

2. REVIEW OF LITERATURE

2.1. Ethnobotany of the global scenario

This part of review is consisting of cultivation of plants, virtues and selection of plants by ancestors, values of traditional food, traditional village forests, medicinal plants, indigenous use of plants, plants mentioned in Qur'an, folkloristic tradition of the use of plants, plants mentioned in Ahadith, migration of plants, aromatic and medicinal plants, tools and implements etc.

Kochhar (1995) noted that long before the dawn of recorded history our prehistoric ancestors discovered the virtues of certain plants and selected the most useful wild species. Early man displayed a noteworthy wisdom in domesticating plants for food and he was a plant breeder without any knowledge of genetics.

Milburn (2004) mentioned growing recognition of the need to change current dietary patterns and the value of traditional food. The research had been taken up by Center for Indigenous peoples Nutrition and Environment (CINE) based at Mc Gill University in Montreal. The CINE is a research and education resource for Indigenous peoples created by Canada's aboriginal leaders to support traditional nutrition and study the safety of traditional food. Miah and Rahman (2004) elucidated on the effect of religious sub-cultural factors on the traditional village forests of two different religious communities. The Hindu-sub cultural factors were very positive for the conservation of homestead forests in rural areas of the flood plain area of Bangladesh. Shebitz (2005) reported case studies on indigenous use of Sweet-grass {*Anthoxanthum nitens* (Weber) Y.Schouten & Veldkemp}, Beargrass {*Xerophyllum tenax* (Pursh) Nuttall in New York State, USA and bear grass in Washington State, USA.

Sultana *et al.* (2006) designed to gather indigenous knowledge about herbal medicines of local women in Pakistan. A total of 38 species were recorded by local inhabitants for the treatment of various diseases. These women believed that natural products were easily available, inexpensive and medicinally useful. Some of the plants and ailments included *Acacia nilotica* (L) Delile (loose motion), *Calotropis procera*

(Aiton) R.Br. (piles wounds for quick relief), *Convolvulus arvensis* L (abdominal worms in children), *Punica granatum* L (diarrhoea), *Raphanus sativus* L (jaundice), *Rhazya stricta* Decne (toothbrush), *Syzygium cumini* (L) Skeels (diabetes) and *Withania somnifera* (L) Dunal. Khafagi *et al.* (2006) reported 22 plants mentioned in the Holy Qur'an. Some of the the plants were *Ficus carica* L, *Olea europea* L, *Phoenix dactylifera* L, *Vitis vinifera* L, *Punica granatum* L, *Ocimum basilicum* L, *Dryobalanops camphora* Colebr., *Zingiber officinale* Roscoe, *Brassica nigra* (L) K. Koch., *Salvadora persica* L, *Ziziphus spina-christi* (L) Willd, *Citrulus colocynthis* (L) Schrad., *Cucurbita pepo* L, *Cucumis sativus* (L), *Allium sativum* L, *Allium cepa* L., *Musa sapientum* L and *Hordeum vulgare* L and *Triticum vulgare* Vill.

Dafni *et al.* (2006) documented study of the folkloristic traditions of the use of the three groups of plants in 40 Muslim graveyards in northern Israel. These were aromatic herbs (especially *Salvia fruticosa* Mill. and *Rosmarinus officinalis* L), white flowered plants (*Narcissus taxetta* L, *Urginea maritime* (L) Stern., *Iris* spp and *Pancreatum* spp.) and *Cupressus sempervirens* L as the leading cemetery tree.

Qureshi *et al.* (2007) reported 50 species of plants used as folk medicines in Pakistan. Some of the plants used against the diseases were *Amaranthus viridis* L (snake bite, joint pain, scorpion bite), *Silybum marianum* L (jaundice, hepatitis), *Calendula arvensis* L (heart disease, eye clearance, skin healing), *Cichorium intybus* L (fever, diarrhoea), *Carum copticum* Benth. and Hook. (diarrhoea, dysentery, gastritis), *Anethum sowa* L (gastritis), *Calotropis procera* R.BR. (cholera and asthma), *Capsella bursa-pastoris* (L) Medik. (diarrhoea, diuretic), *Sysymbrium irio* L (throat and chest infection), *Cyperus rotundus* L (abdomen pain), *Fumaria parviflora* Hussk.(allergy, diuretic, anthelmintic), *Salvia moorcroftiana* Wall. ex Bk.(skin disease), *Acacia nilotica* Wall. (constipation, diarrhoea, dysentery, cough, throat disease), *Acacia modesta* Wall. (sexual tonic, restorant), *Avena sativa* L (nervous exhaustion and tension), allergic skin condition, *Vervascum thapsus* L (asthma), *Euphorbia helioscopia* L (anthelmintic), *Ficus palmata* Forsk.(expectorant, kidney stones), *Galium aparine* L (diuretic, urinary problems), *Urtica pilulifera* L (asthma,

expectorant, kidney and urinary problems), *Tribulus terrestris* L (diuretic, astringent, back pain) and *Oxalis corniculata* L (diarrhoea and dysentery) .

