This is suggested to the ill-healthy and pale children to enhance vigour.

73. ***Cyclea peltata*** (Poir.) Hook.f. & Thoms. **(Menispermaceae) Kuruppa, Padathali:** A piece of root of about 6" in length is ground well, mixed in a glass of water, filtered and administered. A single dose is sufficient to cure stomach pain and blocks within the bowel. Leafy vines are tied over the waist portion of children for the same effect. Cleansing the stomach will soon result in excretion of urine and stool. Fresh rhizomes crushed in coconut oil, cured for at least one week, are applied on foot during jungle walk to repel leeches. Roots are also marketed.

74. ***Cymbopogon flexuosus*** (Nees et al Steud.) Wats. **(Poaceae) Teruve, Inchapullu**: Equal quantity of roots and leaves are ground well to a paste and applied externally on foot itches. This is applied during bedtime for one week.

75. ***Cynodon dactylon*** (L.) Pers. **(Poaceae) Arukam Pullu, Karuka**

76. ***Cyperus malaccensis*** Lam. **(Cyperaceae) Korei**: The basal portion is ground well into a paste and applied externally over swellings caused by scorpion sting. A decoction of a handful of chopped basal portion is prepared in two glasses of water and boiled to half, and administered thrice a day for three days.

77. ***Cyperus rotundus*** L. **(Cyperaceae) Muthangapullu:** The rhizomatous portion is dried, powdered and given to babies along with *Kore* powder for good health.

78. ***Dalbergia latifolia*** Roxb. **(Papilionaceae) Eetty**: Bark paste is wound healing

79. ***Dalbergia paniculata*** (Roxb.) Thoth. **(Papilionaceae) Boovare**, Paingani: Put a handful of leaves in a fireplace for some time, crush well and press on the crown

of head for some time. This causes the release of accumulated phlegm and gives relief from cold and giddiness. Used as firewood and also for making coffins among some clans of Irulas.

80. ***Datura metel*** L. **(Solanaceae) Ummam**: Take a fresh leaf, crush, cover it in a clean cloth and inhale through both nostrils three times. This has to be practiced in the early morning for getting relief from migraine.

81. ***Dendrocalamus strictus*** (Roxb.) Nees **(Poaceae) Moongil, Chooral** : Leaf paste applied on wounds to get easy healing.

82. ***Desmodium gangeticum*** (L.) DC. **(Papilionaceae) Ottele, Orila:** Sun dried leaves are powdered and mixed in coconut oil (a handful powder for 250 ml of oil), boiled to evaporate the moisture content and stored. This oil is smeared regularly over the body of children to cure itching and other similar skin troubles. Uprooted plants are bundled and marketed. The root juice used to check vomiting.

83. ***Desmodium triangulare*** (Retz.) Merr. **(Papilionaceae) Elumbu chedi** : Roots are collected, chopped, sundried and powdered in a wooden mortar. A handful of the powder is mixed in 250 ml of coconut oil and boiled to a specific maturation. This oil is applied regularly to the painful body parts, especially on the knee .

84. ***Desmodium triflorum*** (L.) DC. **(Papilionaceae) Nilappulise**: A handful of plant is collected and washed. It is ground well and applied to the body of infants for child cry. A wet cloth, after a long sleep of the child is used to wipe out the paste. The whole plant is made into a paste by grinding well with coconut oil. This is heated in a tumbler by adding salt and applied on the soles of feet to remove corns. Usually a three days application is required for getting complete recovery. The juice of the fresh plant is taken to check bleeding during pregnancy.

85. ***Desmodium triquetrum*** (L.) DC. **(Papilionaceae) Palemuttu chedi**: Fresh leaves are crushed, pressed and the juice applied over chest for suppressing pediatric asthma. This is to be practiced two times a day, for a period of one month.

86. ***Diospyros montana*** Roxb. **(Ebenaceae) Vakkana maram, Malayakathi**: Infusion of the fruit used as garge in sore throat

87. ***Dodonaea viscosa*** (L.) Jacq. **(Sapindaceae) Mantrachappu, Viraali** : Leaves are ground well with water and applied over lower abdomen to get relief from stomach obstruction. Wash off the paste after one hour.

88. ***Drynaria quercifolia*** (L.) J. Sm. **(Polipodiaceae) Kallothi**: To repel the evil spirits from the house, especially in the presence of infants, *Kungilyam* is smoked on the basal portion of *Kallothi* at evenings.

89. ***Dysoxylum malabaricum*** Bedd. **(Meliaceae) Vellagil**: Medicinally, decoction of the wood is used in the treatment rheumatism.

90. ***Eclipta prostrata*** (L.) L. **(Asteraceae)Kanjunni**: Whole plant is taken, crushed, boiled in coconut oil, filtered and applied on the scalp for a month regularly. This provides cooling effect, deep sleep and promotes hair growth. It also prevents premature greying of hair.

91. ***Eelusine coracana*** (L.) Gaertn. **(Poaceae) Kore**: Fruits are fried and powdered, mixed with coconut oil and applied over wounds for speedy healing. The wounds are not to be washed till they heal.

92. ***Elephantopus scaber*** L. **(Asteraceae) Anayadi**: Roots of a few plants are ground well along with equal quantity of onion. This paste is applied over Erysipelas (a kind of skin disease) seen in children, continuously for a week, two times a day. Leaf paste has wound healing property.

93. ***Eleusine indica*** (L.) Gaertn. **(Poaceae) Mudineetipullu**: Leaf paste boiled in oil and applied on scalp for increased hair growth.

94. ***Ensete superbum*** (Roxb.) Cheesm. **(Musaceae) Kalluvazha**: Seeds paste used in the treatment of kidney stone.

95. ***Entada rheedii*** Spreng. **(Papilionaceae)Onthatti, Kakkumvalli**: The seeds are collected from mature pods and washed in running water for seven days. The kernels of such seeds are boiled along with rice which cures back pain if consumed for a week. Crushed stem is tied over the head to relieve headache.

96. ***Entada scandens*** (L.) Benth. **(Mimosaceae) Kakkumvalli, Malamanchadi**: The juice extracted from the bark and wood is applied exernaly to relieve ulcers.

97. ***Equisetum ramosissimum*** subsp. ***debile*** (Roxb. ex Vaucher) Hanke **(Equisetaceae) Moottuppullu:** Dried shoots are powdered and applied over

wounds for speedy healing. For curing summer-boils fresh shoot paste is applied externally for three days.

98. ***Eucalyptus globulus*** Labil. **(Myrataceae) Eucaly:** Infusion of leaves is prescribed for ulcerations in mouth and throat. The dried leaves are used as tinture to treat asthma. Root used as purgative.

99. ***Euphorbia hirta*** L. **(Euphorbiaceae) Palepidrkku:** A whole of this and *Uppanamchedi* are ground well and mixed with one spoon of powder of *Athimaram* bark powder. This is administered during bed time for one week period to cure leucorrhoea. Latex is used in tattooing skin. Dip a needle in the latex make punctures (as dots) of required shapes on skin. Sprinkle charcoal powder on it and wipe after some time.

100. ***Euphorbia thymifolia*** L. **(Euphorbiaceae) Kalkeere**: If white portion of eyes is wounded, a shoot is plucked and the latex is carefully dripped from the cut end to the affected area. Single time application is suggested.

101. ***Evolvulus alsinoides*** (L.) L. **(Convolvulaceae) Vishnukkiranthi** : Shoots ground well along with garlic and applied during bedtime over Erysipelas of children. This has to be continued for about one month for total cure.

102. ***Ficus hispida*** L.f. **(Moraceae) Tunali**: Leaves are given to cattle along with the leaves of *Moongil* soon after delivery for the easy falling of placenta.

103. ***Ficus racemosa*** L. **(Moraceae) Athimaram**: Bark is used for curing leucorrhoea. A piece of bark, about 6 square inch size is collected and a decoction is prepared in two glasses of water reduced to half, which is administered in the morning and evening. The process is continued for one month (instead of fresh bark, dried bark powder can be used for the same purpose). Equal quantity of dried bark powder and *Nellikkai* mixed in honey is given twice a day for three weeks to anaemic patients to increase blood production. Half-mature fruits are used in culinary preparations.

104. ***Ficus religiosa*** L. **(Moraceae) Aale maram**: The ash of burned young shoots is mixed in gingelly oil and applied externally over scurf regularly until it cures. The same mixture is applied over bee stings to reduce inflammation and pain. The prop roots are cut into small pieces and boiled in coconut oil and applied over scalp regularly for enhancing hair growth.

105. ***Givotia moluccana*** (L.) Sreem **(Euphorbiaceae) Boothaali**: Bark is crushed, dried and powdered; one spoon of powder is mixed in one glass of water and administered in empty stomach at 6 AM, continuously for two weeks to cure bleeding piles.

106. ***Gloriosa superba*** L. **(Liliaceae) Kodan :** Leaves are used in the treatment of snakebite. The crushed leaves along with equal quantity of *Kevisi* leaves are crushed and applied externally over the bite, after removing the impure blood from the bite.

107. ***Glycosmis mauritiana*** (Lam.) Yuich. **(Rutaceae) Moolegili, Ulakodi**: Paste made of leaves is applied on the forehead for curing headache. The root paste applied externally for itches and skin troubles continuously for one-week for fast curing. Two root pieces are crushed and a decoction is prepared in one glass of water. Single administration of this cures stomachache. Root paste scooped with fore finger and administered for those who suffer from bronchial troubles. This is to be taken in the early morning and late evening for continuous ten days. Stem is cut to convenient size to make sticks for cattle rearing.

108. ***Gossipium barbadense*** L. **(Malvaceae) Paruthy:** During the last months of pregnancy a decoction of *Paruthy* roots is administered for 10 – 15 days, which promotes easy delivery. Take a handful of roots, chop, prepare a decoction in two glasses of water, boile and reduce it to half. This is administered (half portion) in the morning and the rest in the evening time.

109. ***Grewia laevigata*** Vahl **(Tiliaceae) Kalle:** Root paste is applied over pussy boils for its speedy maturation and breaking. Single time application during bedtime is suggested.

110. ***Grewia tiliifolia*** Vahl **(Tiliaceae) Lumman, Uluman, Unnam, Chadachi**: Phloem fibres crushed and applied over scalp regularly while taking bath is good for hair growth. This is also used as a scrubber for cleaning body, a substitute for soap.

111. ***Gymnema sylvestre*** (Retz.) R. Br. et al Roem. & Schult. in L. **(Asclepiadaceae) Sakkarekodi:** The leaves are dried in sunlight and powdered. Diabetic patients are advised to administer this regularly in empty stomach, mixing three pinches in half a glass of water.

112. ***Gynandropsis gynandra*** (L) Briq. **(Capparaceae) Velechedi**: To cure earache, apply two drops of leaf juice in each ear twice a day. Application for a single day is suggested.

113. ***Helicteres isora*** L. **(Sterculiaceae) Aviri, Kayoona, Idampirivalampiri, Kaypan**: A piece of bark is crushed, smeared in water and filtered. Put a piece of pebbles (*vellaramkallu*) in fire till its colour changes and immediately put it into this water. Remove the stone from the water allow it to cool and add crushed **Almond** nuts and garlic. Administer 10ml in the morning and evening for one month to cure diarrhoea, stomach disorders and vomiting sensation. Bark and root juice used to treat stomach disorder. The powdered fruit mixed with neem oil is used as massage oil for treatment of paralysis. The juice of the roots is used to treat diabetes, dog bite and snake bite. A paste from the leaves is used to treat skin ailments including eczema.

114. ***Hemidesmus indicus*** (L.) R. Br. **(Asclepiadaceae) Nannari**: The root made into a paste is applied externally, several times a day, for 10 days, over itches and similar skin problems in children. The root paste is used as a deodorant and applied externally. For stomach ulcer, the root paste is prepared with three leaves of *Elanthe* and a small piece of bark of *Kankonge* and administered in empty stomach regularly for three weeks in the morning.

115. ***Holarrhena antidysenterica*** (Roth) A. DC. **(Apocynaceae) Kudakapala:** Bark paste used to treat dysentry

116. ***Holostemma ada-kodien*** Schult. **(Asclepiadaceae) Paalkizhangu**: The ground roots are made to the size of a gooseberry, and mixed with water and taken twice a day for three days for curing stomach pain.

117. ***Homonoia riparia*** Lour. **(Euphorbiaceae) Gudavanchi**: The roots are used to cure urinary colics. A decoction made with crushed roots is given internally at early morning and bedtime to the patient for a month. Two glasses of water with the roots and reduced to one, is boiled, which is taken twice daily.

118. ***Hyptis suaveolens*** (L.) Poit. **(Lamiaceae) Thrijada:** A handful of leaves are boiled in 100 ml coconut oil, filtered and smeared against itches in children. The leaves are dried and powdered, and a spoon of this is added in 1 glass of water and a decoction is made. Thus decoction is a pediatric medicine for fever.

119. ***Indigofera linnaei*** Ali **(Papilionaceae) Nandenganni, Cherupullate**: The whole plant is ground into a paste (a gooseberry-size) and is mixed in hot water and administered for a single time. It cures swelling and other problems related to rat bite. The patient should not take bath on the treatment day. For indigestion and stomach obstruction in cattle exhibited by giddiness, reluctance in feeding etc, a handful of roots (10- 15 plants) ground with ¼ quantity of cumin is administered for single time. Juice of the plant is used as an eyedrop to treat migraine. A decoction of the plant is used to treat epilepsy and insanity. The whole plant mixed with garlic, is used as an oral contraceptive belived to induce permanent sterlity in women. The plant is boiled in oil and applied to relieve burns.

120. ***Jatropha curcas*** L. **(Euphorbiaceae) Tonde maram:** Young shoots are used as toothbrush; regular use removes stains on tooth and cures toothache.

121. ***Justicia tranquebariensis*** L.f. **(Acanthaceae) Uppanamchedi, Ganinch**: Leaves are ground, diluted in water and filtered. A piece of cloth dipped in it is placed over eyelids for conjunctivitis. This is repeated several times a day and continued for three days. To cure pain and inflammation of eyes, leafy shoots are collected, washed in water, ground well to a paste and applied around eyes at bedtime. If necessary, the treatment maybe continued for three days.

122. ***Lawsonia inermis*** L. **(Lythraceae) Mailanchi:** The powdered seeds are used as antifertility agent in women. Leaf paste is applied externally to treat skin diseases.

123. ***Leptadenia reticulata*** (Retz.) Wight & Arn. **(Asclepiadaceae) Pale dagu**: Fresh leaves are sliced, fried in coconut oil, sprinkled with common salt and administered continuously for one month, exudates of leaves during midday meals, cures back-pain. The leaf juice when used as a nasal drops causes sneezing and cures cold.

124. ***Limonia acidissima*** L. **(Rutaceae) Vilamaram, Vlathi:** Fruits antiscorbutic

125. ***Luffa cylindrica*** (L.) Roem **(Cucurbitaceae) Peechil**: Leaves and roots, about 5g each are taken along with a spoon of *Parisu* bark powder, boiled in milk and administered at early morning for 21 days cures difficulty in breathing.

126. ***Mallotus philippensis*** (Lam.) Muell.-Arg. **(Euphorbiaceae) Kathivettimaram**: A handful of leaves is made into a paste and applied externally over the body one hour before bath while a small portion, 3-4 pinches, is mixed in hot water and administered during four menstrual days which helps the women to induce pregnancy during the next ovulation period.

127. ***Mangifera indica*** L. **(Anacardiaceae) Mave maram**: A decoction of the bark is prepared along with a pinch of cumin seeds and administered for Asthma and related bronchial troubles. It is instructed to take fresh bark pieces from tall trees growing along a river. A course of 21 days is prescribed, according to severity. Bark paste used to brush teeth to prevent toothache.

128. ***Mimosa pudica*** L. **(Mimosaceae) Thottavadi**: A paste of the leaves is applied to relieve glandular swelling.

129. *Mimusops elengi* L. **(Sapotaceae) Poothilangi**: A snuff made from the dried flowers induces copious defluxion from the nose and cures headache and pains.

130. ***Momordica charantia*** **L. (Cucurbitaceae) Kattukaippa**: To expel worms and cure fever in children - about ten leaves are crushed along with a pinch of cumin seeds and boiled in a glass of water,reduced to half and consumed two times a day for two consecutive days gives relief from worms.

131. ***Moringa pterygosperma*** Gaertn. **(Moringaceae) Moringa maram**: Fresh bark is crushed and a decoction is prepared which is given to reduce obesity. 6 sq.inch of bark is crushed and boiled in two glasses of water, reduced to half and administered equally in morning and evening. Treatment is suggested for one month.

132. ***Mucuna pruriens*** (L.) DC. **(Papilionaceae) Poonaikalikodi, Keviri, Naikoranakodi**: The pieces of root are ground well in water and applied externally one hour before bath continuously for 10 days for extra health and vigour. Seed kernel is good remedy for general weakness. A strong infusion mixed with honey is used to treat Cholera. The leaves are applied in the form of paste to relieve ulcers.

133. ***Mukia maderaspatana*** (L.) M. Roem. **(Cucurbitaceae) Siluppiri:** When digestive block is observed in children, put some leaves in a fireplace for a few seconds, press out the juice and give a few drops with honey.

134. ***Murraya koenigii*** (L.) Spreng. **(Rutaceae) Kariveppe maram**: Leaves are fried and powdered. Half a spoon of this powder is mixed in honey and given occassionally in empty stomach in the morning, for getting relief from cough.

135. ***Musa paradisiaca*** L. **(Musaceae) Vazha:** Juice obtained from the petiole and stem is applied to scalp of the head to prevent dandruff

136. ***Mussaenda frondosa*** L. **(Rubiaceae) Vellalume, Amma karuthathu molu veluthathu:** Leaf juice is used as poultice for dandruff. It is also used for eye diseases. Leaf paste is used for washing heir. A decoction of root is given against white leprosy.

137. ***Naravelia zeylanica*** (L.) DC. **(Ranunculaceae) Valiyanikadikodi, Thalachithari, Erivalli, Vathamkodi:** Pieces of roots are crushed with onion and inhaled through a cloth piece. Repeat after a short interval, to reduce sneezing. Helps to expel out phlegm and cleanse the lungs. The leaves are boiled partially and wrapped on the knee joint to reduce rheumatic pain. A thin layer of aquous root paste is applied on the neck region three times a day for curing whooping cough. Stem paste is applied on forehead to treat headache and also crushed stem tied around the forehead to treat headache.

138. ***Naringi crenulata*** (Roxb.) Nicol. **(Rutaceae) Ezhilavila, Nilanarakam:** Fresh and dry leaves are smoked around the dwelling area to repel insects. Wood of pole size is used as pillars in hut constrction.

139. ***Ocimum americanum*** L. **(Lamiaceae) Sirutulasi :** Crushed leavesare boiled in water and inhaled to treat fever and headache.

140. ***Ocimum basilicum*** L. **(Lamiaceae) Rama thulasi:** Crush and eat 4-5 shoots daily, continuously for three months, in the morning and evening to treat venenal diseases.

141. ***Ocimum gratissimum*** L. **(Lamiaceae) Rama thulasi**: Whole plant is ground and gently smeared all over the body for curing fever and drowsiness in children. Rub out the paste with a cloth piece after one hour.

142. ***Ocimum tenuiflorum*** L. **(Lamiaceae) Tulasi**: Leaf paste is applied regularly over itches for easy curing. In asthma and similar breathing troubles administer 2-3 leafy shoots regularly in the morning

143. ***Olea dioica*** Roxb. **(Oleaceae) Edana**: Bark juice used in skin infections

144. ***Opuntia striata*** Haw. var. ***dillenii*** (Ker-Gawl.) L. **(Cactaceae) Kallichedi**: A lump of clay is taken in which some latex of this plant is dripped. This is mixed up with water and applied over muscular sprains. While getting dried, water is sprinkled over this for three hours and then washed.

145. ***Parahemionitis cordata*** (Roxb. *et al* Hook. Grev.) Fraser- Jenk. **(Hemionitidaceae) Periya kallu pasai:** An aquous paste is prepared with the tender shoots along with *Periya kallu pase* and applied externally during bed time over the reddish boils appearing on the skin of infants / babies. Application may be required for three days for complete cure.

146. ***Passiflora foetida*** L. **(Passifloraceae) Pottari:** The ripe fruits are edible, which are largely consumed by shepherd children.

147. ***Pentanema indicum*** (L.) Ling **(Asteraceae) Suryachakram:** The paste from leaves is applied on the forehead of children to subside head ache and giddiness due to cold.

148. ***Pergularia daemia*** (Forsk.) Chiov **(Asclepiadaceae) Velipparuthy**: The latex is applied over scorpion bite to allay pain and inflammation. Leaves are crushed and 5-6 drops of the juice mixed with one tablespoon of honey in a single dose.It is administered to cure cough and fever of children. Tender leaves are fried in coconut oil with pieces of onion and administered regularly for one month to a person suffering from epilepsy. Fresh leaves collected and wrapped in a cloth are used as a pillow to get sound sleep in the night.