Marwat *et al.* (2009a) collected detailed data from holy Qur'an, Ahadith's books and books written on the aromatic plants as Islamic medicines. The plants were *Acorus calamus* L, *Artemisia maritima* L, *Boswellia carterii* Birdw, *Boswellia serrata* Roxb, *Cinnamomum camphora* L, *Citrus* spp., *Commiphora molmol* Engl Tschirch, *Crocus sativus* L, *Cymbopogon schoenanthus* Spreng, *Dryobalanops aromatic* Gaertn. F., *Lawsonia inermis* L, *Majorana hortensis* Moench, *Ocimum basilicum* L, *Origanum vulgare* L and *Thymus serpyllum* L. Marwat *et al.* (2009b) enlisted nine herbaceous medicinal plants from the Qur'an and Ahadith. Some of them were *Citrus lanatus* (Thunb.) Mars and Nakai, *Agaricus campestris* L, *Allium cepa* L, *Allium sativum* L, *Beta vulgaris* L, *Lagenaria siceraria* (Molina) Standley, *Trigonella foenum-graecum* L, and *Zingiber officinale* Roscoe. Marwat *et al.* (2009c) did comprehensive study about the fruit plant species mentioned in the holy Qur'an and Ahadith and their ethno-medicinal importance. The recorded fruits were *Cucumis sativus* L, *Cydonia oblonga* Mill, *Ficus carica* L, *Olea eoropa* L, *Phoenix dactylifera* L, *Punica granatum* L, *Salvadora persica* L, *Vitis vinifera* L and *Ziziphus mauritiana* Lam. with Arabic names too. MacDonald Idu (2009) wrote in its Current Trends in Ethnobotany, "peoples of all cultures have always depended on plants on their primary needs (food, shelter, warmth, medicines etc.) and have naturally learned diverse applications of plants. In the course of nomadic roaming this knowledge was exchanged with neighbouring tribes, friends and foe and was gradually expanded upon. Thus, plant knowledge has been passed around the world since the beginning of time, and frequently, the actual plants themselves have spread along as well. The investigations of plants and their uses is one of the most primary human concerns and has been practiced by all cultures for tens, if not hundreds, of thousands of years, though it was not called Ethnobotany, then Ethnobotany is the scientific study of plant lore and agricultural customs of a people". Beyrouthy *et al.* (2009) reported about the plants used for the remedies of anti-rheumatic and anti-neuralgic in the traditional medicines of Lebanon. Sharma *et al.* (2009) reviewed the Indigenous Technical

Knowledge (ITK) from water resource management, soil fertility management, indigenous knowledge (IK) on biodiversity and forest management, indigenous knowledge on pest management, bio-fencing, agricultural tools and implements and traditional beliefs in 5 Districts of Nepal.

Karawya *et al.* (2010) reported anti-inflammatory activity of different extracts of five plants abundantly growing in Egypt. The plants were *Ipomoea palmate* Forsk., *Alstonia scholaris* R.Br., *Salix subserrata* Willd., *Salix tetrasperma* Roxb. and *Populus nigra* L. Taylor (2010) discussed the migration of Opium Poppy (*Papaver somniferum* L) successfully migrated from its putative origin in Southern Europe to large parts of Asia more than three millennia ago. The path can be traced through Greece, Western Asia and Arabia eventually leading to India and China. The advent of the British East India Company succeeded by the British crown led to an almost industrial scale of cultivation and virtual monopoly of its sale, thus poppy protected the British reserves. Khatoon and Goel (2010) reviewed the ethnobotanical literatures related to brain and cognitive disorders. The communication recorded that there were 5000 distinct tribes in over 72 countries across the world and India has the most tribal diversity. More than 150 plant species were recorded in the form of various preparations and mixtures used in cognitive and brain disorders. The fresh stem twig of *Achyranthes aspera* L was used for enhancing patience and retentive memory by Gujaratis and the root of *Asparagus racemosus* Willd. acted as tonic and diuretic.