149. ***Phyllanthus amarus*** Schum. *et* Thonn. **(Euphorbiaceae) Sirunelli**: The whole plant is ground well to gooseberry-size and administered in goat's milk for seven consequent days twice daily to cure jaundice. In some cases tender leaves of castor are also added. Another method: grind well the whole plant, roll to small beads and dry in sunlight. Two tablets powdered, and mixed with honey to be administered twice daily. Use of oil is restricted during the treatment period.

150. ***Phyllanthus emblica*** L. **(Euphorbiaceae) Nelli:** The bark crushed and applied as poultice over fractures in goat or calf and wrapped tightly by a cloth piece immersed in Gingili oil. Keep the animal stall-fed for 21 days for the reunion of bones. Fresh fruits are collected and marketed. Fruits are edible, available during September- December. They are consumed fresh or pickled.

151. ***Piper longum*** L. **(Piperaceae) Thippili**: Crush the root and leaves along with a leaf of *Goppampale,* garlic and two black pepper grains and make it into a paste. Apply the paste on decayed tooth, twice or thrice a day for three days.

152. ***Pithecellobium dulce*** (Roxb.) Benth. **(Mimosaceae) Kodukkaapuli :** The leaves are used as abortifacient

153. ***Pongamia pinnata*** (L.) Pierre **(Pailionaceae) Ponga maram:** Seeds ground well with a pinch of the ash obtained from burnt branches of *Tamarindus* is applied over inflammatory or other types of abscissions. Apply during bedtime, and the swelling will mature and break by midnight.

154. ***Protasparagus racemosus*** (Willd.) Oberm. **(Liliaceae) Chedichal, Tinampori , Chatavalli**: Apply the leaf paste externally for speedy healing of deep wounds. From the fresh tuber collected, a piece of about 10" size is washed in water and its skin and central fibres removed. Further it is made into a paste and administered two times daily for curing heart burn. Continue this for three days. For patients suffering from urinary infection the whole plant is sun-dried and powdered, two teaspoons of this powder is boiled in a glass of goat milk and reduced to half, filtered and administered once a day for seven days.

155. ***Pseudarthria viscida*** (L.) Wight et Arn. **(Papilionaceae) Moovela:** The tender leaves are fried in coconut oil and eaten along with meals twice a day for increased lactation. This is practiced when lactation is not adequate.

156. ***Psidium guajava*** L. **(Myratacea) Pera:** The leaves are used externally to treat wounds. The young leaves are used as a tonic to treat diseases of the digestive system. The pounded tender leaves with ginger, honey and water are used to treat bleeding piles. A decoction of leaves is used as a gargle to relieve toothache and gum boils.

157. ***Pterocarpus marsupium*** Roxb. **(Papilionaceae) Chora vengha, Karinthakara**: The heartwood is used for the treatment of skin diseases. A cold aqueous extract of the wood is used for diabetes.

158. ***Pterocarpus santalinus*** L.f. **(Papilionaceae) Raktachandanam**: The heartwood is used for the treatment of skin diseases. Wood paste is used to treat toothache.

159. ***Rauvolfia serpentina*** (L.) Benth. *et al* Kurz **(Apocynaceae) Amalpori:** Plants uprooted and the root portion used in the treatment of snakebite, stomach disorder etc.

160. ***Ricinus communis*** L. **(Euphorbiaceae) Kotte:** Oil extracted from the seeds is applied over the belly area during the last period of pregnancy and also after delivery to protect the skin from stretching and contracting. This oil is applied externally to babies before bath to improve the health of the skin.

161. ***Rubia cordifolia*** L. **(Rubiaceae) Mullukkodi, Sivalikkodi, Manchati** : To cure the reddish patches appearing on the skin of infants, a small piece of root is ground well in water and smeared all over the body for three continuous days. Taking bath is not suggested during the treatment period. Wipe off the paste using a wet cloth piece after one hour.

162. ***Sansevieria roxburghiana*** Schult. et Schult. **(Agavaceae) Sarpakkathale :** The basal portion of the plant is crushed and applied as a paste over snake bite. This treatment requires support of spirits. Further the leaves are immersed in water for retting. The fine quality fibres are extracted by beating the decaed leaves used in odd jobs

163. ***Santalum album*** L. **(Santalaceae) Sandanam:** Grind well the heart wood to get a quarter protion of the size of a gooseberry, mix it with the root paste of *Mulegili* diluted in half glass of water and taken two times a day for curing all types of fever.

164. ***Schumannianthus virgatus*** (Roxb.) Rolfe **(Marantaceae) Kaattukoove**: Rhizome paste is applied externally to the children who have difficulty in walking. This application strengthens legs when used regularly for long periods, depending upon the severity of problem the treatment can continue.

165. ***Scoparia dulcis*** L. **(Scrophulariaceae) Meenamkannichedi**: To get relief from excessive heat in summer, apply the paste of the whole plant over the head and forehead. Sprinkle water when the paste is dried and wash well after one hour. The paste when applied externally (one hour before bath) for three continuous days,cures summer boils.

166. ***Selaginella delicatula*** (Desv. *et al.* Poir.) Alston **(Selaginellaceae) Kuruvevannasappu:** The whole plant is ground with *sirupeelichedi* and a

decoction is made and administered half a glass each in the morning and evening for three weeks to subside/cure the disease characterised by small protuberance on the skin.

167. ***Senna occidentalis*** (L.) Link **(Caesalpiniaceae) Kokkirichedi:** Roots ground well and applied on the scorpion bite area, soon after the incident to allay poison. Leaves are fried, powdered, applied regularly over burn scars to regain pigmentation. Regular use of this cures Leucoderma.

168. ***Senna tora*** (L.) Roxb. **(Caesalpiniaceae) Dagare :** Fresh roots are ground well to the size of a gooseberry ands administered in empty stomach for three days for curing constipation. This application is also prescribed for pain in the lower abdomen, caused by taking impure food. A decoction of roots is suggested for those suffering from heart problems. Intake of the medicine prepared with one plant's root per day, for a course of one week is said to allay chest pain.

169. ***Sida acuta*** Burm.f. **(Malvaceae) Cheruparu**: The leaves warmed and moistened with sesame seed oil are used to hasten suppuration. The crushed leaves are applied externally to promote healing of bone fracture.

170. ***Sida cordata*** (Burm.f.) Borssum **(Malvaceae) Kurunthotti**: Pounded leaves are applied locally to relieve cuts and bruises.

171. ***Sida rhombifolia*** Borssum **(Malvaceae) Kurunthotti**: The whole plant body is used in the treatment of pulmonary tuberculosis and rheumatism

172. ***Smilax zeylanica*** L. **(Smilaxaceae) Kareelanchi :** Leaf paste is applied to treat rheumatic pain

173. ***Solanum incanum*** L. **(Solanaceae) Gullavatane:** Fresh roots smeared or smelled by the hunting dogs increases their smelling ability.

174. ***Spermacoce hispida*** L. **(Rubiaceae) Peelichedi:** Two plants are crushed and a decoction is prepared in one glass of water, reduced to half. Administer it in the morning in empty stomach. Repeat this for continuous three days against general debility. A decoction of a whole plant along with a handful of *Kuruvevannasappa* is administered in empty stomach for one month is advised for the disease with symptoms of gradually increasing excrescence on skin.

175. ***Sterculia guttata*** Roxb. **(Sterculiaceae) Anjankam, Achangam, Pottakavalam**: A decoction is made by crushing piece of bark with half the

quantity of leaves of *Sida acuta,* root of *Vigna radiata* and leaves of sweet potato. About 50ml of this is administered to the women before delivery to avoid complications. Seeds largely available during summer months are roasted with salt and eaten.

176. ***Streblus asper*** Lour. **(Moraceae) Paruva:** Decoction of the bark is used against dysentery and diarrhoea.

177. ***Strychnos nux-vomica*** L. **(Loganiaceae) Itty, Kanjiram:** A paste of the pulp of ripe fruits is applied over a particular kind of skin disease (like psoriasis). A paste of the bark is smeared several times externally to the body parts to cure pain.

178. ***Syzygium aromaticum*** (L.) Merr. & Perry **(Myrataceae) Karayamboo:** Unopened flower buds are kept under the decaying teeth to treat toothache.

179. ***Syzygium cumini*** (L.) Skeels **(Myrataceae) Naave, Kattunjaval:** The leaf juice is used to treat dysentery. The fruit juice is used as carminative and diuretic and stomachic in the treatment of chronic diarrhoea and spleen enlargement.

180. ***Tamarindus indica*** L. **(Caesalpiniaceae) Puli, Valanpuli**: The infusion of the fruit pulp is used as gargle to relieve sore throat.Seeds pounded with water applied to the crown of the head to relax the uvula.

181. ***Tectona grandis*** L. **(Verbenaceae) Thekku**: Young leaf paste is applied for ring worm infection.

182. ***Tephrosia purpurea*** (L.) Pers. **(Papilionaceae) Kolingi, Kalakomban**: The crushed roots are chewed for toothache. When constipation appears or when stomach is upset, roots of a single plant is freshly collected, ground well and boiled in goat milk and administered twice a day. The whole plant is crushed and boiled in water and cooled. This water is used to wash hair and scalp during bath, regularly for one month reduces premature graying of hair. To cure inflammations and swellings, the leaf paste is applied at bedtime and left over night. It is repeated for three days. When stomach bulging associated with horripilation and reluctance in feeding is observed in cattle, roots of two mature plants are ground with a piece of garlic and half a handful of cumin seeds and administered for three consecutive days.

183. ***Terminalia chebula*** Retz. **(Combretaceae) Kadukkai :** Dried fruits are crushed and put it in a handful of coconut oil along with two pinches of *dammer*. Heat this mixture for a while and smear for rheumatic pain in legs.

184. ***Terminalia cuneata*** Roth **(Combretaceae) Mathi maram**: Leaves crushed and applied regularly in the scalp during bath removes dandruff. Bark pieces crushed and tied with a cloth on the lower abdomen cures stomach upset.

185. ***Thespesia lampas*** (Cav.) Dalz.& Gibs. **(Malvaceae) Kolukkatta, Kattuparuthi**: For curing jaundice, the roots are ground well and administered in a gooseberry-size in goat milk, twice daily in empty stomach for 7 days continuously.

186. ***Thespesia populnea*** (L.) Sol. **(Malvaceae) Poovarassu, Chilanthi**: A decoction of the fruits is considered an antidote for poisoning.

187. ***Thottea siliquosa*** (Lam.) Ding Hou. **(Aristolochiaceae) Peele**: A decoction of roots for a course of 21 days is prescribed for epilepsy. The tribal healer medicates the drug by chanting some mantras and gives it to the patient every day. Three pinches of crushed roots, boiled in one glass of water, reduced it to half is administered in the morning. For curing body pain and joint pain, a bath in lukewarm water medicated by boiling some crushed roots is advised for seven days.

188. ***Tinospora sinensis*** (Lour.) Merr. **(Menispermaceae) Chittamruthu:** Crushed stem is boiled in oil and used as hair oil to treat migraine.

189. ***Toddalia asiatica*** (L.) Lam.**(Rutaceae) Erigunge, Kara**: Grind fresh roots well and make a solution in water. This is administered for severe stomach pain caused by indigestion. Single time application is suggested. For cold and fever apply the leaf paste all over the body for immediate relief. Wipe out this after two hours. Taking bath is not advised during the treatment. Chew and slowly eat small pieces of roots regularly for curing mouth and stomach ulcers, gas formation etc. Fruits are used for preparing pickles. A yellow dye is obtained from roots.

190. ***Tragia involucrata*** L. **(Euphorbiaceae) Kodithoove:** Medicated oil is prepared by adding the crushed root of a mature plant in 100 ml. of coconut oil and

boiled. This oil is applied on the forehead and scalp during early morning to cure migraine.

191. ***Tridax procumbens*** L. **(Asteraceae) Adatodappan chedi, Pukavetti, Thalapokki**: The juice of crushed leaves is mixed with a pinch of lime and made into a paste applied over wounds for fast healing. Leaf juice very good remedy for eye diseases.
192. ***Urena lobata*** L. **(Malvaceae) Uthiram, Uran**: A poultice of the tender leaves is used to promote the healing of wounds.
193. ***Urena sinuata*** L. **(Malvaceae) Uran**: Infusion of the flowers is used to treat bronchitis
194. ***Vateria indica*** L. **(Dipterocarpaceae) Vellappantham, Vellaapayin:** Resin is used to treat throat troubles
195. ***Vernonia divergens*** (Roxb.) Edgew **(Asteraceae) Puthagane, Ambukane, Muyalchevian**: A handful of leaves are taken, ground well with 2-3 pinches of cumin seeds and administered for curing indigestion and stomach pain. Two dosages in a single day are generally suggested.
196. ***Vigna radiata*** (L.) Wilezek. **(Papilionaceae) Kallevelukkara chedi**: For curing severe toothache, chew the root nodules after gargling with lukewarm salt water. In case of inflammation on chin or jaw, apply externally the leaf juice of *Ummam* mixed with a pinch of common salt several times.
197. ***Vitex altissima*** L. f. **(Verbenaceae) Mayila:** Bark juice is used externally to relieve rheumatic swellings and chest pain.
198. ***Wattakaka volubilis*** (L.f.) Stapf **(Asclepiadaceae) Palekodi**: Fresh leaves collected and wrapped in a cloth are used as a pillow to get sound sleep in the night.
199. ***Wrightia tinctoria*** (Roxb.) R. Br. **(Apocynaceae) Goppampale, Dhanthapala:** Leaf paste is remedy for every kind of skin disesases.
200. ***Zingiber officinale*** Rosc. **(Zingiberaceae) Chuku:** A decoction of wild pepper and dried ginger is used for cold.
201. ***Zingiber zerumbet*** Zm. **(Zingiberaceae) Kattinji:** A decoction of rhizome with pepper and cumin seeds is used as a remedy for fever.

202. ***Ziziphus oenoplia*** (L.) Mill. **(Rhamnaceae) Mullanpazham, Thodali**: Bark paste is used to cure wounds.

203. ***Ziziphus rugosa*** Lam. **(Rhamnaceae) Ungatte, Vanthodali**: Leaf paste is applied on the knee joints in rheumatic pain half an hour before bath.

4.2 FODDER AND FORAGE PLANTS

The fodder and forage plants collected from both the districts are given as follows.

1. ***Acacia leucophloea*** (Roxb.) Willd. **(Mimosaceae) Vellavel** : The leaves are given as fodder to sheep and goats.
2. ***Acacia nilotica*** L. **(Mimosaceae) Karivel** : Sheeps and goats are voracious eaters of leaves and pods
3. ***Bauhinia purpurea*** L. **(Ceasalpiniaceae) Mandaram**: It is good fodder species.
4. ***Bombax ceiba*** L. **(Bombacaceae) Ilavu**: The seeds are given to the cattle as a substitute for cotton seed.
5. ***Clerodendrum phlomides*** L. f. **(Verbenaceae) Daggichedi**: The leafy shoots are used to feed goats.
6. ***Cynodon dactylon*** (L.) Pers. **(Poaceae) Karuka**: It is a perennial grass and is used as fodder.
7. ***Dalbergia latifolia*** Roxb. **(Fabaceae) Veeti**: Cattle greedly browse the young plants and some times big trees are lopped for fodder.
8. ***Eleusine indica*** (L.) Gaertn. **(Poaceae) Mudineetipullu**: It is a good fodder.
9. ***Ficus religiosa*** L. **(Moraceae) Aal**: Leaves and twigs are lopped for cattle feed.
10. ***Gmelina arborea*** L. **(Verbenaceae) Kumizhu**: wild animal greedily browse the young plants. Leaves and twigs are lopped for fodder to cattle.
11. ***Grewia tiliaefolia*** Vahl **(Tiliaceae) Chadachi** : Leaves and twigs are lopped for fodder.
12. ***Helicteres isora*** L. **(Sterculiaceae) Kayoona, Idampirivalampiri**: Leaves are used as fodder.

13. ***Hetropogon contortus*** (L.) Beauv. **(Poaceae) Pullu**: When it is young it is considered to be a fairly good fodder for cattle.
14. ***Holoptelia integrifolia*** Planch. **(Ulmaceae) Aval**: The leaves and young fruits are eaten though not relished by livestock.
15. ***Ichnocarpus frutescens*** (L.) R. Br. **(Apocynaceae)** : The leaves are used to feed goats.
16. ***Kydia calycina*** Roxb. **(Malvaceae)** : The tree is valued for the leaves which are lopped for fodder.
17. ***Mucuna pruriens*** (L.) DC. **(Fabaceae) Poonaikalikodi**: Seeds are used as fodder
18. ***Panicum antidotale*** Retz. **(Poaceae):** Very good fodder grass
19. ***Panicum sumatrense*** Roth et al Roem. et Schult. **(Poaceae) Saame**: Very good fodder grass and cultivated for cereals.
20. ***Paspalum ancyclocarpum*** Nees et Steud. **(Poaceae)** : Used as fodder grass
21. ***Paspalum scrobiculatum*** L. **(Poaceae) Varagu**: Very good fodder grass and cultivated for cereals.
22. **Pennisetum americanum** (L.) Leeke. **(Poaceae) Kambum**: Very good fodder grass and cultivated for cereals.
23. ***Pennisetum nervosum*** Trin. **(Poaceae)** : Good fodder grass
24. ***Pterocarpus marsupium*** Roxb. **(Fabaceae) Choravenga** : The leaves make an excellent fodder
25. ***Schleichera oleosa*** (Lour.) Oken **(Sapindaceae) Poovam** : Young shoots are lopped for fodder.
26. ***Sorghum bicolor*** (L.) Moench. **(Poaceae) Kambacholam** : Very good fodder grass and cultivated for cereals.
27. ***Sporobolus diantherr*** (Retz.) Beauv. **(Poaceae)** : It is a favorable food for cattle
28. ***Syzygium cumini*** (L.) Skeels **(Myrtaceae) Njaval**: The leaves form palatable fodder for cattle, sheep and goats. The seeds are used as feed for the live-stock.
29. ***Themeda triandra*** Forsk. **(Poaceae)** : The grass is valuable fodder before flowering and is largely used for hay. It is nutritious and relished by cattle.
30. ***Trema orientalis*** Blume **(Ulmaceae) Aamapetty**: Leaves are lopped for fodder and the plant is often planted for this purpose.

31. ***Zea mays*** L. **(Poaceae) Makkacholam** : Very good fodder grass and cultivated for cereals.

4.3 FOOD PLANTS

Wild edible plants are important in the livelihood strategies of forest dwellers/tribal populations. While these foods are not widely accessible, locally they are of great relevance for nutrition and food security. In many situations, wild foods are not dietary staples. More generally they provide nutritionally valuable supplements in the form of ingredients, vegetables and beverages. They also meet several traditional dietary needs of different tribal groups. *Trichopus zeylanicus* ssp. *travancoricus* used by the Kani tribe of Kerala epitomizes the relevance of ethnobotanical research and from this plant scientists formulated a health drink known as Jeevani (Nandanakunjidam, 2003).

1. ***Acacia nilotica*** (L.) Delile **(Mimosaceae) Karivelam**: Seeds roasted with salt and eaten
2. ***Acacia sinuata*** (Lour.) Merr. **(Mimosaceae)Cheevakay**: Seeds roasted with salt and eaten
3. ***Acalypha fruticosa*** Forssk. **(Euphorbiaceae) Kuppameni:** Used as leafy vegetable
4. ***Adenanthera pavonia*** L. **(Mimosaceae) Manchadi:** Seeds are eaten raw and also roasted
5. ***Aegle marmelos*** Corr. **(Rutaceae) Koovalam:** Fruit pulp edible
6. ***Ailanthus triphysa*** (Dennst.) Alston **(Simaroubaceae) Matti, Mattipal, Pongalliyam**: The fruits are edible
7. ***Alangium salvifolium*** (L.f) Wang. **(Alangiaceae) Ankolam**: The fruits are edible
8. ***Alternanthera sessilis*** (L.) R.Br. **(Amaranthaceae) Kozhuppacheera:** Used as leafy vegetable
9. ***Amaranthus caudatus*** L. **(Amaranthaceae) Porikeere :** Cultivated for its seeds. Seeds roasted, mixed with honey and be eaten. As a ritual this is

eaten after the fasting on 'Sivarathri' day. This is a very nutritious and tasty food.

10. ***Amaranthus spinosus*** L. **(Amarantacea) Mullukkeere :** Young shoots are consumed as a vegetable.
11. ***Amaranthus viridis*** L. **(Amarantaceae) Keere:** Tender leafy shoots are used as a vegetable.
12. ***Amorphophallus paeonifolius*** (Dennst) Nicol. **(Araceae) Kattuchena:** Rhizome cleaned cooked with salt, turmeric, pepper and tamarind and made into curry.
13. ***Anacardium occidentale*** L. **(Anacardiaceae) Kasumav:** Nuts and fleshy false fruits are edible
14. ***Antidesma montanum*** Blume **(Stilaginaceae) Karinelli:** The fruits are edible
15. ***Artocarpus hetrophyllus*** Lamk. **(Moraceae) Chakkapilavu:** Green fruits and seeds used as vegetable. Ripen fruits relished widely. Seeds are eaten after roasted or baked.
16. ***Artocarpus hirsutus*** Lamk. **(Moraceae) Anjili, Ayini :**Ripen fruits relished widely. Seeds are eaten after roasted or baked.
17. ***Baccaurea courtallensis*** (Wight) Muell.-Arg. **(Euphorbiaceae) Uvane**: Fruits edible
18. ***Bambusa arundinacea*** (Retz.) Roxb. **(Poaceae) Moongil, Illi, Mula:**. The grains are collected and stocked which provides a substitute for rice and is a gourmet's delight. Young shoots and rhizome used as vegetable.
19. ***Bambusa bambos*** (L.) Voss. **(Poaceae) Illi, Moongil :** The grains are collected and stocked which provides a substitute for rice and is a gourmet's delight. Young shoots and rhizome used as vegetable.
20. ***Boerhavia chinensis*** (L.) Asch.& Schweinf. **(Nyctaginaceae) Thazhuthama:** Used as leafy vegetable
21. ***Bombax ceiba*** L. **(Bombacaceae) Mullilavu, Mullupoola:** The flowers are edible.
22. ***Bridelia retusa*** Spreng. **(Euphorbiacea) Mullu gonge:** Fruits edible

23. ***Buchanania lanzan*** Spreng. **(Anacardiaceae) Murasi:** Fruit edible when ripe, usually consumed by children of shepherds.The tender stems are used for making curries.

24. ***Cajanus cajan*** (L.) Mills. **(Papilionaceae) Tumare, Thuvara:** Cultivated for seeds; threshed, sun dried and consumed. This is one of the major sources of income for all the tribals in Attappady.

25. ***Calamus rotang*** L. **(Arecaceae) Cheruchooral**: The fruits and seeds are edible

26. ***Canthium rheedei*** DC. **(Rubiaceae) Malamkara:** The fruits are edible

27. ***Cardiospermum helicacabum*** L. **(Sapindaceae) Pokkanam thooki, Uzhinja:** Used as leafy vegetable

28. ***Caryota urens*** L. **(Arecaceae) Anappana:** Stem yields starch used to make flour. Cakes etc.

29. ***Cassia obtusifolia*** L. **(Caesalpiniaceae) Thakara**: The young and tender leaves and stems and unripe pods are eaten as a vegetable. The powdered, roasted seeds can be used as substitute for coffee.

30. ***Cassia occidentalis*** L. **(Caesalpiniaceae) Kondai, Konna**: Leaves and flowers are used as vegetable

31. ***Centella asiatica*** (L.) Urban **(Apiaceae) Kodangal:**: Leaves and flowers are used as vegetable

32. ***Celosia argentea*** L. **(Amaranthaceae) Keere:** Tender shoots and leaves are used as vegetable in the preparation of dishes.

33. ***Celosia polygonoides*** Retz. **(Amaranthaceae) Teyyakkeere:** A leafy vegetable, used for preparing dishes along with *Tumare.*

34. ***Cissus quadrangularis*** L. **(Vitaceae) Narale, Changalamparanda:** The Stem is placed over fire and ground along with coconut for making chutney.

35. ***Citrus aurantifolia*** (Christm, & Panz.) Swingle **(Rutaceae) Eemby sedi :** Cultivated for the fruits. Mature fruits are collected and sold in the market.

36. ***Clausena austroindica*** Stone & Nair **(Rutaceae) Karampe:** Fruits are edible when ripe and mostly consumed by shepherd children.

37. ***Cleome monophylla*** L. **(Capparaceae) Kattukaduku:** Used as leafy vegetable

38. ***Cleome viscosa*** L. **(Capparaceae) Kattukaduku:** Used as leafy vegetable

39. ***Coccinia grandis*** (L.) Voigt **(Cucurbitaceae) Koval** : Cultivated for green fruits

40. ***Cochlospermum religiosum*** (L.) Alston **(Cochlospermaceae) Appakudukka:** Used as leafy vegetable

41. ***Colocasia esculenta*** (L.) Schott **(Araceae) Kattuchembu:** Tubers and petiole used as vegetable

42. ***Commelina benghalensis*** L. **(Commelinaceae) Kaini, Kaine :** The leaves of *Kaine* are used as a vegetable.

43. ***Costus speciosus*** (Koenig) Sm. **(Zingiberaceae) Channakoova:** Rhizome yields starch and stem used as vegetable.

44. ***Cullenia exarillata*** Robyns **(Bombacaceae) Thengimaram, Vedipilavu, Kurangan pilavu, Mullan pilavu:** Fruits are edible. Seeds are roasted and eaten as food. The lightwood is using as plywood.

45. ***Curculigo orchioides*** Gaertn. **(Amaryllidaceae) Nilapana**: Rhizome used as vegetable

46. ***Curcuma neilgherrensis*** Wt. **(Zingiberaceae) Manjakoova:** Rhizome yields starch used to make cakes, sweets etc

47. ***Cycas circinalis*** L. **(Cycadaceae) Eanthal:** Endosperm scooped out, powdered and placed in water over-night to remove harmful substances and poured off water and sundried the powder which is used to prepare cakes, dishes etc.

48. ***Dendrocalamus strictus*** (Roxb.) Nees **(Poaceae) Moongil, Chooral:** Grains are edible

49. ***Dioscorea bulbifera*** L. **(Dioscoreaceae) Kattukizhangu, Chavalkizhangu:** This is an edible tuber.

50. ***Dioscorea hispida*** Dennst. **(Dioscoreaceae) Chavalkizhangu:** This is an edible tuber.

51. ***Dioscorea oppositifolia*** L. **(Dioscoreaceae) Reyyakizhangu , Chavalkizhangu:** This is an edible tuber.

52. ***Dioscorea pentaphylla*** L. **(Dioscoreacea) Nooran kizhangu:** Tubers are edible. They are either baked or cooked.

53. ***Dioscorea tomentosa*** J. Koenig ex Spreng. **(Dioscoreaceae) Jaalekizhangu:** Tubers are edible, contains more fibre.

54. ***Diospyros malabarica*** (Desr.) Kostel **(Ebenaceae) Panachi:** The fruits are edible

55. ***Diplazium esculentum*** (Retz.) Sw. **(Athyriaceae) Churuli:** Young fronds are collected in the morning, the rachis split and spread in sunlight till evening. This is used as a vegetable during supper.

56. ***Elaeocarpus serratus*** L. **(Eleaocarpaceae) Karamavu:** The fruits and seeds pickled also eaten as raw.

57. ***Elusine coracana*** (L.) Gaertn. **(Poaceae) Kore**: The grains are the staple food of majority tribal people and is largely cultivated in farmlands. The grains powdered, boiled and delicious cakes are prepared.

58. ***Ensete superbum*** (Roxb.) Cheesm. **(Musaceae) Kalluvazha:** Fruits edible

59. ***Entada rheedii*** Spreng. **(Mimosaceae):** Endosperm scooped out, powdered and placed in water overnight to remove harmful substances and poured off water and sundried the powder which is used with rice to make gruel

60. ***Euphorbia hirta*** L. **(Euphorbiaceae) Nilapala:** Used as leafy vegetable

61. ***Ficus racemosa*** L.**(Moraceae) Athimaram**: Half-mature fruits are used in culinary preparations. Fruits are boiled first, crushed and fried with coconut oil and salted.

62. ***Garcinia gummi-gutta*** (L.) Robs. **(Clusiaceae) Kodampuli:** Fruit rinds used in curries to get a sour taste

63. ***Gmelina arborea*** Roxb. **(Verbenaceae) Kumbil**: The fruits are edible

64. ***Grewia glabra*** Blume **(Tiliaceae) Kalle:** Fruits orange-coloured when ripe are edible.

65. ***Grewia villosa*** Willd. **(Tiliaceae) Kadalakkalle :** Fruits are edible when ripe and consumed by shepherd children.

66. ***Hibiscus surattensis*** L. **(Malvaceae) Chemmeenpuli**: Fruting calyx and inflorescence used as vegetable

67. ***Ixora brachiata*** DC. **(Rubiaceae) Malankara:** The fruits are relished by children

68. ***Lablab purpureus*** (L.) Sweet **(Papilionaceae) Avarai:** The tender fruits are used as vegetable

69. ***Lannea coromandelica*** (Houtt.) Merr. **(Anacardiaceae) Karasu, Odiyamaram:** young leaves with rice flour is used to make some sweet dishes, cakes etc.

70. ***Lantana camara*** L. **var.** ***aculeate*** (L.) Mold. **(Verbenaceae) Koothadichipoov:** The fruits are relished by children

71. ***Limonia acidissima*** L. **(Rutaceae) Vilamaram, Vlathi:** Pulp of mature fruits are edible. They are also medicinal, so also the leaves and bark. Gum produced in the trunk and branches, is also a non-timber product, which is used in colouring and dyeing.

72. ***Lycopersicon esculentum*** Miller **(Solanaceae) Siruthakkali**: Ripe fruits are collected from the wildly growing plants and used as a vegetable.

73. ***Macrotyloma uniflorum*** (Lam.) Verdc. **(Papilionaceae) Kollu:**Cultivated for its seeds; threshed, sun dried and consumed or sold in the market.

74. ***Mangifera indica*** L. **(Anacardiaceae) Thenmavu:** Fruits widely used and seeds yields starch used to make cakes, sweets etc.

75. ***Mesua ferrea*** L. **(Clusiaceae) Nangu :** The fruits are relished by children

76. ***Mimusops elengi*** L. **(Sapotaceae) Elengi:** Fruits are edible

77. ***Mollugo pentaphylla*** L. **(Molluginaceae) Kozhuppacheera :** Used as leafy vegetable

78. ***Moringa pterygosperma*** Gaertn.**(Moringaceae) Moringa maram**: Leaves, fruits and flowers are used to make curries.

79. ***Mucuna pruriens*** (L.) DC. **(Papilionaceae) Poonaikalikodi, Keviri , Naikoranakodi:**Young leaves and fruits are used as vegetable.

80. ***Musa paradisiaca*** L. **(Musaceae) Vazha:** *Musa* is frequently grown by people settled in forest areas for edible fruits, stem and rhizome.

81. ***Olea dioica*** Roxb. **(Oleaceae) Edana**: Fruits are edible

82. ***Opuntia striata*** Haw. var. ***dillenii*** (Ker-Gawl.) L. **(Cactaceae) Kallichedi:** The ripe fruits of this plant are tasty, eaten when they are red in colour. Care should be taken to remove the central round spine, which is embedded in the pulp.

83. ***Oryza sativa*** L. **(Poaceae) Nellu:**Cultivated for its grains.

84. ***Oxalis corniculata*** L. **(Oxalidaceae) Puliyarila:** Used as leafy vegetable

85. ***Palaquium ellipticum*** (Dalz.) Baill. **(Sapotaceae) Pali:** Fruits are edible

86. ***Panicum sumatrense*** Roth ex Roem. & Schult. **(Poaceae) Saame:** Cereal cultivated for its grains. Gruel is usually prepared with this.

87. ***Paspalum scrobiculatum*** L. **(Poaceae) Varagu:** Cereal cultivated for its grains. Gruel or cake with the powder is commonly prepared with this.

88. ***Passiflora foetida*** L. **(Passifloraceae) Kurukkanpazham**: Fruits are edible

89. ***Pennisetum americanum*** (L.) Leeke. **(Poaceae) Kambu:**Cereal cultivated for its grains. Gruel is prepared with grains or cake with the powder.

90. ***Phyllanthus emblica*** L. **(Euphorbiaceae)Nelli *(I)*:** Fresh fruits are collected and pickled. Fruits are available during September- December.

91. ***Pimpinella heyneana*** (DC.) Kurz **(Apiaceae) Kozhijeera:** Leaves are added to curries or ground with coconut to make chutney.

92. ***Pithecellobium dulce*** (Roxb.) Benth. **(Mimosaceae) Kodukkaapuli :** The ripe fruits are edible, relished by tribal people, seen planted around most hamlets.

93. ***Portulaca oleracea*** L. **(Portulacaceae) Kolambucheera:** Used as leafy vegetable

94. ***Pouzolzia zeylanica*** (L.) Bennet & Brown **(Urticaceae) Kuppacheera:** Used as leafy vegetable

95. ***Prosopis juliflora*** (Sw.) DC. **(Mimosaceae) Dillimaram :** Fallen ripe fruits are collected and used as cattle feed. The wood and branches are also used as fire wood.

96. ***Psidium guajava*** L. **(Myrataceae) Pera:** Fruits are edible when ripe.

97. ***Saccharum spontaneum*** L. **(Poaceae) Kattukarimbu:** Stem is utilized for its sweet juice

98. ***Sarcostigma kleinii*** Wt.&Arn. **(Icacinaceae) Odalvalli:** Fruits edible

99. ***Schleichera oleosa*** (Lour) Oken **(Sapindaceae) poovam:** The seeds are roasted and eaten.

100. ***Semecarpus anacardium*** L.f. **(Anacardiaceae) Thenkotta, Vellacheru, Thembrakkai**: The kernels of seeds are edible.

101. ***Sesamum orientale*** L. **(Pedaliaceae) Ellu** :Seeds are either sold in the market or made into eatables.

102. ***Smilax zeylanica*** L. **(Smilaxaceae) Kareelanchi:** Fruits are edible

103. ***Solanum anguivi*** Lamk. **(Solanaceae) Chundai:** Fruits and young shoots are used as vegetable

104. ***Solanum americanum*** Mill. **(Solanaceae) Kakke daagu :** Leaves and young shoots are used as a vegetable especially given for pregnant women. Ripe fruits are also edible.

105. ***Solanum violaceum*** Ortega **(Solanaceae) Siru sundai:** The mature fruits are collected, hammered to split and are put in salt water and later sun dried. This is used to prepare a particular dish, called *vattakkulambu*

106. ***Solanum torvum*** Sw. **(Solanaceae) Sukkuticheera:** Used as leafy vegetable

107. ***Sorghum bicolor*** (L.) Moench. **(Poaceae) Solam:** Grains powdered and a kind of cake is prepared, which is eaten with curries.

108. ***Sterculia guttata*** Roxb. **(Sterculiaceae) Anjankam, Achangam, Pottakavalam**: Seeds roasted with salt and eaten

109. ***Sterculia urens*** Roxb. **(Sterculiaceae) Thondi:** Fruits are edible and seeds roasted and eaten

110. ***Syzygium cumini*** (L.) Skeels **(Myrataceae) Naave, Njaval:** Fruits are edible when ripe.

111. ***Syzygium palghatense*** Gamble **(Myrataceae) Kattunjaval:** Ripened friuts are edible

112. ***Tamarindus indica*** L. **(Caesalpiniaceae) Puli, Valanpuli** : Flowers, fruits ripe and unripe is used as vegetable. Seeds roasted and eaten

113. ***Terminalia bellirica*** (Gaertn.) Roxb. **(Combretaceae) Thanni**: Seeds roasted with salt and eaten

114. ***Toddalia asiatica*** (L.) Lam. **(Rutaceae) Erigunge, Kara**: Fruits are used for preparing pickles.

115. ***Vigna mungo*** (L.) Hepper **(Papilionaceae) Uzhunnu:** Cultivated and the gram is consumed or sold in the market.

116. ***Vigna radiata*** (L.) Wilcz. **(Papilionaceae) Kattupayar:** Used as leafy vegetable

117. ***Vigna trilobata*** (L.) Verdc. **(Papilionaceae) Kattupayar:** Used as leafy vegetable

118. ***Vigna unguiculata*** (L.) Walp.ssp. ***cylindrica*** (L.) Verdc. **(Papilionaceae) Payaru :** The pods are freshly used as a vegetable.

119. ***Vigna vexillata*** (l.) A. Rich. **(Papilionaceae) Kattupayar:** Used as leafy vegetable

120. **Wrightia *tinctoria*** (Roxb.) R.Br. **(Apocynaceae) Goppampale, Dhanthapala:** A few drops of latex of this tree are mixed with milk and kept for a few minutes for quick fermentation and consumed later.

121. ***Zea mays*** L. **(Poaceae) Makka solam :** The straw is largely used in thatching huts and sheds. Seeds form a principal cereal.

122. ***Ziziphus mauritiana*** Lam. **(Rhamnaceae) Ilanthe:** Fruits are collected in plenty during October- December. Ripe fruits are edible while immature fruits are occasionally pickled.

123. ***Ziziphus oenoplia*** (L.) Mill. **(Rhamnaceae) Mullanpazham, Thodali**: Fruits are edible

124. ***Ziziphus rugosa*** Lam. **(Rhamnaceae) Ungatte, Vanthodali:** The fruits are eaten when ripe, which is available during summer season.

4.4 NATURAL DYES AND COLOURING SUBSTANCES

Natural dyes are obtained from plant, animal and mineral resources. Vegetable dyes are obtained from almost every part of the plant. Some of the vegetable dyes and their plants are given below.

1. ***Acacia catechu*** (L.f.) Willd. **(Mimosaceae) Karivelam :** The cutch obtained from the heart wood yields a brown colour
2. ***Acacia concinna*** DC. **(Mimosaceae) Chivakka:** The bark yields brown dye.
3. ***Acacia leucophloea*** (Roxb.) Willd. **(Mimosaceae):** Leaves and bark yield red dye.

4. ***Acacia nilotica*** (L.) Del. **(Mimosaceae):** Bark and pods yield black dye.
5. ***Adenanthera pavonina*** L. **(Casealpiniaceae) Manchadi:** Powdered wood yields red dye.
6. ***Adhatoda vasica*** Nees **(Acanthaceae) Adalodakam:** Leaves yield yellow dye.
7. ***Aegle marmelos*** (L.) Corr. **(Rutaceae) Koovalam :** Rind of the fruits yields yellow dye.
8. ***Ailanthus triphysa*** (Dennst.) Alston **(Simaroubaceae) Matti:** The leaves are the source of black dye
9. ***Artocarpus hetrophyllus*** Lamk. **(Moraceae) Plavu:** Wood, bark, and roots yield yellow dye.
10. ***Bauhinia purpurea*** L. **(Ceaselpiniaceae) Mandaram:** The bark is the source of brown dye
11. ***Bischofia javanica*** Blume **(Euphorbiaceae):** Stem bark yields a red dye which is used locally for dyeing wool and leather.
12. ***Bixa orellana*** L. **(Bixaceae):** Seeds yield a red dye which is now mainly used for colouring edible products.
13. ***Butea monosperma*** (Lamk.) Taubert. **(Fabaceae):** The flowers yield a brilliant but very fugitive yellow colouring matter.
14. ***Caesalpinia sappan*** Roxb. **(Caesalpiniaceae):** The heart wood yields a red dye.
15. ***Careya arborea*** Roxb. **(Myrtaceae):** The bark yields brown dye
16. ***Cassia fistula*** L. **(Caesalpiniaceae):** Bark yields red dye
17. ***Coscinium fenestratum*** (Gaertn.) Colebr. **(Menispermaceae) Maramanjalkodi:** Crushed wood yields a yellow dye.
18. ***Diospyros peregrina*** (Gaertn.) Gurke **(Ebenaceae) :** The fruits yield yellow dye
19. ***Emblica officinalis*** Gaertn. **(Euphorbiaceae):** The pulp of the fruit yields dark brown dye.
20. ***Erythrina variegata*** L. var. ***orientalis*** (L.) Merr. **(Fabaceae) Mullumurikku:** The flowers, twigs, bark are the source of red dye.
21. ***Ficus religiosa*** L. **(Moraceae) Aal:** Bark, leaves and roots yield a red dye.
22. ***Garcinia morella*** Desr. **(Clusiaceae) Kodampuli:** Leaves, gamboges, flowers and fruits yield a golden colour.