El Midaoui *et al.* (2011) carried out a survey on aromatic and medicinal plants of Middle Atlas Mountains of Morocco in relation to anti-rheumatic and anti-neuralgic diseases and had found 231 species of various plants. The results showed a range of indigenous and diversified Medicinal and Aromatic Plants belonging to 10 botanical families viz. Lamiaceae, Asteraceae, Rosaceae, Chenopodiaceae, Papaveraceae, Caryophyllaceae, Cupressaceae, Rutaceae, Anacardiaceae and Zygophyllaceae.

Elzubeir (2014) described and identified hand and animal drawn tools and implements used as agricultural operations by the farmers of Sudan. Ballick (2015)

expressed that “the traditional knowledge is a body of information and a set of skills developed by a group of people over time and is in a constant state of change”. Ahmed *et al.* (2016) presented a review on antiurolithiatic effect of four hundred and fifty seven (457) plants belonging to 108 (one hundred and eight) families found in different parts of the world. Balangcod and Balangcod (2018) reported from Philippines that the people of diverse culture used plants in the usage of food, shelter, clothing, rituals, medicine etc. Semanya (2018) attempted to fill the research gap of not conducting any research about the plants to cure asthma disease. It noted some plants useful for the treatment of diseases and the plants were *Citrus limon* (L) Burm.f., *Zea mays* L subsps.mays L, *Cannabis sativa* L. var. indica (Lam) Wehmer and *Allium sativum* L.

2.2. Ethnobotany of India

The review on ethnobotany of India involves plants in relation with sacred groves, edible wild plants, plants with religion, threatened horticultural plants, ways of study in ethnobotanical aspects, use of different plant species by tribals, tribal traditional medicines, useful trees, ethnomedicinally useful fungi, conservation of plants, various plant groups as medicines, agricultural tools, folklores and cultivation of plants, utility of bamboo plants, endemic and threatened plants, purity of plant materials etc.

Gadgil and Vartak (1973 and 1976) did research in ethnobotany of sacred groves. Gaur (1977) started documentation of edible wild plants. Gadgil and Vartak (1981) again documented plants from sacred groves. Singh and Pandey (1982) gave reference of plants in the study of religion and religious beliefs from India. Shadeque (1989) recognised many varieties of horticultural plants which were under the shadow of threatened plants.

Maheshwari (1996a) recognised four major inter-related fields of study in ethnobotany viz. (1) basic documentation of traditional resources, (2) quantitative evaluation of the use and management of botanical resources, (3) experimental

assessment of the benefits derived from plants, both for subsistence and for commercialization, and (4) applying traditional ecological knowledge to biodiversity conservation and community development. These studies had been referred to as basic, quantitative, experimental and applied ethnobotany.

Samwatsar and Diwani (1996) presented reports of the use of different plant species by the tribals of western Madhya Pradesh in house building, utensils, musical instruments and preparation of strong drinks. Maheshwari (1996b) reported over 550 species of plants used by primitive tribal groups i.e. Abujmaria, Korwa, Kamar, Baiga, Bharia, Birhor and Saharia of Madhya Pradesh. The tribes used the plants in traditional and folk medicines. Nine plants, eight plants and twenty seven plants were reported to have used as musical instruments, basketry and agricultural implements respectively. Twenty two plants were associated with magico-religious and social beliefs. Hosagoudar and Henry (1996) reported plants and plant parts used by the Soliga tribe for various ailments, food, religious ceremonies or beliefs etc. under three major groups i.e. ethno-medicine, edible plants and miscellaneous (social beliefs, insect and leech repellent, meal plate, worship etc.). Sharma (1996) noted an account of altitudinal distribution and uses of some tree species found in Garhwal Kumaon Himalaya. The plants were useful in respect of timber, medicine, fibre, food, gum, resin, tannin etc. Some plants useful to make musical instruments were *Buxus wallichiana* Baill. and *Gmelina arborea* Roxb. Whereas, some plants useful to make agricultural implements are *Anogeissus latifolia* Wall., *Terminalia alata* Heyne ex Roth., *Quercus dilatata* Royle., *Quercus semicarpifolia* Sm., *Ougeinia oojeinensis* (Roxb.) Hochr., *Wedlandia heynei* (R and S) Sant. Merch. and *Salix acutifolia* Willd. The plant *Salix acutifolia* Willd. was used in the making of basket and the plant *Holarrhena antidysenterica* (L.) Wall. was medicinally useful.

Tosh (1996) studied 25 species of medicinal plants from western Maharashtra. Rai *et al.* (1996) reported 10 ethno-medicinally useful fungi viz. *Astraeus hygrometricus* (Pers.) Morgan, *Agaricus* spp., *Calvatia cyathiformis* (Bosc.) Morgan, *Cyathus stercoreus* (Schw.) De Toni, *Cyathus limbatus* Tul & C. Tul.,

Lycoperdon pusillum Hedw., *Microporus xanthopus* (Fr.) Kuntze., *Phallus rubicandus* (Bosch) Fr. by Baiga and Bharia tribes of Central India. Khanna *et al.* (1996) described medicinal uses of 33 plant species including plant species *Coccinia indica* Wt. & Arn., *Datura metel* L (rheumatism), *Ficus religiosa* L (constipation), *Gossypium hirsutum* L (regulation of menstruation), *Ocimum basilicum* L (intestinal worms), *Polygonum barbatum* L (fever), *Solanum nigrum* L (successful pregnancy), *Vitex negundo* L (arthritis) and *Sida rhombifolia* L (tuberculosis). Bhattacharya (1996) presented 27 land weeds of Saurashtra in connection with medico-ethnobotanical value.

Phartyal *et al.* (2002) discussed that “the extinction potential of a species was related to the degree of its biological vulnerability and the degree of threat by biotic and abiotic factors. Therefore, the need for conservation was exceptionally high and of paramount importance to preserve this plant heritage for posterity. One of the most effective biological techniques to conserve this biodiversity was the establishment of gene banks i.e. *ex-situ* conservation”. Verma *et al.* (2004) reminded of humans dependant on medicinal plants by Indian, Chinese and other Oriental systems. The authors added that the Asiatic flora includes tropical, sub-tropical and temperate plant species used in modern medicines and aroma industries. They provided a list of most frequently prescribed drugs derived from plants viz., *Agave americana* L (heecogenin), *Aloe barbadensis* (L.) Burm.f. (Aloin), *Artemisia annua* L (artemisinin, santonin), *Atropa belladonna* L (atropin), *Cassia angustifolia* M.Vahl. (sennoside), *Cymbopogon* spp. (citral, geraniol), *Datura innoxia* Mill. (citronella), *Dioscorea deltoidea* Wall. Ex.Griseb (digitoxin, digoxin, lantasoides), *Solanum khasianum* C.B.Clarke (solasodine), *Solanum laciniatum* Aiton. (solasodine), *Trigonella foenum-graecum* L (diosgenin, gitogenin, yamogenin), *Glycyrrhiza glabra* L (glycirrhizin), *Papaver somniferum* L (codeine, morphine) and *Rauvolfia serpentina* (L) Benth. Ex Curz. (serpentine).

Kala and Sajwan (2006) recorded the importance of conservation of medicinal plants worldwide more particularly by India Government. It started in the

year 2000 to set up State Medicinal Plants Board (SMPB) under National Medicinal Plants board (NMPB) under the department of ayurveda, yoga, and naturopathy, unani, sidha and homeopathy (ayush). Gupta (2006) reported 74 traditional medicinal and healing plants comprising of 4 pteridophytes and 70 angiosperms of Bangni tribe of East Kameng District in Andhra Pradesh. The plants included *Acorus calamus* L, *Aegle marmelos* (L) Correa ex Roxb., *Clerodendrum colebrookianum* Bruce ex King., *Cynodon dactylon* (L) Pers. and *Rubia cordifolia* L. The author further suggested for the investigation of the curative properties and active phyto-chemical active constituents. Dhiman (2006) reported 70 plant species used for birth control measures. The plants included *Amaranthus spinosus* L, *Azadirachta indica* A.Juss., *Bombax ceiba* L, *Butea monosperma* (Lam.) Taub., *Calotropis gigantea* (L)R.Br., *Carica papaya* L, *Curcuma longa* L, *Cynodon dactylon* (L) Pers., *Cyperus articulatus* L, *Piper longum* L, *Piper nigrum* L, *Santalum album* L and *Vitex negundo* L. Saikia *et al.* (2006) documented a total of 85 plants for their therapeutic use against 18 skin diseases. The plants *Curcuma longa* L and *Melia azedarach* L were among 14 plants used to cure multiple skin diseases. Das and Nag (2006) reviewed traditional agricultural tools used in ancient India. Some of these tools were still in abundant use either in original form or with modification as we see in case of articles made from bamboo and wood for lifting water and processing of grain crops besides use of stones.