23. ***Indigofera tinctoria*** L. **(Fabaceae) Neelamari:** Leaves and flowers yeild a blue dye
24. ***Kirganelia reticulata*** (Poir.) Baill. **(Euphorbiaceae):** Roots are the source of red dye.
25. ***Lagerstroemia parviflora*** Roxb. **(Lythraceae)Manimaruth:** The bark dyes black
26. ***Lannea coromandelica*** (Houtt.) Merr. **(Anacardiaceae) Karassu:** Bark yields brown dye which is used as preservative for fishing nets.
27. ***Lawsonia inermis*** L. **(Lythraceae) Mayilanchi:** Leaf paste yields an orange red colour dye
28. ***Mallotus philippensis*** (Lam.) Muell.-Arg. **(Euphorbiaceae) Sindhoori:** Fruits and seeds yield an orange red dye
29. ***Melastoma malabathricum*** L. **(Melastomaceae):** Leaves and roots yield pink dye.
30. ***Mesua ferrea*** L. **(Clusiaceae):** Flowers are the source of yellow dye.
31. ***Mimusops elengi*** L. **(Sapotaceae) Elengi:** Bark yields brown dye
32. ***Morinda angustifolia*** Roxb. **(Rubiaceae) Malambavatta:** Roots are the source of yellow dye.
33. ***Moringa oleifera*** Lamk. **(Moringaceae) Muringa:** Wood yeilds indigo dye
34. ***Nyctanthes arbotristis*** L. **(Oleaceae):** An orange coloured dye is obtained from the bright orange corolla tubes of the flowers.
35. ***Oroxylum indicum*** (L.) Benth. *et al* Kurz **(Bignoniaceae) Palakapayyani:** Fruits yields an reddish brown dye.
36. ***Pithecellobium dulce*** (Roxb.) Benth. **(Mimosaceae):** Bark paste yields yellow colour dye
37. ***Pterocarpus marsupium*** Roxb. **(Fabaceae) Choravenga:** The gum and bark yield red dye.
38. ***Pterocarpus santalinus*** L.f. **(Fabaceae) Rakthachandanam:** The ground wood yields red dye for cotton and wool
39. ***Rauvolfia tetraphylla*** L. **(Apocynaceae):** Fruits yields a black dye
40. ***Schlechera oleosa*** (Lour.) Oken **(Sapindaceae)Poovam:** Flowers yields a green colour dye
41. ***Semecarpus anacardium*** L.f. **(Anacardiaceae) Vellacheru:** Pericarp of the fruit yeilds black dye

42. ***Solanum indicum*** L. **(Solanaceae) Cheruvazhthina:** Half ripe fruits yields black dye
43. ***Syzygium cumini*** (L.) Skeels **(Myrtaceae):** Bark yields red dye.
44. ***Tamarindus indica*** L. **(Caesalpiniaceae) Puli:** Leaves yield a yellow dye
45. ***Tectona grandis*** L.f. **(Verbenaceae) Thekku:** Wood and leaves yield a yellow colour substance
46. ***Tephrosia purpurea*** Pers. **(Fabaceae) Kalakomban:** Leaves dye blue
47. ***Terminalia chebula*** Retz. **(Combretaceae)Kadukka:** Fruits yield yellow dye
48. ***Toddalia asiatica*** (L.) Lam. **(Rutaceae):** Roots yield a yellow dye
49. ***Toona ciliate*** Roem. **(Meliaceae) :** The flowers yield a yellowish red dye.
50. ***Trema orientalis*** (L.) Blume **(Ulmaceae) Aamapetti:** Bark paste yields a brown dye
51. ***Ventilago madraspantana*** Gaertn. **(Rhamnaceae) :** Then root bark is the source of red dye.
52. ***Wrightia tinctoria*** R.Br. **(Apocynaceae) Dhanthapala**: The flowers are source of yellow dye.

4.5 FISH POISONS AND PESTICIDES

Fish poisons are used to stupefy or kill fish without making them toxic to humans. There is a large number of plants which contain poisonous principles. In small doses they are non poisonous to man and his cattle but are very toxic to lower creatures. Therefore they are used to catch fish by stupefaction and to combat insect pests, vermin and rodents. They are used in the form of powders, emulsions, solutions and extracts.

1. ***Acacia rugata*** (Lam.) J. Voigt **(Mimosaceae) Cheenykkay:** The bark of this climber is collected and crushed and thrown into water. This is applied in February –March season. Nearly two bundles (10kg) are used for a single operation.
2. ***Acacia torta*** (Roxb.) Craib **(Mimosaceae) Thodan valli:** This climber is crushed in water till surf develops. About 5-6kg is used for poisoning. The

extract is applied in the water with the help of 5-10 persons. After half an hour, fishes lose their balance and are collected using common traps like the Koortha. The method is applied in stagnant or slow running waters. Paniyans usually employ this method.

3. ***Anamirta cocculus*** (L.) Wight & Arn. **(Menispermaceae) Nanjukuru:** Nanjukuru and Green chilly are crushed along with copper sulphate (Thurissu) and the mixture is thrown into the stream. After half an hour, the fishes die or become unconscious and are collected using common traps or by using hand picking.
4. ***Antiaris toxicaria*** Lesch. **(Moraceae) Maravuri:** The fresh milky sap of the tree is also used to poison arrows.
5. ***Azadirachta indica*** A.Juss. **(Meliaceae) Veppu:** The leaves placed in grains, cloths etc. and the odour produced by burning of dried leaves is said to be fatal to insects.
6. ***Bamboosa bambos*** (L.) **(Poaceae) Mula or Illi:** The tender shoots of bamboo are collected, crushed and mixed with water. Nearly 50-70 tender shoots are used for a single operation and is normally employed during the months of January-March. Sometimes copper sulphate *(Thurisu)* is also added to this for quick action and prolonged sedation time for fishes. They apply this method in slow flowing or stagnant waters. Almost all the tribes adopt this method.
7. ***Casearia tomentosa*** Roxb. **(Flacourtiaceae) Anakkarana:** Crushed roots and fruits applied in slow running or stagnant water to stupefy fish.
8. ***Crataeva nurvala*** Buch.-Ham. **(Capparaceae) Nirmathalam:** Crushed seeds are applied on stagnant water as piscicide.
9. ***Entada rheedii*** Spreng. **(Mimosaceae) Kakkavalli:** Crushed seeds are used as poison
10. ***Euphorbia thirucalli*** L. **(Euphorbiaceae) Thirukalli:** The plant is collected and put on the surface of stagnant water. The sap oozed out from the plant is detrimental to fishes. About 5-10kg of plants is used for a single operation.

11. ***Hydnocarpus pentandra*** (Buch.-Ham.) Oken **(Flacourtiaceae) Marrotti:** The leaves and the fruits of the plant are crushed and mixed together. The mixture is applied in the stream. Fruit alone is also sufficient for the operation. This technique is usually practiced during summer season.
12. ***Nicotiana tabacum*** L. **(Solanaceae) Pokala:** The tobacco is cut into pieces and applied. Six kilogram would be required for a single operation. Kurumar employs the method during summer season in stagnant waters.
13. ***Randia brandisii*** Gamble **(Rubiaceae) Karrakai:** The fruits of *Randia brandisii* are collected from the forest and crushed. Nearly 5-6 kg is normally used. Usually medium sized fishes are used by this method. The method is commonly employed in summer season when the water level is low. Almost all the tribes use this method.
14. ***Ricinus communis*** L. **(Euphorbiaceae) Avanakku:** Crushed seeds are used as poison
15. ***Samadera indica*** Gaertn. **(Simaroubaceae) Karinjotta:** A decoction of the leaves is used to kill termites, lice and fleas.
16. ***Sapindus trifoliata*** L. **(Sapindaceae) Soapkai:** The fruits of *Sapindus* are crushed to powder form in fresh condition and mixed with water. This method is normally employed in summer.
17. ***Spilanthes acmella*** (L.) Murr. **(Asteraceae) Kammalpoo:** The entire plant paste applied as fish poison and fresh flower extract in water is effective against mosquito.
18. ***Strychnos nux vomica*** L. **(Loganiaceae) Kanjiram:** The seed powder is used as pisicide and raticide. The tribals use the seeds in the preparation of arrow and dart poisons.
19. ***Syzigium caryophyllaeum*** Gaertn. **(Myrtaceae) Njaval:** The bark of the tree, *S.caryophyllaeum* is collected from the forests, squeezed and mixed in the stream. After half an hour the fishes become unconscious and are collected using traditional traps like Koortha. Nearly 5kg of bark is required for a single operation. Paniyans and Naikans are expert in making this mixture.

20. ***Vitex negundo*** L. **(Verbenaceae) Nochi:** The leaves are put in stored grains and cereals to repel insects and fungus.

4. 6 . OIL YIELDING PLANTS

Some of the oil yielding plants are given below.

1. ***Abrus precatorius*** L. **(Fabaceae)Kunni:** Climber Seeds yield light reddish oil
2. ***Acacia decurrens*** Willd. **(Mimosaceae) Karivel:** seeds yield a pale brown fatty oil.
3. ***Acacia nilotica*** Delile subsp.***indica*** (Benth.)Brenan **(Mimosaceae) Karivel:** The seeds yield a brownish oil
4. ***Acorus calamus*** L. **(Araceae) Vayambu:** An essential oil is obtained from the leaves
5. ***Alangium salvifolium*** (Linn.f.) Wang. **(Alangiaceae) Ankolam:** Yield fatty oil and seed yield oil- illuminant.
6. ***Aphanamixis polystachya*** (Wall.) Parker **(Meliaceae):** Kernels yield oil-illuminant
7. ***Argemone mexicana*** L. **(Papaveraceae):** Seed oil used as illuminant
8. ***Azadirachta indica*** A. Juss **(Meliaceae) Veppu:** Kernels yields an oil-illuminant
9. ***Barringtonia racemosa*** Roxb. (L.) Spreng. **(Barringtoniaceae) Neervanchi:** The seed oil illuminant and used in lamps
10. ***Bischofia javanica*** Bl. **(Euphorbiaceae):** The seeds yield a drying oil potential for use as a raw material in the surface
11. ***Calophyllum inophyllum*** L. **(Cusiaceae) Punna:** Seed oil used for burning
12. ***Calophyllum polyanthum*** Wall.ex Choisy **(Clusiaceae):** Seed kernel oil for lighting
13. ***Canarium strictum*** Roxb. **(Burseraceae):** Resin is used as an illuminant. On destructive distillation it yields an oil

14. ***Cerbera manghas*** L. **(Apocynaceae) Odallam:** Seed oil- illuminant, Odolla fat producing.
15. ***Cymbopogon flexuosus*** (Nees ex Steud.) Wats **(Gramineae) Inchipullu:** It is the source of the valuable aromatic oil known as"Oil of Lemon-grass".
16. ***Dalbergia sissoo*** Roxb. **(Fabceae)Veeti:** Heartwood yields oil.
17. ***Entada rheedii*** Spreng. **(Mimosaceae) Kakkumvalli:** Seed oil- used in lamps
18. ***Eucalyplus sideroxylon*** A. **(Myrtaceae) Eucaly:** Leaves & terminal branches yields an oil used in indigenous medicine
19. ***Gymnacranthera*** **canarica** Warb. **(Myristicaceae):** Seed fat- burning
20. ***Holoptelea integrifolia*** Planch. **(Ulmaceae) Aval:** Non edible seed oil
21. ***Hydnocarpus alpina*** Wight **(Flacourtiaceae) Maraveti:** Seed oil- illuminant
22. ***Jatropha curcas*** L. **(Euphorbiaceae) Kallichedi:** Seed oil- Illuminant (burns without soot)
23. ***Jatropha gossypifolia*** L. **(Euphorbiaceae) Kalli:** Seed oil- lamps
24. ***Kingiodendron pinnatum*** (Roxb. ex DC.) Harms **(Leguminosae) Neeroli:** Wood yields an oil
25. ***Leucas aspera*** Spreng. **(Apiaceae) Thumba:** The seeds yields oil used for illumination purposes
26. ***Mallotus philippensis*** Muell.-Arg. **(Euphorbiaceae) Manjana:** Seed oil used in cosmetics
27. ***Michelia champaca*** L. **(Magnoliaceae) Champakam:** Leaves/ flowers/ seeds Oil used in perfumes
28. ***Mesua ferrea*** L. **(Clusiaceae) Kumizhu:** Seed oil- illuminant, fatty oil and for soap making
29. ***Palaquium ellipticum*** (Dalz.)Baill. **(Sapotaceae) Pali:** Seed oil- lighting, fatty oils for soap making
30. ***Pongamia glabra*** Vent. **(Fabaceae) Venga:** Seed oil- illuminant
31. ***Putranjiva roxburghii*** Wall. **(Euphorbiaceae):** Seed kernel oil for burning, Kernel yields an essential oil, seeds yield a fatty oil used for burning
32. ***Ricinus communis*** L. **(Euphorbiaceae) Avanakku:** Seed oil is used as fuel, Seeds yield castor oil, a fatty oil used as cathartic and also for lubrication and illumination

33. ***Santalum album*** L. **(Santalaceae) Chandanam:** Seed oil- illuminant
34. ***Sarcostigma kleinii*** Wight & Arn. **(Icacinaceae) Odal:** Seeds yields a fatty oil used as an illuminant.
35. ***Schleichera oleosa*** (Lour.) Oken **(Sapindaceae) Poovam:** Kernel oil- illuminant
36. ***Sterculia foetida*** L. **(Sterculiaceae) Pottakavalam:** Seed oil- illuminant
37. ***Stereospermum suaveolens*** DC. **(Bignoniaceae) Paral, Pathiri:** Seeds yield non drying fatty oil.
38. ***Syzygium aromaticum*** (L.)Merrill & Perry **(Myrtaceae) Karayampu:** Tree, flowers and bud yield pale yellow oil used in traditional medicine
39. ***Tamarindus indica*** L. **(Caesalpiniaceae):** Seed kernels oil is used for burning lamps, fatty oil of seeds is used in making paints

4.7 FIBRE YEILDING PLANTS

There are normally two classes of wild fibrous plants i.e. those in which the fibre is found in the stem of the plants and those in which the fibre forms the structural system of the leaf . Separation of fibre from stem is easier than the leaf fiber. The fibre from leaves is obtained by bunding them and beating on a stone. The fibers of some plants are not separated from the rest of the vegetable matter but the stems and leaves are simply dried and twisted in their entire state as in the case of grass and sedges.

1. ***Abutilon indicum*** (L.) Sweet **(Malvaceae) Velluram** : The stem on reting yields a fibre which is used for making ropes.
2. ***Acacia leucophloea*** Roxb. **(Mimosaceae) Vellavel** : The bark steeped in water and beaten yields fibre is used for fishing nets.
3. ***Agave cantula*** Roxb. **(Agavaceae)** :Leaves yield fibre for making ropes, nets, cordage etc.
4. ***Antiaris toxicaria*** (Pers.) Lesch. **(Moraceae) Maravuri**: The inner bark yields a fibre by retting in water and beating it is used for making sacks, mats etc
5. ***Bauhinia purpurea*** L. **(Caesalpiniaceae) Chomappumandaram:** Bark yields a fibre by retting in water and beating it is used for making ropes.
6. ***Bauhinia racemosa*** Lamk. **(Caesalpiniaceae) Arampuli:** Bark yields a fibre by retting in water and beating it is used for making ropes.

7. ***Borassus flabellifer*** L. **(Arecaceae) :** Fibre obtained from the rachis and the stem is used for making brushes and brooms.
8. ***Calotropis gigantea*** (L.) R.Br. **(Asclepiadaceae) Erikku**: The fibre obtained from the stem is used for making fishing nets, twine etc.
9. ***Careya arborea*** Roxb. **(Myrtaceae) :** Bark yields a fibre by retting in water and beating it is used for making ropes.
10. ***Caryota urens*** L. **(Arecaceae) Anappana**: Leaf sheaths, petioles and flowering stalks yield a fibre which is used for making ropes, fishing nets, brooms etc
11. ***Cissus quadrangularis*** L. **(Vitaceae) Narale, Changalamparanda:** Stem and roots yield a fibrous material.
12. ***Dillenia pentagyna*** Roxb. **(Dilleniaceae) Malambunna** : Bark fibre used for cordage
13. ***Grewia tiliaefolia*** Buch.-Ham. **(Tiliaceae) Chadachi**: Bark fibre used for cordage
14. ***Helicteris isora*** L. **(Sterculiaceae) Kayoona, Idampirivalampiri :** The inner bark yields a fibre by retting in water and beating it is used for making sacks, mats etc
15. ***Heteropogon contortus*** Roxb. **(Poaceae) Soochipullu:** The grass is used for making mats
16. ***Holoptelia integrifolia*** (Roxb.) Planch. **(Ulmaceae) Aaval:** The bark yields a strong fibre by retting in water and beating it is used for making ropes and cordages.
17. ***Ichnocarpus frutescens*** R.Br. **(Apocynaceae) Paalvally:** The twiny branches are used for tying purposes
18. ***Kydia calycina*** Roxb. **(Malvaceae) :** The inner bark yields a fibre by retting in water and beating it is used for making sacks, mats etc.
19. ***Lannea coromandelica*** (Houtt.) Merr. **(Anacardiaceae) Karassu :** Bark is the source of strong fibre.
20. ***Melochia cochorifolia*** L. **(Sterculiaceae) :** Bark yields a fibre which is used for making fishing lines etc.
21. ***Pandanus tectorius*** Soland. **(Pandanaceae) Thazhakaitha:** Leaves are the source of fibre used for making mats, sacks etc.
22. ***Sida acuta*** Burm.f. **(Malvaceae) Manjakurunthotty:** Stem yeilds a fibre used for making broom stick

23. ***Spatholobus roxburghii*** Benth. **(Fabaceae) Chamatha :** The fibre obtained from the stem is useful for ropes and twines
24. ***Sterculia urens*** Roxb. **(Sterculiaceae) Pottakavalam:** The fibre obtained from the stem is useful for ropes and twines
25. ***Thespesia lampas*** Dalz. **(Malvaceae) Poovarathi:** The young stem yields a red fibre
26. ***Thespesia populnea*** (L.) Soland. **(Malvaceae) Poovarathi:** Stem bark yields a strong fibre which is useful for making ropes and twines.
27. ***Trema orientalis*** Blume **(Ulmaceae) Aamapetty:** The fibre obtained from the stem is useful for ropes and twines
28. ***Urena lobata*** L. **(Malvaceae) Ooram:** The stem fibre used for making ropes and fabrics

4.8 BEVERAGES , NARCOTICS AND MASTICATORIES

Substances which are chewed and sucked for some psychological satisfaction are regarded as masticatories (Faulks, 1958). The practice of chewing certain plant product is wide spread. Chewing of *Areca catechu* is common in India but also Burma, Ceylon and Malyesia. It is used raw or cured.

1. ***Acacia leucophloea*** (Roxb.) Willd. **(Mimosaceae) Vellavel:** The bark is used in the preparation of alcoholic drinks acting as a flavouring agent.
2. ***Aegle marmelos*** (L.) Corr. **(Rutaceae) Koovalam**: The fruit pulp diluted with water and mixed with sugar and tamarind makes a delicious drink.
3. ***Anamirta coculus*** (L.) Wt. *et* Arn. **(Menispermaceae) Nangin kuru** : Seeds are used as narcotics
4. ***Areca catechu*** L. **(Arecaceae) Adakkai :** Nut used as *Borassus flabelifer* L. (Arecaceae) Pana: the fresh sap of these palms is called sweet toddy
5. ***Artabotrys hexapetalus*** (L.f.) Bhandari **(Annonaceae) Manoranjitham**: The flowers are used to prepare a stimulating tea like beverage.
6. ***Callicarpa tomentosa*** (L.) L. **(Verbenaceae) Cheru thekku**: The bark is chewed like betel leaf.

7. ***Canaga odorata*** (Lam.) Hook.f.&Thom **(Annonaceae) Kattuchempakam:** The flowers are used to prepare a stimulating tea like beverage.
8. ***Caryota urens*** L. **(Aracaceae) Anapana**: The fresh juice tapped from the spadices is used as sweet toddy.
9. ***Curcuma zeodaria*** (Christm.) Rosc. **(Zingiberaceae) Kattu kuva**: The rizhome possesses stimulant properties and is therefore used in the manufacture of local liquors.
10. ***Cyclea peltata*** (Poir.) Hook.f. *et* Thoms. **(Menispermaceae) Padathalikizhangu**: The leaf juice of the plant is used in the preparatuion of beverages
11. ***Datura stramonium*** L. **(Solanaceae) Ummathumkai**: The leaves and seeds are narcotic
12. ***Elettaria cardamomum*** (L.) Maton **(Zingiberaceae) Aallum:** The seeds are used as masticatory
13. ***Entada rheedii*** Spreng. **(Mimosaceae) Kakkumvalli**: The roasted and powdered seeds are used as substitute for coffee.
14. ***Kaempferia galanga*** L. **(Zingiberaceae) Kacholum** : Along with betel and areanut rhizome is chewed as masticatory.
15. ***Strychnos nux-vomica*** L. **(Loganiaceae) Kanjiram**: The seeds are very poisonous and have intoxicating effect.
16. ***Syzygium cumini*** (L.) Skeels **(Myrtaceae) Njaval**: Fruits are used to prepare wines and liquors
17. ***Terminalia bellirica*** (Gaertn.) Roxb. **(Combretaceae) Thannikka**: The fruits are used to increase the potency of alcoholic spirits.
18. ***Terminalia chebula*** Retz. **(Combretaceae) Kadukka**: The fruits are used to increase the potency of alcoholic spirits.

4.9 AGRICULTURAL IMPLEMENTS

1. ***Litsea stocksii*** (Meisner) Hook.f. **(Lauraceae) Kolisera :** Stem is used for making handle of hammers due to strength and flexibility.
2. ***Acacia chundra*** (Roxb. ex Rottl.) Willd.**(Mimosaceae) Karungali:** Wood is used in the making of handles of agricultural implement

3. ***Morinda pubescens*** J. E. Smith **(Rubiaceae) Noone:** Timber for making of agricultural implements like hoe, handles etc.
4. ***Canthium dicoccum*** (Gaertn.) Teys.& Binn.**(Rubiaceae) Oppemaram**: Wood is used to make handles of knife.

4.10 HOUSE BUILDING AND HUT CONSTRUCTION

1. ***Butea monosperma*** (Lam.) Taub. **(Papilionaceae) Saanthuviri, Plassu, Chamatha:** Poles are used in hut construction. Smooth, durable and beautiful poles are the attraction for this species.
2. ***Desmostachya bipinnata*** (L.) Stapf. **(Poaceae) Darppa**: Occasionally used for thatching small sheds and huts.
3. ***Mesua ferea*** L. **(Clusiaceae) Nanku**: Timber is used for house building purposes
4. ***Mimusops elengi*** L. **(Sapotaceae) Poothilangi:** Poles are used for making huts
5. ***Mundulea sericea*** (Willd.) Cheval. **(Papilionaceae) Ponnaveeram:** Poles occassionally used in the making of temporary sheds.
6. ***Tarenna asiatica*** (L.) Kuntze **(Rubiaceae) Tarani**: Leafy shoots are used in the preparation of trellis, because of its defoliating nature. Poles posses extra strength and durability and hence used in the hut or shed construction.
7. ***Zea mays*** L. **(Poaceae) Makka solam:** The straw is largely used in thatching huts and sheds.

4.11 SOAPS, DETERGENTS,PERFUMES AND COSMETICS

1. ***Grewia tiliifolia*** Vahl **(Tiliaceae) Lumman, Uluman, Unnam, Chadachi** : Phloem fibres are crushed and applied over scalp regularly while taking bath is good for hair growth. This is also used as a scrubber for cleaning body, a substitute for soap.

2. ***Mesua ferea*** L. **(Clusiaceae) Nanku**: Flower buds used to make cosmetics and flowers used as perfumes
3. ***Sapindus emarginata*** Vahl **(Sapindaceae) Poocha maram :** Ripe fruits are collected, dried and marketed. The nuts used as a substitute for soap, for cleaning clothes, vessels etc. Put some nuts in hot water and keep for a few hours and the solution is used for cleaning purpose.

4.12 SPICES ,CONDIMENTS AND SAVORY PLANTS

1. ***Alpinia galanga*** (L.) Willd. **(Zingiberaceae) :** The rhizome is used as a condiment and seeds are used as spice.
2. ***Cinnamomum zeylanicum*** Bl. **(Lauraceae) Karuvapatta**: Stem bark is used as flouvaring food.
3. ***Curcuma aromatica*** Salib. **(Zingiberaceae) Pullakizhanna** : The rhizomes are used as flavouring agent
4. ***Elettaria cardamomum*** (L.) Maton **(Zingiberaceae) Aallum**: The seeds are used as spice and condiment
5. ***Murraya koenigii*** (L.) Spreng. **(Rutaceae) Kariveppilei** : Leaves are used for flavouring curries.
6. ***Myristica fragrans*** Houtt. **(Myristicaceae) Jathikka**: Nutmegs extensively used for flavouring curries.
7. ***Piper longum*** L. **(Piperaceae) Kattithippali** : The fruits are extensively used as spice and condiment.
8. ***Piper nigrum*** L. **(Piperaceae) Nallamulaku** : The fruits are extensively used as spice and condiment.
9. ***Syzygium aromaticum*** (L.) Merr.&Perry. **(Myrataceae) Karayamboo**: Dried unopened flower buds are used as a spice .
10. ***Zingiber zerumbet*** (L.) J.E. Smith **(Zingiberaceae) Kattinchi** : Rhizome used as spice in curries.

4.13. GUMS ,RESINS AND TANNING MATERIALS

1. ***Acacia nilotica*** (L.) Willd. ex Delile (**Mimosaceae) Karivelom:** The bark yeilds tannin known as indian gum arabic is extracted by wounding the bark during summer months.
2. ***Ailanthus triphysa*** (Dennst.) Alston **(Simaroubaceae): Matti, Mattipal, Pongalliyam**: The tree produces an aromatic resin used for burning as incense and in the manufacture of Agarbathies.
3. ***Butea monosperma*** (Lamk.) Taub. **(Fabaceae) Plasin samatha:** The bark yeilds red gum is used in indigenous medicine.
4. ***Canarium strictum*** Roxb.**(Burseraceae) Kungilyam :** Dark brown resin exuded from incisions on the trunk. This is collected and sold.
5. ***Cassia auriculata*** L. **(Caesalpiniaceae) Avaram:** Bark yeilds tannin
6. ***Cassia fistula*** L. **(Caesalpiniaceae) Kanikonna:** Bark yeilds tannin
7. ***Chukrasia tabularis*** Juss. **(Meliaceae) Chuvannagil:** The bark of the tree yeilds red gum used as an adhesive. The bark and young lleaves contain tannin.
8. ***Cochlospermum religiosum*** (L.) Alston **(Cochlospermaceae) Apakkudukka:** The gum is exuded from deeply furrowed bark
9. *Commiphora caudata* (Wight & Arn.) Engl. **(Burseraceae) Kiluva, Gulgulu:** A gum resin is extracted from the trunk is diuretic and antiseptic.
10. ***Croton tiglium*** L. **(Euphorbiaceae) Neervalam**: The seeds yeilds an oil contains a toxic resin with blistering action.
11. ***Diospyros malabarica*** (Desr.) Kostel. **(Ebenaceae) Panachi :** Unripe fruits contain tannin and fruit gum used in binding drums
12. ***Dipterocarpus indicus*** Bedd. **(Dipterocarpaceae) Kalpayin**: The resin obtained from trunk of tree is used in medicine.
13. ***Holigarna arnottiana*** Hook.f. **(Anacardiaceae) Karimcherue**: Gum is collected for varnishes
14. ***Kingiodendron pinnatum*** (Roxb. ex DC.)Harms **(Caesalpiniaceae) Kodapala**: The tree yields a dark brown oleoresin is used in the treatment of veneral diseases.
15. ***Kydia calycina*** Roxb. **(Malvaceae) Vellachadachi**: Bark of the tree yeilds gum

16. ***Limonia acidissima*** L. **(Rutaceae) Vilamaram, Vlathi:** Gum produced in the trunk and branches, is also a non-timber product which is used in colouring and dyeing.
17. ***Mesua ferrea*** L. **(Clusiaceae) Nangu:** Seeds yeilds an oleoresin
18. ***Mimusops elengi*** L. **(Sapotaceae) Elengi:** The tree yeilds a gum
19. ***Myristica malabarica*** Lamk. **(Myristicaceae) Pathiripoo:** Bark of the tree yeilds gum
20. ***Palaquium ellipticum*** (Dalz.) Baill. **(Sapotaceae) Pali**: The trunk of the ree yeilds gum
21. ***Pterocarpus marsupium*** Roxb. **(Papilionaceae) Karinthakara, Choravenga:** Bark of the tree yeilds gum
22. ***Sterculia urens*** Roxb. **(Sterculiaceae) Pottakavalam**: Karayagum is extracted from this plant
23. ***Sterculia villosa*** Roxb. ex. DC. **(Sterculiaceae) Vakka**: Bark of the tree yeilds gum
24. ***Terminalia arjuna*** (Roxb ex DC.) Wt. *et* Arn. **(Combretaceae) Neermaruth:** Bark yeilds tannin
25. ***Terminalia chebula*** Retz. **(Combretaceae) Kadukka:** Fruits yeilds annin
26. ***Toona ciliata*** Roem. **(Meliaceae) Vembu :** The trees yeilds gum used as an adhesive
27. ***Tribulus terrestris*** L. **(Zygophyllaceae) Nerinjil**: Fruits contain resin tannin and oil
28. ***Vateria indica*** L. **(Dipterocarpaceae)Vellappantham, Vellaapayin:** Wounds are made on the trunk to exude the resin, collected in large pieces and sold.

4.14 SOCIO-RELIGIOUS AND RITUALS

1. ***Aloe vera*** (L) Burm. f. **(Liliaceae)Chothukathale**: The whole plant is hung on the roof of dwelling place. The plant selected for this purpose is with a reddish tinge, is locally called *'Ratta kathale'*. This deed invites prosperity into the house.
2. ***Angiopteris evecta*** (G. Forst.) Hoffm. **(Angiopteridaceae) Aanavanangi:** This plant is said to be having magical effect. The plant parts are tied in an amulet on

any part of the body, which provides plentiful confidence and courage to the person. It is considered as a bewitching agent.

3. ***Areca catechu*** L. **(Arecaceae) Adakkai :** Used to protect from evil spirit
4. ***Cynodon dactylon*** (L.) Pers. **(Poaceae) Arukam Pullu, Karuka :** Some shoots and *Gani Tumbe* are taken with water and cow's urine in a tumbler. This is sprinkled all around the house premises to expel the evil spirits. Shoots of this are also used for sprinkling water over head by chanting some mantras for protecting the pregnant women from evil spirits. This sacred water is taken internally every day in the morning after completing eight months of pregnancy.
5. ***Dillenia pentagyna*** Roxb. **(Dilleniaceae) Ponne, Malabunna** : The bark of this tree ground in equal quantity along with a piece of Arecanuts and tobacco. This powder is sun dried and different types of honey are added. A pinch of this is administered during the visit to one's enemy hamlet, to get protection from evil spirits.
6. ***Lagerstroemia microcarpa*** Wight **(Lythraceae) Bega, Poomaruth:** Bark of *Bega* along with a root piece of *Pongamia* is made to a paste and apply on the sole to escape from an evil deed done by enemies.
7. ***Strychnos potatorum*** L. f. **(Loganiaceae) Sillemaram:** Dried bark pieces are secretly placed somewhere in the enemies house to make residents quarrel, and finally result in evacuating the area.

4.15 MISCELLANEOUS USES

1. ***Anogeissos latifolia*** (Roxb. ex DC.) Wall. **(Combretaceae) Vecha:** Wood and branches are used as firewood.
2. ***Bambusa bambos*** (L.) Voss. **(Poaceae) Moongil, Illi, Mula:** Mature stem splitted longitudinally and trellises are prepared for cattle/ goat shed. The mature culms are used in the construction of huts. These are spiltted, sliced and interweaved on the

sidewalls of huts. After drying, mud is pasted over this. Bamboo splints are also used to make the structure of roof. Several materials are prepared out of bamboo. Mats, trellis, baskets-like materials are weaved with bamboo splints and used for several domestic needs. Hencoops, mats for drying grains etc. are also made from bamboo clums.

3. ***Bombax ceiba*** L. **(Bombacaceae) Mullilavu, Mullupoola**: Silk cotton is produced in the fruits of tree and is is used extensively for stuffing beds, pillows etc. The lightwood is using as plywood.
4. ***Bridelia retusa*** Spreng. **(Euphorbiaceae) Mullu gonge :** Trunk and branches are utilized as firewood
5. ***Cullenia exarillata*** Robyns **(Bombacaceae)Thengimaram, Vedipilavu, Kurangan pilavu, Mullan pilavu:** The lightwood is using as plywood.
6. ***Dalbergia paniculata*** (Roxb.) Thoth. **(Papilionaceae) Boovare, Paingani:** Used as fire wood and also for making coffins among some clans of Irulas.
7. ***Dendrocalamus strictus*** (Roxb.) Nees **(Poaceae) Moongil, Chooral:** Dried clumps are used as firewood.
8. ***Dodonaea viscosa*** (L.) Jacq. **(Sapindaceae) Mantrachappu, Viraali**: Cut shoots possess defoliating nature and not easily attacked by termites, hence used in the construction of veils, trellis etc.
9. ***Dysoxylum malabaricum*** **Bedd. (Meliaceae) Vellagil**: Timber is very much reputed
10. ***Ficus exasperata*** Vahl **(Moraceae) Parisu ,Chagare:** Stem is employed in the making of flute
11. ***Givotia moluccana*** (L.) Sreem **(Euphorbiaceae) Boothaali:** Wood is used for making drums.
12. ***Glycosmis mauritiana*** (Lam.) Yuich. **(Rutaceae) Moolegili, Ulakodi**: Stem is cut to convenient size to make sticks for cattle rearing.
13. ***Helicteres isora*** L. **(Sterculiaceae) Aviri, Kayoona, Idampirivalampiri, Kaypan**: Fruits in coconut oil yield a hair tonic.
14. ***Jatropha curcas*** L. **(Euphorbiaceae) Tonde maram :** Dried fruits are collected, split open and the seeds are sold to the local buyers for Rs. 2- 5 / Kg.

15. ***Mundulea sericea*** (Willd.) Cheval. **(Papilionaceae) Ponnaveeram:** Stem provides good firewood
16. ***Ocimum americanum*** L. **(Lamiaceae) Sirutulasi:** Plants are plucked and tied together to a small bundle as a brush and used to repel insects on cattle
17. ***Pleiospermium alatum*** (Wight & Arn.) Sw **(Rutaceae) Kurunthamaram:** Leaves are fried with grains of *Zea* and well powdered. A mature termite hill is broken on the top and this powder is slowly blown through the hole. This results the outburst of insects which are collected with a pot, fried in coconut oil and eaten.
18. ***Pterocarpus marsupium*** Roxb. **(Papilionaceae) Chora vengha, Karinthakara:**The Gum is diluted in water or castor oil, and applied to the temple portion of children keeps evil-eye away.
19. ***Sida acuta*** Burm.f. **(Malvaceae) Kalakarande :** Arial parts are used for making brooms. Plants collected are sun dried and tied to a handy bundle, which is used as broomsticks. *Mudugas* retain this plant while weeding their agricultural fields.
20. ***Thespesia populnea*** (L.) Sol. **(Malvaceae) Poovarassu, Chilanthi**: A decction of the fruits are considered an antidote for poisoning.
21. ***Trewia nudiflora*** L. **(Euphorbiaceae) Unninava:** Wood is used for making planks of goatshed. By making horizontal cuttings on the wood, it is used as a ladder for goats to climb into the elevated shed.

Table 1. Plant species used by the tribals of Palakkad and Malappuram Districts

No	Species	Ar	Ch	Kub	Ir	Kur	Mud	Kat	Pan	Malas	Malay	Malam	Kad
1.	*Abrus precatorius L.*	M	M		P	M	M	P,M	P,M	P	P	P	P
2.	*Abutilon hirsutum*				P	-	M	P,M	P,M	P	P	P	P
3.	*Acacia chundra Roxb. ex Rottl.) Willd.*				P	-	-	P	P	P	P	P	P
4.	*Acacia leucophloea (Roxb.) Willd.*				P	-	-	P	P	P	P	P	P
5.	*Acacia nilotica (L.) Delile*				P	-	-	-	P	P	P	P	P
6.	*Acacia pennata (L.) Willd.*				P	P	P	-	P	P	p	P	P
7.	*Acacia sinuata (Lour.) Merr.*				P	P	P	P	P	P	p	P	P
8.	*Acalypha alnifolia Klein ex Wild*				P	-	-	-	-	P	P	P	P
9.	*Acalypha indica L.*						M	M	M				
10.	*Achyranthes aspera L.*				P	P	P		P	P	P	P	P
11.	*Actinopteris radiata*				P	-	-	P	-	P	P	P	P
12.	*Aerva lanata(L.)Juss.*	M					M						
13.	*Ageratum conyzoides L.*	M			P	P,M	P,M	M	M	P	P	P	p
14.	*Ailanthus excelsa Roxb.*	M				M	M	M	M				
15.	*Alangium salvifolium (L.f.)Wang*	M	M			M	M	M	M				
16.	*Albizia amara (Roxb.)Boivin*				P	-	-	P	-	P	P	P	P

17.	*Albizia odoratissima* (L.f.)Benth				-	-	P	-	-	-	-	-	-
18.	*Allium cepa*	M		M				M					
19.	*Allium sativum*	M	M	M			M	M	M				
20.	*Allium schoenoprasum L.*	M	M	M			M	M	M				
21.	*Aloe vera (L.)Burm.f.*	M	M	M	P	-	M	M	P,M	P	P	P	P
22.	*Amaranthus hypochondriacus*				P	P	P	P	P	P	P	P	P
23.	*Amaranthus spinosus L.*		M		P	P	P,M	-	P	P	P	P	P
24.	*Amaranthus viridis L.*				P	P	P	P	P	p	P	P	P
25.	*Amorphophallus dubius Blume*	M	M	M			M	M	M				
26.	*Andrographis paniculata Nees*	M	M	M	P	-	M	P,M	P,M	P	P	p	P
27.	*Angiopteris evecta*				P	P	P	-	P	p	P	P	P
28.	*Anogeissus latifolia (Roxb.ex DC.) Wall.ex Guill. & Perr.*				P	-	-	-	P	p	P	P	P
29.	*Anona reticulata L.*						M	M	M				
30.	*Areca catechu L.*	M	M	M	-	p	P,M	M	M	-	-	-	-
31.	*Argemone mexicana L.*				P	-	-	-	P	-	-	P	P
32.	*Aristolochia indica L.*	M	M		P	-	P,M	P	P,M	P	P	P	p
33.	*Asparagus racemosus Wild.*	M	M	M	-	P	P,M	P,M	M	-	-	-	-
34.	*Atalantia monophylla (L.) DC.*				P	-	-	-	P	p	P	p	P
35.	*Averrhoa bilimbi L.*						M	M	M				

36.	*Azadirachta indica A.Jss.*	M	M	M	P	p	P,M	M	P,M	P	P	P	P
37.	*Bacopa monneri (L.) Pennell*	M	M	M			M	M	M				
38.	*Baccaurea courtallensis (Wight) Muell.- Arg.*				-	-	P	P	-	-	-	-	-
39.	*Balanophora fungosa J .R. & G.Forst.*				-	p	-	-	-	-	-	-	-
40.	*Bambusa arundinaceae Willd.*	M	M	M	P	P	P,M	P,M	P,M	P	p	P	P
41.	*Basella alba L.*				p	-	-	-	P	P	p	p	P
42.	*Bauhinia racemosa Lam.*				p	P	-	-	p	P	p	P	P
43.	*Biophytum reinwadtii (Zucc.) Klotzsch.*	M	M	M	-	-	P,M	M	M	-	-	-	-
44.	*Blepharis maderaspatensis (L.) Roth.*				P	-	-	P	p	P	P	p	P
45.	*Blumea mollis (D.Don) Merr.*				-	-	P	P	-	-	-	-	-
46.	*Boerhavia diffusa L.*	M	M	M	P	-	M	M	P,M	P	P	P	P
47.	*Brassica juncea Hk.f.et Th.*	M	M	M	-	P	M	M	M	-	-	-	-
48.	*Breynia retusa (Dennst.) Alston*				P	-	P	-	P	P	P	P	P
49.	*Briedelia retusa (L.) Spreng.*				P	-	-	P	P	P	P	P	P
50.	*Bridelia scandens (Roxb.) Willd.*				P	-	P	P	P			P	P
51.	*Buchanania lanzan Spreng.*				P	-	P	-	P	P	P	P	P
52.	*Butea monosperma Lam.*	M	M	*M*	P	-	-	-	P	P	P	P	P
53.	*Cajanus cajan (L.) Millsp.*				P	P	p	P	P				
54.	*Calophyllum inophyllum L.*	M	M	M			M	M	M				

55.	*Calotropis gigantia(L.) R.Br.*	M	M	M	P	-	P,M	P,M	P,M	P	P	P	P
56.	*Camellia sinensis (L.) O.Ktze.*	M	M	M			M	M	M				
57.	*Canarium strictum Roxb.*	M		M	-	P	P,M	P	-	-	-	-	-
58.	*Cannabis sativa L.*				P	P	P	P	P	P	P	P	P
59.	*Cansjera rheedi Gmel.*	M	M	M	M		M	M	M				
60.	*Canthium dicoccum (Gaertn.) Teijsm. & Binn.*				P	-	-	-			P	P	P
61.	*Canthium parviflorum Lam.*				P	-	P	-	P	P	P	P	P
62.	*Capparis zeylanica L.*	M	M	M	P	-	M	P,M	P,M	P	P	P	P
63.	*Capsicum fruitescens Clarke.*	M	M	M	-	-	P,M	M	M	-	-	-	-
64.	*Capsicum nigrum*	M	M	M			M	M	M				
65.	*Caralluma attenuate Wight*				P	-	-	-	p	P	P	P	P
66.	*Cardiospermum helicacabum L.*				p	-	M	P,M	P,M	P	P	P	P
67.	*Carica papaya L.*						M	M	M				
68.	*Carissa carandas L.*				P	-	-		P	P	-	-	-
69.	*Carmona retusa (Vahl) Masamune*				P	-	-	P	P	P	-	-	-
70.	*Cassia auricualata L.*				P	-	-	-	P	P	P	P	P
71.	*Cassia fistula L.*				P	P	P,M	M	M	P	P	P	P
72.	*Cassia occidentalis L.*				P	-	M	M	M	P	P	P	P
73.	*Cassia tora L.*				P	P	P,M	P,M	M	-		P	P