Sidhu and Kaur (2007) reported some selected plants to use in the maternal health care. The useful plants were *Curcuma longa* L., *Terminalia chebula* Retz, *Azadirachta indica* A.Juss, *Zingiber officinale* Roscoe and *Areca catechu* L. Kironjit and Kaur (2007) attempted to determine the awareness of the rural woman regarding the purpose of use of some selected plants and their products for natural health care. All purposes of use of Turmeric and Chebolic Myrabolan were known to more than 70 % of the woman. The purpose of use of dry Zinger and Acre nut was known to majority of the woman. Hegde *et al.* (2007) recorded a total of 18 formulations from 25 plant species commonly used to treat 12 different reproductive ailments at Uttara

Kannada District in Western Ghats of Karnataka. Some plants were individually highly useful for the treatment of some particular diseases.

Mohanty *et al.* (2008) highlighted Oriya folklores and folk proverbs concerning aspects of farming schedule, climate, soil and habitat, germplasm selection and farming methods including interim care for cultivation of around 30 different plant varieties of horticultural and Olericultural Orissa produce of state. The study included *Mangifera indica* L, *Dolichos biflorus* L, *Zea mays* L, *Sesamum indicum* L, *Gossypium arboreum* L, *Corchorus olitorius* L, *Nicotiana tabacum* L, *Saccharum officinarum* L, *Areca catechu* L, *Musa sapientum* L, etc. Ballabh *et al.* (2008) reported 68 medicinal plants against the treatment of kidney and urinary disorders of the tribal communities at Ladakh region, India. The Amchis of this region used some plants viz., *Cinnamomum zeylanicum* Nees, *Crocus sativus* L, *Elettaria cardamomum* (L) Maton, *Emblica officinalis* Gaertn, *Ficus religiosa* L, *Mangifera indica* L, *Santalum album* L and *Zingiber officinalis* Roscoe for the same treatment.

Kala (2009) carried out a study in the South Surguja District of Chhattisgarh state in India and identified 73 edible species of plants including 36 medicinal plants. Rout *et al.* (2009) reported 58 ethno-medicinally useful plant species along with the diseases cured by the plants from five villages in Mayurbhanj District. The indigenous people of the study area fully or partially depended on the plants viz. *Aegle marmelos* Correa ex Roxb. and *Asparagus racemosus* Willd., *Ficus religiosa* L, *Solanum surrattense* Burm.f., *Enhydra fluctuans* Lour., *Curcuma longa* L, *Mimosa himalayana* Gamble, *Syzygium cumini* (L) Skeels., *Stereospermum suaveolens* DC, *Aristolochia indica* L, *Terminalia chebula* Retz. and *Opuntia dilenii* Haw. against the diseases gastro-intestinal, skin diseases, skeletal diseases, gynaecological disorders, piles, bronchitis, diabetes, neurological, snake bite, cardio-vascular and ophthalmic respectively. Jadhav (2009) provided uses of 17 ethnomedicinal plants in relation with the treatment for dental troubles in respect of Bhil tribe of Ratlam District (MP). The plants included *Achyranthes aspera* L (twigs), *Albizia procera* (Roxb.) Benth. (stem bark), *Azadirachta indica* A. Juss. (twigs), *Carica papaya* L (latex) and *Jatropha*

curcas L (latex). Prachi *et al.* (2009) revealed 15 plant species used in the treatment of urinary tract and kidney stones in respect of Muzaffarnagar District of Uttar Pradesh. This included the plants *Abutilon indicum* (L) Sweet, *Boerhaavia diffusa* L, *Bryophyllum pinnatum* (Lamk.) Oken, *Crataeva nurvala* Buch-Ham, *Cynodon dactylon* (L) Person., *Equisetum debile* Roxb and *Ricinus communis* L. Goel and Tripathi *et al.* (2009) reviewed the Journal Ethnobotany and elaborated the various aspects covered under the publications of the past 20 years. The authors viewed “till 2009 the journal published 135 papers in relation with ethno-medicinal uses. The sacred groves had received minimum attention. Most of the states were all covered but smaller states like Manipur, Mizoram, Tripura, Nagaland, Himachal Pradesh, Sikkim and Andaman & Nicobar Islands and the alpine Himalayan regions are poorly covered”. The intensive ethno-botanical studies for sustainable use of the plant resources were suggested. Karthikeyan *et al.* (2009) undertook to identify various traditional tools used in agricultural operations by the farmers of Tamil Nadu. The research identified 21 traditional agricultural tools from 10 Districts of Tamil Nadu. Tomar *et al.* (2009) reported multifarious utility of bamboo plants and their important role in food and nutritional security besides industrial value of the tribal population in north-east India.