74.	*Cassine glauca Lam.*				P	-	-	P	-	-	P	P	P
75.	*Cassuarina equisetifolia L.*				P	-	-	-	P	-	-	P	P
76.	*Cayratia pedata (Lam.) Juss.*						M	M	M				
77.	*Celastrus paniculatus Willd.*				P	P	-	P	P	P	-	-	-
78.	*Celosia argentia L.*				P	P	P	-	P	P	P	P	P
79.	*Celosia polygonoides Retz.*				P	-	-	-	P	P	P	P	P
80.	*Cereus pterogonus Lam.*				P			P	P				
81.	*Centella asiatica L.*				P	-	M	P,M	P,M	P	P	P	P
82.	*Cephalandra indica (Wight. & Arn.) Naud.*						M	M	M				
83.	*Chasalia curviflora Wall.ex Kurz*						M	M	M				
84.	*Chenopodium ambrosioides L.*				P	P	P	P	P	P	P	P	P
85.	*Chloroxylon swietenia DC.*				P	-	-	P	P	P	P	P	P
86.	*Chromolaena odorata (L.)King & Robin.*				-	-	-	P,M	M	-	P	P	P
87.	*Cinnamomum macrocarpum Hook .f.*				-	P	P	P	-	-	-	-	-
88.	*Cipadessa baccifera (Roth.) Miq.*						M	M	M				
89.	*Cissampelos pariera L.*						M	M	M				
90.	*Cissus quadrangularis L.*				P	-	M	M	P,M	P	P	P	P
91.	*Cissus repens Lam.*						M	M	M				
92.	*Citrullus colocynthis (L.) Schrad.*				P	-	-	P	P	P	P	P	P

93.	*Citrus limon (L.) Burm.f.*				P	P	P	P	P	P	P	P	P
94.	*Citrus medica L.*						M	M	M				
95.	*Clausena heptaphylla (Roxb.) Wight & Arn. Ex Benth.*				P	-	-	P	P	P	P	P	P
96.	*Cleome gynandra L.*				P				P	P	P	P	P
97.	*Clematis gauriana Roxb. ex DC.*				-	P	P,M	P,M	M	-	-	-	-
98.	*Clerodendrom phlomidis L.f.*				p	-	-	-	P	P	P	P	P
99.	*Clerodendrom serratum (L.) Moon*				-	P	P		-	-	-	-	-
100.	*Clerodendrum viscosum Vent.*				-		P	p	-	-	-	-	-
101.	*Clitoria ternatea L.*				p	-	M	P,M	,M	P	P	P	P
102.	*Coccinia grandis(L.) Voigt*				p	-	P	P	P	P	P	P	P
103.	*Cocos nucifera L.*				-	-	-	-	-	-	-	-	-
104.	*Coffea arabica L.*						M	M	M				
105.	*Commelina benghalensis L.*				p	-	-	p	P	P	P	P	P
106.	*Commiphora caudata (Wight & Arn.) Engl.*				P	-	M	M	P,M	P	P	P	P
107.	*Corbichonia decumbens*				P	-	-	P	P	P	P	P	P
108.	*Cordia wallichii G.Don*				-	-	P	P	-	-	-	-	-
109.	*Costus speciosus (Koenig) Sm.*				-	-	P,M	M	M	-	-	-	-
110.	*Crateva magna (Lour.) DC.*						M	M	M				
111.	*Cucumis sativus L.*				P	P	P	P	p	P	p	P	P

112.	*Cucurbita pepo L.*				P	P		p		P	P	P	p
113.	*Cullenia exarellata Robyns*				-	P	P	P	-	-	-	-	-
114.	*Cuminum ciminum*						M	M	M				
115.	*Curculigo orchioides Gaertn.*				P	P	P,M	M	P,M	P	P	P	P
116.	*Curcuma aromatica Salisb.*						M	M	M				
117.	*Curcuma longa L.*						M	M	M				
118.	*Cyathula prostrate (L.) Bl.*						M	M	M				
119.	*Cycas circinalis L.*				P	-	-	P	P	P	P	P	P
120.	*Cyclea peltata Miers*				P	P	P,M	P,M	P,M	P	P	P	P
121.	*Cymbopogon flexuosus(Nees ex Steud.) Wats.*				-	P	P	P,M	M	-	-	-	-
122.	*Cynodon dactylon (L.) Pers.*				P	P	P,M	P,M	P,M	P	P	P	P
123.	*Cyperus malaccensis Lam.*				P	-	-	P	P	P	P	P	P
124.	*Cyperus rotundus L.*				-	-	P	-	P,M	P	P	P	-
125.	*Dalbergia latifolia Roxb.*				-	-	P,M	P,M	P,M	P	P	P	-
126.	*Dalbergia paniculata Roxb.*				P	-	-	-	P	P	P	P	P
127.	*Datura metel L.*				-	-	P,M	M	M	-	-	-	-
128.	*Datura stramonium L.*						M	M	M				
129.	*Derris scandens (Roxb.) Benth.*						M	M	M				
130.	*Dendrocalamus strictus (Roxb.) Nees*				P	-	-	P	P	P	P	P	P

131.	*Desmodium gangeticum (L.) DC.*				-	P	P,M	P,M	M	-	-	-	-
132.	*Desmodium triangulare (Retz.) Merr.*				-	-	P	-	-	-	-	-	-
133.	*Desmodium triflorum (L.) DC.*				P	-	-	P	P	P	p	P	P
134.	*Desmodium triquetrum (L.) DC.*				P	-	-	P	P	P	P	P	P
135.	*Desmos lawii (Hook .f. & Thoms.) Safford*						M						
136.	*Desmostachya bipinnata*				-	P	P	-	-	-	-	-	-
137.	*Dillenia pentagyna Roxb.*						M	M	M				
138.	*Dioscorea bulbifera L.*						M	M	M				
139.	*Dioscorea oppositifolia L.*				P	P	P	-	P	P	P	P	P
140.	*Dioscorea pentaphylla L.*				P	P	P	P	P	P	P	P	P
141.	*Dioscorea tomentosa Koenig ex Spreng*				-	P	P	P	-	-	-	-	-
142.	*Dioscorea wallichii Hook .f.*				-	P	P	P	-	-	-	-	-
143.	*Diospyros Montana Roxb.*				P	-	-	p	P	P	P	P	P
144.	*Diplazium esculentum*				P	P	P	-	P	P	P	P	P
145.	*Dipterocarpus indicus Bedd.*						M	M	M				
146.	*Dodonea angustifolia L.f.*				P	-			P	P	P	P	P
147.	*Dolichus biflorus L.*						M	M	M				
148.	*Drynaria quercifolia*				P	-	-	P	P	P	P	P	P
149.	*Eclipta alba (l.) Hassk.*				-	-	P,M	M	M	-	-	-	-

150.	*Eclipta prostrate L*						M						
151.	*Elaeocarpus serratus L.*						M	M	M				
152.	*Elephantopus scaber L.*				-	-	P	-	-	-	-	-	-
153.	*Elettaria cardamomum (L.) Maton var.cardamomum*							M					
154.	*Eleusine coracana (L.) Gaertn.*				P	P	P	-	P	P	P	P	P
155.	*Embelia acutipetala (Lam.ex Hassk.)M.R. & S.M.Alm.*				-	-	P	P	-	-	-	-	-
156.	*Emblica officinalis Gaertn.*						M	M	M				
157.	*Entada rheedii Spreng.*				-	-	P	P	-	-	-	-	-
158.	*Equisetum ramosissimum*				P	-	-	P,M	P,M	P	P	P	P
159.	*Erythroxylum monogynum Roxb.*				P	-	-	P,M	P,M	P	P	P	P
160.	*Euphorbia hirta L.*				P	P	P,M	-	P,M	P	P	P	P
161.	*Euphorbia thymifolia L.*				P	-	-	P,M	P,M	P	P	P	P
162.	*Evolvulus alsinoides (L.) L. var.alsinoides*				P	-	-	P,M	P,M	P	P	P	P
163.	*Ficus exasperate Vahl*				-	-	P,M	P,M	-	-	-	-	-
164.	*Ficus hispida*				P	-	P,M	P,M	P,M	P	P	P	P
165.	*Ficus racemosa L.*				P	P	P,M	-	P,M	P	P	P	P
166.	*Ficus religiosa L.*				P, M	-	-	P,M	P,M	P	P	P	P
167.	*Flacourtia indica (Burm. f.) Merr.*				P	-	-	P	P	P	P	P	p

168.	*Garcinia gummi – gutta (L.) Rob.*		M	M	-	P	P	P	-	-	-	-	-
169.	*Givotia rottleriformis Griff.*				\P	-	-	-	P	P	P	P	p
170.	*Gloriosa superb L.*	M	M	M	P	-	M	P,M	P,M	P	P	P	P
171.	*Glycosmis mauritiana (Lam.) Tanaka*				P	-	-	P	P	P	P	P	P
172.	*Gmelina arborea Roxb.*				-	P	P	P		-	-	-	-
173.	*Gossipium barbadense L.*				P	-	-	P	P	P	P	P	P
174.	*Grewia bractiata Mast.*				P	-	-	P	P	p	p	p	P
175.	*Grewia tiliifolia Vahl.*				p	P	P	-	P	p	p	P	P
176.	*Grewia villosa Willd.*				P	-	-	P	P	p	p	P	P
177.	*Gymnema sylvestre (Retz.) R.Br. ex Schult.*				P	-	-	-	P	P	p	P	p
178.	*Helicteres isora L.*	M	M	M	-	P	P,M	M	P	-	-	-	-
179.	*Hemidesmus indicus (L.) R.Br.*	M	M	M	P	P	P,M	M	P,M	P	p	P	P
180.	Holarrhena antidysenterica Wall.	M					M		M				
181.	Holigarna arnottiana Hook .f.	M	M	M	M		M		M				
182.	Holoptelea integrifolia (Roxb.) Planch.	M	M	M			M	M	M				
183.	*Holostemma ada-kodien Schult.*				-	P	P	P	-	-	-	-	-
184.	*Homonoia riparia Lour.*				-	P	P	P	-	-	-	-	-
185.	Hopea parviflora Bedd.	M	M	M			M	M	M				
186.	Hydnocarpus pentandra (Buch.-Ham.) Oken	M	M										

187.	Hygrophila spinosa Anders.	M	M	M	M		M						
188.	*Hyptis suaveolens (L.) Poit.*				-	-	P	P	-	-	-	-	-
189.	*Ichnocarpus frutescens (L.) R.Br.*				P	-	-	P	P	P	P	P	P
190.	*Imperata cylindrical (L.) Raeusch.*				p	-	-	P	P	p	P	P	P
191.	*Indigofera linnaei Ali*				P	-	-	P	P	p	P	P	P
192.	*Indigofera spicata Forssk.*	M	M	M	M		M						
193.	Ipomaea pestigridis L.	M	M	M			M	M	M				
194.	Ixora coccinea L.	M	M	M			M	M	M				
195.	*Jatropha curcas L.*				P	P	P	P	P	p	P	P	P
196.	Justicia gendarussa Burm.f.	M	M	M			M	M	M				
197.	*Justicia tranquebariensis L.f.*				P	-	-	-	P	p	P	P	P
198.	Kaempferia galangal L.						M		M				
199.	Kirganelia reticulate (Poir.) Baill.	M	M	M			M	M	M				
200.	Kyllinga brevufolia Rottb. var. brevifolia			M									
201.	*Lablab purpureus (L.) Sweet*				P	P	P	P	P	p	P	P	P
202.	*Lagenaria siceraria (Molina) Standley*				P	p	P	-	P	p	P	P	P
203.	*Lagerstromea microcarpa Wight*				-	P	P	P	-	-	-	-	-
204.	Lannea coromandelica(Houtt.) Merr.		M					M					
205.	Lantana camara L. var. aculeate (L.) Mold.				P	p	P	P	P	p	P	P	P

206.	*Lantana indica Roxb.*				-	-	P	P	-	-	-	-	-
207.	Lawsonia alba Lam.	M					M	M					
208.	Lepisanthus tetraphylla (Vahl) Radlk.	M	M	*M*			M	M	M				
209.	*Leptadenia reticulata (Retz.) Wight & Arn.*	M	M	M	P	-	M	P	P	P	P	P	P
210.	*Leucas aspera (Willd.) Spreng.*	M	M	M	P	-	M	M	P,M	p	P	P	P
211.	*Limonia acidissima L.*				P	-	-	-	P	p	P	P	P
212.	*Litsea stocksii (Meisner) Hook.f.*				P	-	-	P	p	P	P	P	P
213.	*Lobelia nicotianifolia Roth ex Roem. & Schult.*				-	-	P	P	-	-	-	-	-
214.	*Luffa cylindrical (K.) Roem.*				-	-	P	P	-	-	-	-	-
215.	*Lycopersicon esculentum Mill.*				P	P	P	P	P	P	P	P	P
216.	*Macrotyloma uniflorus*				P	-	-	-	P	P	P	P	P
217.	*Mallotus philippensis (Lam.) Muell.-Arg.*				P	-	P	P	P	P	P	P	P
218.	*Mangifera indica L.*	M	M	M	P	P	P,M	P,M	P,M	P	P	P	P
219.	Maranta arundinacea L.	M	M	M			M	M	M				
220.	Melia dubia Cav.	M	M	M			M	M	M				
221.	Melochia corchorifolia L.	M	M	M			M	M	M				
222.	Mesua ferrea L.	M	M	M			M	M	M				
223.	Michelia champaka L.							M					
224.	Miliusa tomentosa (Roxb.) Sinclair	M	M	M			M	M	M				

225.	Mimosa pudica L.		M	M									
226.	*Momordica charantia L.*	M	M	M	-	-	P,M	P,M	M	-	-	-	-
227.	*Morinda coreia Buch.- Ham.*				P	-	-	-	P	P	P	P	P
228.	*Moringa oleifera Bedd.*	M	M	M			M	M	M				
229.	*Moringa pterygosperma Gaertn.*				P	-	-	P	P	P	P	P	P
230.	*Mucuna pruriens (L.) DC.*	M	M	M	p	-	P,M	P,M	P,M	P	P	P	P
231.	*Mukia madraspatana (L.) Roem.*				-	-	P	-	-	-	-	-	-
232.	*Mundulea sericea (Willd.) Cheval.*				P	-	-	P	P	P	P	P	P
233.	*Murraya koenigii (L.) Spreng.*	M	M	M	P	-	P,M	P,M	P,M	P	P	P	P
234.	*Murraya paniculata (L.) Jack.*	M	M										
235.	*Musa paradisiacal L.*						M	M					
236.	*Mussaenda frondosa L.*	M	M	M			M	M	M				
237.	*Mussaenda hirsutissi (Hook.f.) Hutch.ex Gamble*				-	-	P	-	-	-	-	-	-
238.	*Myristica fragrans Houtt.*	M	M	M			M	M	M				
239.	*Naregamia alata Wight & Arnon.*						M		M				
240.	*Naravelia zeylanica (L.) DC.*				P	P	P	P	P	P	P	P	P
241.	*Naringi crenulata (Roxb.) Nicols.*				P	-	-	P	P	P	P	P	P
242.	*Nelumbium speciosum Willd.*	M	M	M	M			M	M				
243.	*Nilgirianthus ciliates (Nees) Bremek.*				-	P	P	P	-	-	-	-	-

244.	*Nothapodites nimmoniana (Graham) Mabb.*	M		M	M		M	M	M				
245.	*Nothopegia travancorica Bedd. Ex Hook.f.*	M	M	M	M		M	M	M				
246.	*Ocimum americanum L.*				P	-	-	P	P	P	P	P	P
247.	*Ocimum basilicum L.*				p	-	-	P	P	P	P	P	P
248.	*Ocimum canum Sims*		M					M					
249.	*Ocimum gratissimum L.*				P	-	-	P	p	P	P	P	P
250.	*Ocimum sanctum L.*	M	M	M		M	M	M					
251.	*Ocimum tenuiflorum L.*				P	-	-	P	P	P	P	p	P
252.	*Olax imbricate Roxb.*	M	M	M			M						
253.	*Opuntia dillenii (Ker-Gawl.) L.*				P	-	-	-	p	P	P	p	p
254.	*Oryza sativa L.*				P	P	P	p	P	P	P	P	P
255.	*Oxalis corniculata L.*	M	M	M	P	P	P,M	P,M	P,M	P	P	P	P
256.	*Palaquim ellipticum (Dalz.) Baill.*				-	p	P	P	-	-	-	-	-
257.	*Panicam miliare non Lam.*				P	P	P	p	P	P	P	p	P
258.	*Parahemionitis cordata*				P	-	-	p	p	P	P	p	P
259.	*Paspalam scorbiculatum L.*				P	P	P	P	P	P	P	P	P
260.	*Passiflora foetida L.*				P	-	-	P	P	P	P	P	P
261.	*Pavonia odorata Willd.*		M	M			M	M	M				
262.	*Pennisetum americanum (l.) Leeke*				P	P	P	P	P	P	P	P	p

263.	*Pergularia daemia (Forssk.) Chiov.*				P	-	-	P	p	P	P	P	P
264.	*Phaseolus mungo L.*				P	-	-	P	P	p	p	p	P
265.	*Phoenix humilis Royle*				P	P	P	-	P	p	P	P	P
266.	*Phyllanthus amarus Schum. & Thonn.*				P	P	P	-	P	P	P	P	P
267.	*Phyllanthus emblica L.*				P	P	p	p	P	p	p	P	P
268.	*Pimpinella heyneana (DC.) Kurz*				-	P	P	p	-	-	-	-	-
269.	*Piper betle L.*	M	M	M			M	M	M				
270.	*Piper longum L.*	M	M	M	-	-	P	P,M	M	-	-	-	-
271.	*Piper nigrum L.*	M	M	M			M		M				
272.	*Pithecellobium dulce (Roxb.) Benth.*				P	-	-	P	P	P	P	p	P
273.	*Pleiospermium alatum (Wall. ex Wight & Arn.) Swingle*				P	-	-	P	p	P	P	P	P
274.	*Plumbago zeylanica L.*	M	M	M	P	-	M	P,M	P	P	P	P	P
275.	*Poeciloneuron indicum Bedd.*	M	M				M	M	M				
276.	*Polyalthia longifolia (Sonner.) Thw.*		M	M			M	M	M				
277.	*Polycarpaea corymbosa (L.) Lam.*	M	M	M			M	M	M				
278.	*Pongamia glabra Vent.*	M	M	M			M	M	M				
279.	*Pongamia pinnata (L.) Pierre*	M	M	M	p	-	-	P,M	P,M	P	P	P	P
280.	*Portulaca pilosa L.*	M	M	M			M	M	M				
281.	*Premna corymbosa*				P	-	-	-	P	P	P	P	P

282.	*Premna tomentosa Willd.*				P	-	-	P	P	P	P	P	P
283.	*Prosopis juliflora (Sw.) DC.*				P	-	-	P	P	P	P	P	P
284.	*Prunus avium*			M			M		M				
285.	*Pseudarthria viscid (L.) Wight & Arn.*				-	p	p	P	-	-	-	-	-
286.	*Psidium guajava L.*	M	M	M				M	M				
287.	*Pterocarpus marsupium Roxb.*	M	M		P	P	P,M	-	P,M	p	P	P	P
288.	*Pterocarpus santalinus L.f.*	M	M	M			M	M	M				
289.	*Pterolobium hexapetalum (Roth) Sant. & Wagh*				p	-	-	P	P	P	p	P	P
290.	*Pterospermum reticulatum Wight & Arn.*	M	M	M			M	M					
291.	*Pterygota alata (Roxb.) R.Br.*		M	M			M	M	M				
292.	*Randia malabarica Lam.*				P	-	-	-	P	P	P	P	P
293.	*Rauvolfia serpentine (L.) Benth.ex Kurz*				-	p	p	P	-	-	-	-	-
294.	*Ricinus communis L.*	M		M	P	P	P,M	P,M	P	P	P	P	P
295.	*Rubia cordifolia L.*				-	p	p	-	-	-	-	-	-
296.	*Saccharum officinarum L.*		M	M			M	M	M				
297.	*Sanseveria roxburghiana Schult. & Schult.f.*				P	P	-	-	P	P	P	P	p
298.	*Santalum album L.*	M	M	M	P	-	-	P	P,M	P	P	P	P
299.	*Sapindus emarginatus Vahl*				-	-	P	P	-	-	-	-	-
300.	*Sapindus trifoliate L.*	M	M	M			M	M	M				