Ghalme *et al.* (2010) documented 14 threatened and 24 endemic plant species. The plants were becoming rare in the 25 sacred groves and highlighted the need for conserving and enriching our genetic resources. Salave *et al.* (2010) reported 24 medicinal plant species from Mahadeo Kolis populace from Ghatsiras in Pathardi Taluka of Ahmednagar District of Maharashtra. The useful plants and diseases were *Solanum nigrum* L (mouth ulcer), *Heterophragma quadriloculare* (Roxb.) K. Schum. (skin infection), *Trichodesma indicum* (L) R.Br. (dysentery), *Cordia gharaf* (Forsk.) Ehrenb. and Asch. (chronic cough), *Withania somnifera* Dunal (stomach ache), *Cissampelos pareira* L (jaundice), *Jatropha gossypifolia* L (diarrhoea) and *Sapindus gossypifolia* L. Jadhav (2010) reported the ethno-gynecological uses of 42 plant species under 12 genera belonging to 31 families by Bhil tribe of Ratlam District (Madhya Pradesh). The roots extract of *Asparagus racemosus* Willd. was administered

orally in leucorrhoea and the root or flower extract is taken to prevent miscarriage and to promote conception. The seed powder of *Butea monosperma* (Lamk.) Taub. was given for the proper conception. Kachare and Suryawanshi (2010) carried out village level survey to record traditional knowledge for the treatment of diabetes. The collection of knowledge of the Janatas or traditional medicinal practitioners was aimed to disseminate information for the usefulness of poor people. The plants in the treatment of diabetes included *Momordica charantia* L., *Azadirachta indica* A. Juss., *Ipomoea aquatic* Forsk., *Tinospora cordifolia* (L) Merr., *Punica granatum* L. and *Catharanthus roseus* L. Singh *et al.* (2010) reported that Kulattha (*Dolichos biflorus* L) be used to reduce the recurrence of calcium oxalate stone and it was shown to have a better result than the use of conventional potassium citrate in such patients. Segev *et al.* (2010) reported “the coloured (black, red, brown, green, rubiginous, grey, yellow and cream) dry chick-pea were staple and potentially functional food”.

Harminder *et al.* (2011) reviewed the taxonomy, ethnobotany, chemical constituents and pharmacology of *Oroxylum indicum* Vent. The plant was useful for the treatment of ailments such as cancer, diarrhoea, fever, ulcer, jaundice and arthritis. Rajurkar (2011) studied *Clerodendrum infortunatum* Gaertn. and indicated immense potential of the plant in the treatment conditions such as wounds, malaria, coughs, inflammatory, diabetes etc. The plant exhibited anti-oxidant, anti-microbial, anti-inflammatory, anti-diabetic, wound healing effect, anti-venom and anti-fertility activities. Jain *et al.* (2011) revealed diverse use of wetland plants as food, medicine, and other socio-cultural purpose by the ethnic communities of Manipur. The study involved 51 plant species including 38 medicinal plants. Some plants were sold in the market. Mohanty *et al.* (2011) documented traditional knowledge of twenty eight plants viz. *Sida cordifolia* L., *Bambusa stricta* Retz., *Phoenix acaulis* Roxb., *Borassus flabellifer* L., *Dalbergia sisoo* Roxb., *Vitex negundo* L., *Gmelina arborea* Roxb.etc. The plants *Polyalthia longifolia* Thw., *Acacia catechu* Willd., *Embllica officinalis* Gaertn., *Ficus religiosa* L. used in rituals by tribal people of Denkanal District, Odisha. Some plants were used for the preparation of broom, mat, basket, measuring device of grains, insecticide to store grain and rituals like marriage.

Chellapandian *et al.* (2012) documented the knowledge of traditional Siddha medicinal practitioners from Radhapuram Taluk of Titunel veli District in Tamil Nadu, India. The authors reported 217 species of plants preparing 448 formulations. Some consensus plants along with the associated diseases were viz, *Mukia madarasepatana* (L) M. Roem. (Kapha ailments), *Mollugo nudicaulis* Lam. (febrifuge), *Indigofera asphalathoides* DC (dermatological ailments), *Aerva lanata* (L) Juss. (urinary ailments), *Abutilon indicum* (L) Sweet. (haemorrhoids) and *Hybanthus enneaspermus* (L) F. Muell. (aphrodisiac).

Joseph and Nair (2013) reviewed and reported the ethno-pharmacological properties of *Ocimum sanctum* L such as anti-diabetic, anti-cancerous, analgesic, anti-inflammatory, radio-protective, hepato-protective, anti-microbial, immune-modulatory effect, cardio-protective, anti-coagulant, anti-fertility, anti-oxidant, neuro-protective etc. The plant was reportedly used for the treatment of fever and cold, malaria and dengue, cough, bronchitis, asthma, influenza, sore throat, heart disorder, eye diseases, stress, mouth infections, insect bite, kidney stone, headache, tooth disorder, skin disorder, children's ailment, improve memory etc. Ajesh and Kumuthakalavalli (2013) revealed 21 plants for construction of huts, 16 plants for domestic articles, 15 plants for cultural and traditional purpose, 12 plants for clothing and cosmetics, 20 plants for tools and weapons and about 47 plants as edible/NTFPs (Non-timber forest products) etc. in respect of Muthuvan tribal from the Idukki District of Kerala.

Shah (2014) discussed about the *Artemisia* species of India from the regions of northern plains and in the peninsular region, India. The ethnobotany and the medicinal aspects of *Artemisia* were also highlighted. Ghalme and Deokule (2014) noted 36 dicot species, 11 monocot species and 1 gymnosperm species medicinally useful from Ratnagiri District, Maharashtra. The plants were reportedly conserved in the sacred groves due to religious beliefs. Patil *et al.* (2014) identified and documented the indigenous knowledge related to use of traditional agricultural implements and the plant resources used by local peoples of Bhor and Mahad regions of Western Maharashtra. Tripathi *et al.* (2014) noted "the purity of the plant material is the pre-

requisite for the safety and efficacy of plant derived medicine”. The validation of plant drugs was considered one of the top priorities of researches in the area of phytomedicine. The phytochemical standardization was considered to be a reliable tool for verification of identity of raw materials for ensuring the purity and efficacy of plant-derived medicines. Chorel *et al.* (2018) noted the traditional knowledge on the useful aspect of radish (*Gya-labuk*) plant against burns and bruises and jaundice.

2.3. Ethnobotany of northeast India

This section of review comprises of food and medicines, edible plants, folklore of plants, medicinal plants, overview of the ethnobotanical research in this region, ethnodomestication of plants, wild vegetables sold in the market, positive effect of a plant, review of plant wealth of northeast India, ethnobotany of particular communities, medicinal plants used against veterinary diseases, phyto-resources of plants, biological objects and cultural artefacts etc.

Islam (1996) reported underground parts of 29 monocotyledonous plants and 11 dicotyledonous plants used by tribes particularly from north-eastern region. Most of the plants were food and medicines. The important medicinal plants were *Acorus calamus* L (anthelmintic, insecticide), *Alpinia allughas* Roscoe. (fever, bronchitis, rheumatism), *Asparagus adscendens* Roxb.(dysentery, diarrhoea), *Curcuma aromatica* Salisb.(high fever), *Kaempferia galanga* L (cough), *Lasia spinosa* (L) Thw.(Sore throat and piles), *Mirabilis jalapa* L (aphrodisiac) etc. The important tubers used as food plants were *Alocasia indica* (Lour.) Spach, *Amorphophallus campanulatus* Blume ex Dechne, *Amorphophallus racemosus* Willd., *Colocasia esculenta* (L.) Schott., *Cyperus rotundus* L., *Lasia spinosa* (L) Thwaites. Bora (1996) had dealt with new or less known 34 ethno-medicinally useful plant species used by the Bodo tribe of sonitpur District, Assam. The plants and the diseases included *Acacia catechu* (L.f.) Willd.) (tooth-ache), *Asparagus racemosus* Willd. (increase lactation), *Hibiscus rosa-sinensis* L (stomach pain), *Mikania micrantha* Kunth. (stop bleeding), *Mimosa pudica* L (dysentery).