301.	*Saraca asoka (Roxb.) de Wilde*	M	M				M	M	M				
302.	*Sarcostigma kleinii Wight. & Arn.*			M			M	M	M				
303.	*Schleichera oleosa (Lour.) Oken*	M	M	M			M	M	M				
304.	*Schumannianthus virgatus (Roxb.) Rolfe*				-	-	P	-	-	-	-	-	-
305.	*Scoparia dulcis L.*				p	-	-	P	P	P	P	P	P
306.	*Secamone emetic (Retz.) R. Br. Ex Schult.*				P	-	-	P	P	P	P	P	P
307.	*Selaginella delicatula*				-	P	-	-	-	-	-	-	-
308.	*Semecarpus anacardium L.f.*	M	M	M			M	M	M				
309.	*Sesamum indicum L.*				P	-	-	P	P	P	P	P	P
310.	*Sida acuta Burm.f.*				P	P	P	P	P	P	P	p	P
311.	*Sida cordifolia L.*	M	M	M			M	M	M				
312.	*Sida rhombifolia L.*				-	P	P	P	-	-	-	-	-
313.	*Solanum anguvii Lamk*				P	-	-	-	P	P	P	P	P
314.	*Solanum insanum L.*				P	-	-	P	P	P	p	P	P
315.	*Solanum nigrum non L.*				P	P	p	P	P	P	P	p	P
316.	*Solanum torvum Sw.*	M	M	M	-	p	P,M	M	M	-	-	-	-
317.	*Sorghum bicolor (L.) Moench*				P	P	P	P	P	P	P	P	P
318.	*Spermacoce hispida Hook.f.*				P	-	P	P	P	P	P	P	P
319.	*Spondias pinnata (L.f) Kurz*	M		M			M		M				

320.	*Sterculia guttata Roxb. Ex DC.*	M	M	M	-	P	P,M	P,M	M	-	-	P	-
321.	*Strebles asper Lour.*				P	-	-	P	P	P	P	P	P
322.	*Strychnos nux-vomica L.*	M	M	M	P	-	M	P,M	P,M	P	P	P	P
323.	*Strychnos potatorum L.f.*				P	-	-	P	P	P	P	P	
324.	*Syzygium aromatic (L>) Merr. & Perry*	M	M	M			M	M	M				
325.	*Syzigium cumini (L.) Skeels*				P	P	P	P	P	P	P	P	
326.	*Tabernaemontana coronaria (Jacq.)Willd.*	M	M	M			M	M	M				
327.	*Tabernaemontana heyneana Wall.*	M	M	M			M	M	M				
328.	*Tamarindus indica L.*	M	M		P	-	M	P,M	P,M	P	P	P	
329.	*Tarenna asiatica (L.) O.Ktze. ex K. Schum.*				P	-	-	P	P	P	P	P	
330.	*Tectona grandis L.f.*				P	P	P	P	P	P	p	P	P
331.	*Tephrosia purpurea (L.)Pers.*	M	M	M	P	-	M	P,M	P,M	P	P	P	P
332.	*Terminalia arjuna (Roxb. Ex DC.) Wight & Arn.*				P	-	-	-	P	P	P	P	P
333.	*Terminalia cattapa L.*	M	M	M			M	M	M				
334.	*Terminalia chebula Retz.*	M	M	M	P	-	-	M	P,M	P	P	P	P
335.	*Themeda triandra Forssk.*				P	-	-	P	P	P	P	P	P
336.	*Thespesia lampas (Cav.) Dalz. & Gibs.*	M	M	M	-	-	P,M	M	P,M	P	P	-	-
337.	*Thottea siliquosa (Lam.) Ding Hou*				-	-	P	P	P	p	p	-	-
338.	*Tinospora cordifolia L.*	M	M	M			M	M	M				

339.	*Toddalia asiatica (L.) Lam.*	M	M	M	P	-	M	P,M	P,M	P	P	P	P
340.	*Tragia involucrate L.*	M	M	M	-	P	M	P,M	M	-	-	P	-
341.	*Trewia nudiflora L.*				P	-	-	P	P		P	P	P
342.	*Tribulus terrestris L.*	M	M	M	P	-	M	M	P,M		P	P	P
343.	*Trichodesma indicum (L.) Lehm.*				P	-	-	p	P		P	P	P
344.	*Tridax procumbens L.*	M			P	P	P,M	P	P		P	P	P
345.	*Triumfetta rhomboidea Jacq.*	M	M	M			M	M	M				
346.	*Tylophora asthmatica(L.f) Wight Arn.*	M	M	M			M	M	M				
347.	*Vateria indica L.*	M	M	M	-	P	P,M	M	M	-	-	P	-
348.	*Vepris bilocularis (Wight & Arn.) Engl.*	M											
349.	*Vernonia cinerea (L.) Less.*	M	M	M			M	M	M				
350.	*Vernonia divergens (Roxb.) Edgew.*				P	-	P	P	P	P	P	P	P
351.	*Vetiveria zizanioides (L.) Nash*	M	M	M			M	M	M				
352.	*Vicoa indica (L.) DC.*				P	-		P	P	P	P	P	P
353.	*Vigna radiate L.*				-	-	P	P	-	-	-	P	-
354.	*Vigna unguiculata (L.) Walp.*				P	P	P	P	P	P	P	P	P
355.	*Vitex altissima L.f.*		M			-	M	P	P	P	P	P	P
356.	Vitex negundo L.	M	M	M			M	M	M				
357.	Walsura trifolia (A.Juss.) Harms	M	M	M			M	M	M				

358.	Waltheria indica L.	M	M	M			M	M	M				
359.	Withania somnifera (L.) Dunal	M	M	M			M	M	M				
360.	*Wattakaka volubilis (L.f.) Stapf*					-	-	p	P	P	P	P	P
361.	*Wrightia tinctoria (Roxb.) R.Br.*				p	-	P	-	P	P	P	P	P
362.	*Xylia xylocarpa (Roxb.) Taub.*	M	M	M			M	M	M				
363.	*Zea mays L.*				P	P	P	-	P	P	P	P	P
364.	*Zingiber officinale Rosc.*	M	M	M			M	M	M				
365.	*Zizyphus mauritiana Lam.*				P	-	-	-	P	P	P	P	p
366.	*Zizyphus oenoplea (L.)Mill.*	M	M	M	-	-	P,M	M	M	-	-	P	-
367.	*Zizyphus rugosa Lam.*				-	P	P	P	-	-	-	P	-

Strategy and action plan for conservation and utilization of plant resources in a sustainable manner

Some of the strategies and action plans for conservation and utilization of plant resources in a sustainable manner are the following.

1. **Strategy** : Create a network of ethnobotanical researchers and identify gaps in information.

Action Plans:

a) Identify the institutions, universities, NGOs etc. who conduct research on ethnobotany in the state and create an institutional network.

b) Conduct periodic meetings to exchange information.

c) Identify the gaps in information through the above mentioned meetings.

2. **Strategy :** Prioritize the gaps identified and conduct ethnobotanical reaserch.

Action Plans:

a) Prioritize the gaps in information system for research.

b) Identify suitable institutions who conduct ethnobotanical research and extend support.

c) Develop proper monitoring mechanism and ensure quality of research through periodic review.

3. **Strategy** : Conserve the ethnobotanical plants which are endemic and RET species.

Action Plans:

a) Identify the endemic and RET plant species through the information system, Red Data Book, News Letter of IUCN etc.

b) Develop in situ conservation and recovering plan.

c) Develop ex situ conservation plan.

4. **Strategy** : Develop comprehensive baseline information for developing management plans and monitoring.

Action Plans:

a) Establish permanent monitoring plots, transects and prepare database on distribution of ethnobotanical species, population structure and its resilience and carrying capacity of habitat.

b) Conduct ecological studies on key species.

c) Conduct periodical review of management constraints / problems.

5. **Strategy** : Create different management zones.

Action plans:

a) Identify different management zones.

b) Manage different zones for sustainable conservation of plant resources

6.Strategy : Identify and restore the degraded area.

Action Plans:

a) Identify the degraded areas through the maps prepared by KFRI.

7.Strategy : Develop monitoring design and protocols for each activity.

Action Plans:

a) Develop a participatory monitoring committee in each tribal settlement.

b) Identify different activities that are being implemented in the tribal settlements and set parameters for participatory monitoring.

8. **Strategy** : Create awareness among tribal people and the public to minimize the threats and to encourage sustainable utilization of resources.

Action Plans:

a) Develop an interpretation plan for each tribal settlement.

b) Identification of target groups.

c) Develop curriculam for each target group.

d) Identify and develop appropriate tools for awareness programmes.

9. **Strategy** : Create awareness among NGOs and other institutions regarding financial support provided by GOK and GOI for tribals through different schemes.

Action Plans:

a) Create a database of all the institutions / NGOs working in the field of ethno-botany.

10. **Strategy** : Review the ongoing PFM and Eco development initiatives.

Action Plans:

Evaluate and identify the short falls or weakness of the ongoing participatory approach.

11. **Strategy** : Extend PFM / Eco development programmes in all the tribal settlements of Palakkad and Malappuram districts.

Action Plans:

a) Analyze and assess the mindset of the tribals and forest department officials towards PFM and Eco development.

b) Identify Stake-holders, their level of dependence and reciprocal impact on the forests.

c) Involve and utilize tribal knowledge in gathering information.

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12. **Strategy** : Improve capacity through training, workshops etc.

Action plans :

a) Impart basic training to frontline staff immediately after selection.

b) Impart refresher courses and special training in tune with the policies and tools of modern management.

c) Periodic review and modification of training curriculum.

d) Compulsory posting of instructors in the training school should be reviewed and only people with correct aptitude and skill may be appointed.

13.Strategy: Establish a model for restorable utilization of ethnobotanical plants for livehood and the equitable benefits

Action plans :

a) Access the socio economic status of tribals who are the dependants of the forest resources

b) Assess the extent of demand, and resources being used, mode of collection and impact (positive and negative) due to the collection , through participatory approach.

c) Assess status, ecology, regeneration capacity and resilience to exploitation carrying capacity and stock of the NWFP species.

d) Develop alternative livelihood mechanism for the tribals to reduce their dependence on the forest.

DISCUSSION

The study was confined to the tribals of Palakkad and Malappuram districts. The Tribals of both the districts include Irular, Paniyan, Mudugar, Kurumba, Malasar, Malamalasar, Malai arayan, Kattuaikan, Kadar, Malamuthan, Aranadan, Kuruman, Cholanaikan and Kurunji Paniyan. These tribals live either inside or outside the forests. Tribals depend forests on several purposes like agriculture implements, dyes,water, food, fodder, fuel, fibres, furniture, fishing / hunting, gum, gunny bags / ropes, house building , medicine, musical instruments, oil, small timber, socio-religious purposes, tannin and tools. They use enormous plants for their ailments. Different tribal groups use different plants for a particular ailment. Since tribal medicine is cheap, curative and with less side effects rural people is also being accepted by it. Nowadays tribals gather plants not only for their domestic needs but also for commercial purposes. The Kerala forest department has given permission to tribals to collect more than one hundred and fifteen NWFPs from the forests (Appendix 2). The SC / ST Federation collects NWFPs from the tribals and gives them the necessary remuneration. In this way tribals get somewhat good remuneration to their products collected from the forests. In addition to these NWFPs a number of other plant products are collected for food, medicine etc. For food they collect a number of leaves, roots, tubers, rhizomes, flowers, fruits and seeds. Since the demand of NWFPs and other plant products are increased the pressure to collect these items from the forests also increased. As a result some of these plants are now included in the threatened categories.

A total of 369 plants have been found to be used by various tribal groups for edible and non-edible purposes from Palakkad and Malappuram Districts. Some of these plants are used for house construction, food, medicine etc.

Different parts of plants like leaves, roots, rhizomes, inflorescence, fruits, seeds etc. are being used for different purposes. The edible and non-edible plants utilized by the tribals of Palakkad and Malappuram districts are given in the **table I.**

Now a days much pressure has been exerted by the tribals to collect medicinal plants from the wild. The quantitative demand of these plant raw drugs is on the increase and this has definite implications on their conservation and sustainable utilization. The

vast majority of medicinal plants used in traditional medicine systems is collected from the wild; while propagation occurs for a few species. Propagation is generally limited due to the expenses and time periods required for plants to reach saleable size. Regrettably unscientific harvest is an increasingly common occurrence that threatens not only the future of the species but also the livelihood and health status of tribal people.

Unscientific collection of species through digging and cutting of plants is a matter of concern. The increasing scarcity of medicinal plant species is inevitably accompanied by increasing prices. As growing demand is one of the root causes of over- exploitation the most popular and effective species are the most vulnerable.

The unsustainable methods of collection of some of the plants and their plant parts by different tribal groups and their proposed sustainable methods of collection are given as follows.

Traditionally tribals use plants for their different ailments. In some cases they use whole plants for medicines and in other cases different parts of plants such as leaves, roots, stem, flowers, fruits and seeds. They use whole plants or different parts of plants unsustainably due to commercial purposes. The population of commercially exploited herbaceous species is not affected much by the present rate of extraction, largely due to the efficient and diverse regenerative methods capable of overcoming the exploitation rate. It is observed that *Sida rhombifolia*, *Pseudarthria viscida and Desmodium gangeticum* are collected by Kuruman, Mudugan, Kattunaikan and paniyan and the smaller and weaker plants are left out and only the robust plants are collected. These plants could grow and become the seed source for the next growing generation. The long and tuberous roots of *Hemidesmus indicus, Asparagus racemosus, Plumbago zeylanica* etc. are difficult to collect completely. These species can also regenerate from left out roots. The collection of these species does not affect the population.

Curculigo orchioides can regenerate through tuberous roots, leaf apices, and seeds. Thus most of these species showed better regeneration rate from left out roots. Since the root of *Aegle marmelos* is one of the dasamoola, tribals cut down the whole tree and collect the roots. Sustainable method of collection is the collection of the mature side roots from the standing tree without disturbing the tap root. Bark of *Oroxylem indicum* is used against rheumatism. Root bark is used against diarrhoea and dysentery. Tribals cut

down the tree and collect bark and roots. Sustainable method of collection of bark is the removal of 1/3 of bark and remove the outer and middle bark and leave the inner bark for regeneration. In the case of roots, collect only the mature side roots and leave the tap root untouched. The roots of G*melina arborea* and *Stereospermum colais* which are also Dasamoolas can also be sustainably collected as described above. The corm of *Amorphophallus paeonifolius* is used against piles by all groups' of tribals of Malappuram district. Usually tribals dig out the corm and roast it over fire. Then small pieces of it will be kept on the affected area. This may be repeated two or three times daily for two or three days.

Sida rhombifolia is collected by all tribal groups of Palakkad districts .The plant is medicinal and also yeilds fibre. Roots are used in the treatment of rheumatism. Tribals collect and sell root to the SC / ST federation. Tribals uproot them before seed setting and seed dispersal. Sustainable methods of collection will only encourage regeneration. Leave small area untouched and collect roots after seed setting and seed dispersal.

Andographis paniculata is a medicinal herb and has been used for centuries for the treatment of various ailments. Malasar of Palakkad district use the juice of this plant to treat jaundice and leaf paste is used to treat snake bite. The tribals collect the whole plant by uprooting them before flowering. This unsustainable overharvesting is the reason for not regenerating the plants properly. The sustainable method of collection is by cutting the plants four centemetre above the ground level or further more increased harvesting would reduce the pressure for wild harvest.

The Kuruman, Mudugan and Kattunaikan of Palakkad district collect the roots of *Rauvolfia serpentina* by uprooting the plant. This unsustainable harvesting of the roots of *Rauvolfia serpentina* by the tribals by uprooting the plant leads to a depletion of the resource in the wild. It is listed as an endangered species due to its indiscriminate harvesting and the poor method of conventional propagation. It can be harvested sustainably by harvesting its mature and developed roots only and sparing the smaller roots (root suckers) for regeneration. The roots should be collected in the month of December to January when the active content is more. The roots should also be collected after the maturity of seeds for regeneration of plants for the next generation.

Malasar, Malamalasar, Kadar and Muthuvan of Palakkad district collect the stem of *Tinospora cordifolia* from above the ground without leaving any stem for copycing. Due to unsustainable collection and overexploitation its natural population is decreasing at an alarming rate. Sustainable method of collection is that leaving about 50 cm of stem above the ground for copycing.

Tribals of Palakkad and Malappuram districts collect seeds, roots and hairs on fruits of *Mucuna pruriens* for selling to Kerala state SC / ST federations. The endosperm part of seeds and the roots of plant are the major useful items collected and marketed. When the fruits get matured, they uproot the plant and collect roots and fruits for giving to Kerala State SC / ST federation. Sustainable method of collection is that leaving at least 20 percent of plants untouched.

Roots of *Cyclea peltata* are collected by most of the tribal groups of Palakkad and Malappuram districts. Tribals use leaf juice for washing hair. Sustainable method of collection is that leaving at least 20 percent of the plants untouched and also while collecting leaves, collect only leaves and don't cut the plants above the ground. It is also used as a fodder and tribals and other rural people collect the aerial part of the plant without leaving any stem above the ground.

Most of the tribals of both the districts collect tubers of *Dioscorea pentaphylla, Dioscorea bulbifera, Dioscorea oppositifolia , Dioscorea hispida* and *Dioscrea tomentosa* for edible and also for medicinal purposes. Cholanaikans main food is root tubers especially tubers of Dioscorea species which they call Kitanon . They are extensively extracted unsustainably from the forests. Sustainable collection is that leaving about 20 percent of plants untouched and also plant some portions of the top part of the plants collected to the area from where they are collected.

The roots of *Holostemma ada-kodien* are extracted on a large scale by the tribals of Palakkad district. The SC / ST federation collects roots from them. They use leaves, flowers and fruits of the plant as vegetable. Due to commercial demand they collect roots unsustainably from the wild. Sustainable method of collection is that leaving about 20 per cant of the plants untouched.

The rhizome of *Curcuma aromatica* is collected by the tribals of Malappuram district for selling to SC / ST federation. They collect it unsustainably by uprooting the

plant from the forests. Sustainable method of collection is that leaving small area of plants untouched for regeneration while collecting rhizome.

The tribals of Malappuram district collect the rhizome of *Curcuma zedoaria* which is used in the manufacture of perfumes and cosmetics. The Kerala State SC / ST federation receives the item from the tribals. It is used as a subtitute for Curcuma aromatica. The plants are both domestically consumed and exported. Tribals collect the rhizomes by uprooting the plants. Sustainable method of collection is that leaving a small area untouched for regeneration while uprooting them.

The seeds and rhizomes of *Gloriosa superba* are collected by the tribals for the treatment of piles and rheumatism. The plant is fast depleting in natural forests. The tribals collect all the rhizomes without leaving any part in the wild. They collect flowers before maturing leading to depletion of the valuable plant. Its seeds should be collected only after maturity and only old rhizomes should be collected after seeding. Sustainable method of collection is that leaving 20 percent of the plants untouched while collecting rhizomes.

The collection of fruits of *Emblica officianalis, Garcinia gummi-gutta, Myristica dactyloides, Mangifera indica, Hydnocarpus pentandra, Cinnamomum malabatrum* and *Calamus spp* is done by lopping of branches. Sustainable method of collection is that in which the collection of fruits is made by hand or with hook which is fixed at the end of a long stick.

Tribals collect the fruits of *Acacia sinuata* by cutting the base of woody climber to avoid the effort of climbing. After a few days the fallen fruits are gathered from the ground. Tribals powder the pods and use it as soap. Pods promote growth of hair and prevent dandruff. Sustainable way of collection is by hand or with hook without any injury to the climber.

Fruits of *Sapindus trifoliata* is collected by lopping of branches by tribals and the pericarp of fruits used for washing purposes. It is commonly used as a hair wash and to clean other materials. Root, bark and fruits of the plant are extracted for various purposes. Sustainable method of collection is by hand or with hook.

Seed powder of *Ensete snperbum* is used for kidney stone. Malasar, Malamalasar and Kadars of Palakkad district use the same for the disease. Its life cycle is three to four

years depending upon the area it grows. Tribals collect young plants along with fruits to plant in their homesteads. This is an issue of serious concern since the species is already listed as rare, endangered and conservation concern. Sustainable method of collection is that leaving some plants untouched while collecting fruits.

The roots, stems and fruits of *Piper longum* are medicinally used. Tribals take fruit powder along with honey for cough and cold. Due to commercial demand it is facing threat. Sustainable method of collection is that leaving a small area untouched in the wild.

Cinnamomum malabatrum flower is collected by loping of branches. Sustainable method of collection of flowers is with hand or hook tied at the end of a long stick. Stem bark is used by tribals for treating dysentery and stomach ache. The stem and root bark of the tree are medicinal and extracted on a large scale. It is also used against bleeding piles. Tribals cut down the entire tree and then chop the main stem and branches. They remove the entire bark from the existing trees. Sustainable method is to remove only $^1/_3$ of the bark from the tree and also remove outer and middle bark leaving the inner bark for regeneration.

The bark, leaves and flowers of *Saraca asoca* is used as medicinal. Tribals of Malappuram district collect stem bark to treat against Piles. They cut down the entire tree and chopping the main stem and branches. Sustainable method of collection of bark is that removing only $^1/_3$ of the mature bark and removes only the outer and the middle bark leaving the inner bark for regeneration.

The stem bark of *Helicteris isora* is extracted by the tribals for fibre. Fibre is used for making bags, fancy items etc. Root, bark and fruits are medicinal. Tribals cut the plant and collect bark and fruits. Sustainable method of collection of bark is removing $^1/_3$ of bark from the plant and also removes the outer and middle bark leaving the inner bark for regeneration.

Bark decoction of *Terminalia arjuna* is used as tea in heart troubles. Tribals collect bark from the existing trees without leaving the inner bark. Sustainable method of collection of bark is removing only $^1/_3$ of bark from the plant and also removes the outer and middle bark leaving the inner bark for regeneration.

Unscientific and unscrupulous collection of the bark of *Persea macrantha* by the tribals leads the death of the tree in the wild. Collection of the bark is done according to its demand. Bark is collected mostly in a destructive manner by removing as much quantity as the gatherers can remove. The bark of Persea macrantha is difficult to remove completely from the wood. Such bark is cut into small pieces and collects. Its bark is extensively used in the preparation of Agarbathis. Sustainable method of collection of bark is that removing only $^{1}/_{3}$ of the mature bark and removes only the outer and the middle bark leaving the inner bark for regeneration.

It has been observed that the new bark of *Cassia fistula* can be peeled easily. The bark decoctions is used for bath in skin diseases. Tribals cut the tree and collect the bark. Sustainable method of collection is that removing 1/3 of the mature bark and remove the outer and middle bark leaving the inner bark for regeneration.

The bark of *Bauhaenia racemosa* which is used by the tribals to treat diarrhoea and dysentery. It is collected unscientifically from the standing tree. Sustainable method of collection is that removing 1/3 of the mature bark and remove the outer and the middle bark leaving the inner bark untouched for regeneration.

The barks of *Azadirachta indica, Mangifera indica, Syzygium cumini, Tamarindus indicus, Zizyphus rugosa* etc are unscientifically extracted by the tribals for various diseases and also to give to the Kerala State SC / ST Federation. Sustainable method of extraction is that removing 1/3 of the mature bark and remove the outer and middle bark leaving the inner bark for regeneration.

The leaves of *Abrus precatorius* are extracted by the tribals for various diseases. They chop down the entire vine for collecting the leaves. The pounded leaves are used to relieve cough and cold. Leaf decoction is applied in the affected portion for inflammation. The sustainable method of collection is that harvesting mature leaves with hand without disturbing the plant.

Normally tribals collect the leaves of *Gymnema sylvestre* by cutting the whole plant and then collecting the leaves. Due to the wide spread prevalence of such unsustainable harvesting practice, the availability of Gymnema sylvestre is decreasing in the wild day by day. The sustainable collecton of leaves is by plucking the leaves and not cutting the entire plant.

The whole plant of *Indigofera tinctoria* is extracted by the tribals to promote growth of hair. They cut the whole plant into small pieces and put it in coconut oil and keep it in sunlight for some days. This oil will promote growth of hair. Root decoction is given internally for kidney stone. Sustainable method of collection is that leaving a small area untouched while collecting plants.

The leaves, bark and seeds of *Wrightia tinctoria* are medicinal. Tribals collect 1 Kg of leaves and put the pieces of leaves in 1 Kg of coconut oil and keep it in broad sunlight for 7-8 days. Filter it and use it for Psoriasis. Leaves are also used against dandruff. Tribals put leaf pieces of the plant in milk to turn it to curd. Branches are chopped to collect leaves. Sustainable method of collection is that collecting leaves with hand.

Decoction of bark of *Coscinium fenestratum* is given for intermitent fever. The stem of the plant is exploited in the preparation of facial creams. Consequent to over exploitation the plant is getting depleted from the forests. Sustainable method of collection is that leaving about 50 cm of stem above the ground for copycing.

The stem of *Entada rheedii* is cut into small pieces and softens, is used as a substitute for soap and as a cleaning material. Sustainable method of collection is that collecting the required stem from the top part of the climber.

The whole plant of *Phyllanthus amarus* is very beneficial in Jaundice. An infusion of young shoots is given in dysentery. Sustainable method of collection is that leaving a small area untouched while collecting plants.

The whole plant of *Andrographis paniculata* is used in the treatment of various ailments. The whole plant is collected by uprooting them before flowering. This unsustainable overharvesting is the reason for not regenerating the plant properly. Sustainable method of collection is by cutting the branches of plants from above the ground level.

The whole plant of *Aristolochia indica* is used for medicinal purposes. Leaf paste in water or in milk is taken by tribals for snake and insect poison. Usually tribals collect leaves along with stem.Sustainable method of collection is that collecting some mature leaves from the plants and not along with stem.

Eclipta Prostrata is collected by the tribals to promote growth of hair. They collect the whole plant and cut into small pieces. 500 gm of plant is kept in 1 litre of coconut oil and keep it in sunlight for one week.Then remove the leaves and other parts and use the oil for hair growth.Sustainable method of collection is that leaving 20 per cent of the plants untouched while collecting plants for preparing oil.

The usual method of extraction of resin from *Canarium strictum* is to burn and scorch the bark and outer layer of wood at the base of the trunk promoting exudation or by making incisions and scorching.Large quantities of the bark resin called *Black Dammer* is extracted and marketed from the natural forests of Kerala. Sustainable method of collection of resin is that avoid fire setting underneath the tree.

The tree *Vateria Indica* yields an Oleo-Resin called white Dammer. It is extracted either by wounding the bark or by putting fire around the base of the main trunk which promote exudation of the resin. Medicinally, the resin is refracted to be a tonic. It is also to cure piles, diarrhea rheumatism etc. Sustainable method of collection of resin is that marking incisions at the base of the trunk and avoid fire setting underneath the tree.

Tribals extract the gum of *Sterculia urens* by making incision on the main stem. Unscientific tapping weaken the tree and cause premature death. The tribals who are having less knowledge about this make deep incisions for complete extermination of gum.

CONCLUSION

During ethnobotanical studies on the tribals of Palakkad and Malappuram districts, the stress was given to document information of plants utilized by various tribal groups for edble and non-edible purposes, to study the methods of utilization of some of the species and to assess the sustainability of the methods employed. Though the study has generated lot of baseline information on ethnobotany of the tribals of both the districts, still there are information gaps in many areas. The study should include experts from six disciplines such as botany, ethnopharmacology, anthropology, ecology, economics, and linguistics. In any long-term project, techniques availed from these fields can be combined to carry out a systematic survey of ethnobotanical knowledge in a single community or region. The present study showed that eventhough allopathic medicines are used by some of the tribals, ethnomedicinal knowledge and its applications are still alive among tribals of both the districts. Unscientific collection, over-exploitation, clearing of land for agriculture and use of chemical herbicides put adverse effect on the natural vegetation. Steps should be taken to exchange information among indigenous people regarding conservation, management and sustainable utilization of plant resources. If the plant resource is not conserved properly in the wild the traditional ethnobotanical knowledge will also be lost along with it. Conservation of ethnobotanical plants can be accomplished by the ex-situ, i.e, outside natural habitat by cultivating and maintaining plants in biotic gardens, parks, other suitable sites. A valuable ex-situ conservation measure would be the creating of a network of regional and sub-regional ethnobotanical gardens, which should contain accessions of all plants known to the various ethnic communities in different regions of the districts.

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Appendix I

List of tribal communities of Kerala

1.	Adiyan
2.	Arandan (Aranadan) .
3.	Eravallan
4.	Hill Pulaya (Mala Pulayan, Kurumba pulayan, Karavazhi pulayan, Pamba Pulayan)
5.	Irular (Irulan)
6.	Kadar (Wayanad Kadar)
7.	Kanikaran, Kanikkar
8.	Kattunaikan (Primitive group)
9.	Kochuvelan
10.	Koraga
11.	Kudiya Malakudi
12.	Kurichan (Kurichiyan)
13.	Kurumans (Mulla Kuruman, Mulla Kuruman, Mala Kuruman)
14.	Kurumbans (Kurumbar, Kurumban)
15.	Mala Malasar
16.	Malai Arayan (Mala Arayan)
17.	Malai Pandaram
18.	Malai Vedan
19.	Malai Kuravan
20.	Malasar
21.	[Malayan, Nattu Malayan, Konga Malayan], (excluding the areas comprising Kasaragode, Kannur, Wayanad and Kozhikode districts)
22.	Malayarayar
23.	Mannan (To be spelt in Malayam script in Parenthesis)
24.	Muthuvan, Mudugar, Muduvan
25.	(Palleyan, Palliyan, Palliyar, Paliyan)

26.	Paniyan
27.	Ulladan (Ullatan)
28.	Uraly
29.	(Mala vettuvan) in Kasaragode and Kannur districts)
30.	(Ten kurumban, Jenu kurumban)
31.	(Thachanadan, Thachanadan moopan)
32.	(Cholanaikan)
33.	(Mavilan)
34.	(Karimpalan)
35.	Vetta Kurumban
36.	(Mala Panicker

APPENDIX 2

Table A-2. List of NWFP collected from the forests of Kerala (Prepared by the Forest Department)

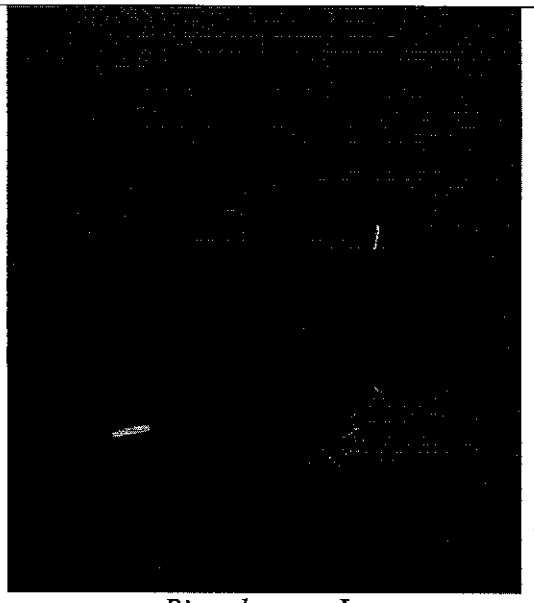
SL. NO.	MALAYALAM NAME	SCIENTIFIC NAME
I	Adapathian	*Holostemma ada-kodien*
2	Athithippali	*Raphidophora pertusa*
3	Amalpori (red)	*Rauvolfia serpentina*
4	Amalpori (white)	*Rauvolfia serpentina*
5	Adalodakam	*Adhatoda zeylanica*
6	Edampiri-Valampiri	*Helicteres isora*
7	Eenthappana	*Cycas circinalis*
8	Urinchikai	*Sapindus laurifolius*
9	Eramkol (grade 1)	*Oxytenanthera monostigma*
10	Eramkol (grade 2)	*Oxytenanthera monostigma*
11	Elakkai	*Elettaria cardamomum*
12	Odamaram	*Sarcostigma kleinii*
13	Orila	*Desmodium velutinum*
14	Kacholam	*Kaempferia galanga*
15	Kadukka	*Terminalia chebula*
16	Kadukkathode	*Terminalia chebula*

17	Kannadivella (low quality)	*Valeria indica*
18	Kannadivella (low quality)	*Valeria indica*
19	Kannadivella (high quality)	*Valeria indica*
20	Kakkumkai	*Entada rheedii*
21	Kayyonni (kunjunni)	*Eclipta alba*
22	Karinkurinji	*Strobilanthes ciliatus*
23	Karinthen	—
24	Kalpasam	*Parmelia dilatata*
25	Kasthoorimanjal	*Curcuma aromatica*
26	Kazhanji	*Caesalpinia bonduc*
27	Kattar vazha	*Aloe vera*
28	Kanjiram	*Strychnos nux-vomica*
29	Kattinchi	*Zingiber zerumbet*
30	Katukurumulaku	*Piper nigrum*
31	Kattuthippali	*Piper longum*
32	Kattuthulasi	*Ocimum gratissimum*
33	Kattupayar	*Vigna trilobata*
34	Kattupavakka	*Momordica charantia*
35	Kattupunnakka	*Calophyllum inophyllum*
36	Kanthaarimulaku	*Capsicum minimum*
37	Kattumanjal	*Curcuma aromatica*
38	Kattumulaku	*Piper sps.*
39	Kiriyatu	*Andrographis paniculata*
40	Keezhanelli	*Phyllanthus airy-shawii*
41	Kungillyam, Kungiliam	*Boswellia serrata*
42	Kudampuli (unakka)	*Garcinia gummi-gutta*
43	Kudampuli (pacha)	*Garcinia gummi-gutta*
44	Kunthirikkom (grade I)	*Canarium strictum*
45	Kunthirikkom (grade II)	*Canarium strictum*
46	Kunthirikkom (grade II)	*Canarium strictum*
47	Kumizhu	*Gmelina arborea*
48	Kurunthotti	*Sida rhombifolia ssp. retusa*
49	Kodithuva	*Tragia involucrata*
50	Koduveli	*Plumbago indica*

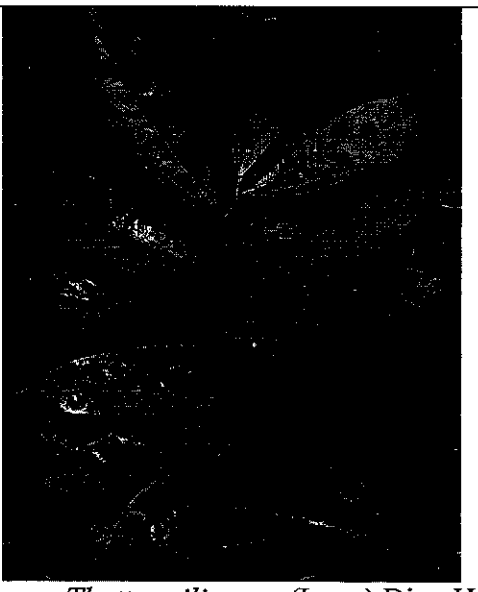
51	Kopuvella	*Valeria indica*
52	Kolarakku	--
53	Kolinchi	*Alpinia galanga*
54	Garudakodi (eswaramooli)	*Aristolochia indica*
55	Changalamparanda (green)	*Cissus quadrangularis*
56	Chappanga	*Caesalpinia sappan*
57	Chittirapoovu	*Euphorbia thymifolia*
58	Chittaratha (dry)	*Alpinia calcarata*
59	Chittamruthu (green)	*Tinospora cordifolia*
60	Chittelam	*Heracleum ringens*
61	Cheevakkai/shekkakkai	*Acacia sinuata*
62	Chemparathi	*Hibiscus rosa-sinensis*
63	Cheruthekku	*Callicarpa tomentosa*
64	Jeevakom	*Malaxis rheedii*
65	Jnaaval	*Syzygium cumini*
66	Thakara	*Cassia tora*
67	Thazhuthama	*Boerhaavia diffusa*
68	Thanni (bark)	*Terminalia bellirica*
69	Thanikka (fruit)	*Terminalia bellirica*
70	Thajfarakizhangu	*Nelumbium speciosum*
71	Thaen	*Apies sps.*
72	Thaen mezhuku	*Apies sps.*
73	Thaen mezhuku (processed)	*Apies sps.*
74	Thepprakkayu	*Semecarpus anacardium*
75	Thettamparal	*Strychnos potatorum*
76	Darbha	*Desmostachya bipinnata*
77	Naruneendi, Nannari	*Hemidesinus indicus*
78	Naankinkuru	*Mesua ferrea*
79	Naaykkuruna	*Mucuna pruriens*
80	Neela amari	*Indigofera tinctoria*
81	Neeruvalakkuru	*Croton tiglium*
82	Nellikka (dry)	*Phyllanthus emblica*
83	Nellikka (green)	*Phyllanthus emblica*
84	Nellikka (fruit wall)	*Phyllanthus emblica*

85	Panjikkaya	*Ceiba pentandra*
86	Padavalam	*Trichosanthes cucumerina*
87	Pattincha	*Acacia caesia*
88	Paachotti	*Symplocos cochinchinensis*
89	Paadakizhangu	*Cvclea peltata*
90	Paathiripoovu (1st quality)	*Stereospermum colais*
91	Paathiripoovu (Ilnd quality)	*Stereospermum colais*
92	Paali	*Palaquium ellipticum*
93	Paalmuthukku	*Ipomoea maiiritiana*
94	Peenari	*Nothapodytes nimmoniana*
95	Putharichunda	*Solatium indicum*
96	Punnapoovu	*Dillenia pentagyna*
97	Pulthylum	*Cymbopogon flexuosu*
98	Puli (with seed)	*Tamarindus indica*
99	Puli (without seed)	*Tamarindus indica*
100	Poovanathari	*Schleichera oleosa*
101	Pollakkaya	*Anamirta cocculus*
102	Plassu (Poovum, Kaayum)	*Butea monospenna*
103	Manjakkoova	*Curcuma angustifolia*
104	Mattippal	*Ailanthus triphysa*
105	Maramanjal	*Coscinium fenestratum*
106	Marotti (seed)	*Hydnocarpus pentandra*
107	Marotti (oil)	*Hydnocarpus pentandra*
108	Muthanga	*Cyperus rotundus*
109	Mullilam	*Zanthoxylum rhetsa*
110	Moovila	*Pseudarthria viscida*
112	Ramacham	*Vetiveria zizanioides*
113	Vankurumthotti	*Sida acuta*
114	Vayampu	*Acorus calamus*
115	Vazhana	*Cinnamomum verum*
116	Veluthavanakku	*Ricinus communis*
117	Vellathumba	*Leucas aspera*
118	Salhavari	*Asparagus racemosus*
119	Silhari (Vithari)	*Embelia ribes*

Plate 4. Some of the ethnomedicinal plants used by the tribals of Palakkad and Malappuram districts.

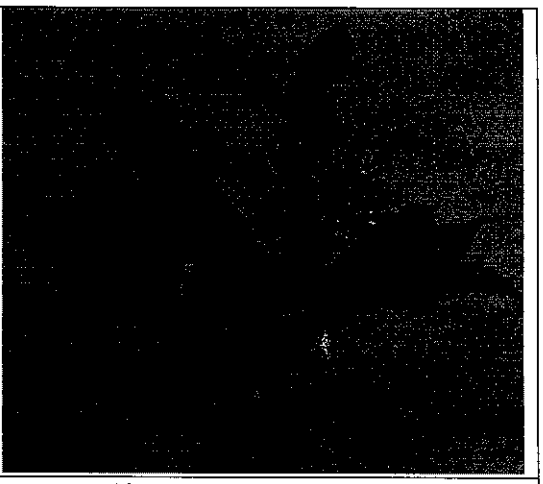


Piper longum L.

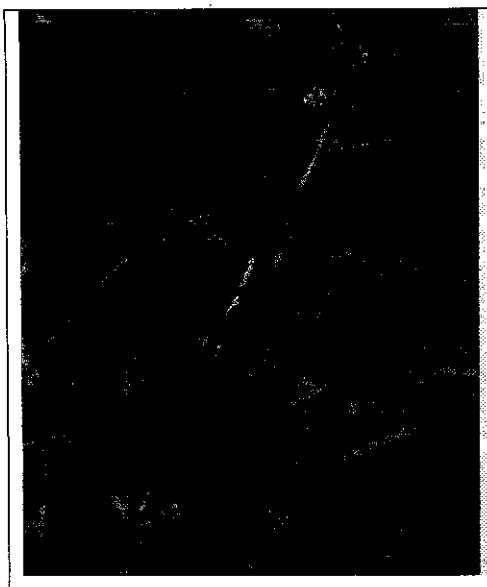


Thottea siliquosa (Lam.) Ding Hou

Aloe vera Mill.



Rauvolfia serpentina (L.) Benth. *et al* Kurz



Cassia tora L.

Zingiber zerumbet (L.) Sm.

Fig. 3 Data documentation from Cholanaikans

Fig..2Cholanaikans of Manchery tribal colony