Sharma (2000) reported thirty six native plant remedies for the treatment of different diseases prevalent among the Nepalese of Assam during the ethno-botanical survey. The plants and the treatment of diseases included *Acorus calamus* L (bronchitis, cold and cough, fever), *Asparagus racemosus* Willd. (stomach disorder), *Bombax ceiba* L (dysentery), *Cassia fistula* L (diuretic), *Hydrocotyle asiatica* L (amoebic dysentery), *Mirabilis jalapa* L (aphrodisiac), *Paederia foetida* L (paint over teeth to prolong its life), *Rumex nepalensis* Spreng (Jaundice) and *Hibiscus rosa-sinensis* L (flowers, roots, leaves crushed together to use against bronchial infection).

Mahalakshmi and Subhan (2003) documented accounts of the folk-lore of 71 plant species used among the Tai-Ahoms, one of the ethnic groups predominant in Assam. Kemp (2003) described most commonly used ethno medicinal plants found in the area inhabited by Rengma tribes in Dimapur District of Nagaland. These included the plants for the treatment of different ailments. Das and Sharma (2003) described ethno-medico-botanical study of 47 vascular plants for the treatment of various ailments viz., skin diseases, wounds, sores, toothache, diarrhoea, dysentery, jaundice, fever, sexual diseases of women and cancer in respect of Barman and Manipuri communities of Cachar District. Some of the plants along with the diseases were *Azadirachta indica* A.Juss.(small pox), *Bombax ceiba* L(female diseases), *Cajanus cajan* (L) Millsp.(jaundice), *Calotropis gigantea* R.Br.(piles), *Carica papaya* L(dysentery), *Clerodendrum colebrookianum* Walp.(high blood pressure), *Clitorea ternatea* L (urinary troubles), *Enhydra fluctuans* Lour.(constipation), *Ocimum sanctum* L(cough) and *Tamarindus indica* L (skin disease).

Dutta and Dutta (2005) made an overview of the ethnobotanical research in the northeast India and pointed out the presence of altogether 427 tribal communities all over India. The authors acknowledged the potentialities of ethnomedicinal plants, their identification and their conservation in northeast India. They wrote, "Northeast India has a valuable heritage of herbal remedies. Its rural people and tribals living in remote or forest areas still depend to a great extent on the indigenous systems of medicine or cultivation. A very limited number of studies was reported from tribes of

northeast region, viz, Jorhat, Morigaon, Karbi, Miris, Khasi and Jaintia, Garo, Monpas, Nishi, Apatani, Reangs etc. A wide range of plants with ethno-botanical value against some very important diseases have been reported but much number of folk medicines has remained endemic to certain tribal pockets in northeast India. Therefore, the detail studies on the ethno-botanical aspects in the region may provide meaningful ways for the promotion of traditional herbal medicinal plants or land races of crop plants for the benefit of mankind at large”.

Purkayastha and Nath (2006) made an account of folk-lore medicinal uses and biological activities in connection with 65 plant species. The study reported plant species growing wild in Assam of northeast India. Some of the useful plants included *Adhatoda zeylanica* Medic. (anti-asthmatic activity), *Alternanthera sessilis* (L) R.Br. ex DC. (anti-ulcer activity), *Butea monosperma* (Lam.) O. Kuntze., *Curcuma longa* L (anti-inflammatory activities) and *Solanum nigrum* L (hepato-protective activity). Chhetri (2006) reported 62 wild plant species ethno-domesticated by Khasis, Garo and Jaintia tribe of Meghalaya. The plants included *Aegle marmelos* (L) Correa., *Averrhoa carambola* L, *Allium tuberosum* Rottl. ex Spreng., *Allium hookeri* Thwaites, *Dendrocalamus hamiltonii* Munro., *Passiflora edulis* Sims., *Xanthoxylum acanthopodium* DC. and *Yucca gloriosa* L. The plants were claimed to have domesticated for the purpose of medicine, fruits, vegetables, bio-hedges, wood for baskets, huts, mats, bow and arrows, agro-tool handle, spices and condiments etc.

Sudhalter (2007) reported the positive effects on mood by lavender plant. Kar and Borthakur (2007) had dealt with 29 wild edible vegetables sold in the local markets of Karbi Anglong. The plants included *Alpinia nigra* (Gaertn.) Burt., *Bambusa balcooa* Roxb., *Bambusa spinosa* Roxb., *Centella asiatica* (L.) Urb., *Clerodendrum colebrookianum* Walp., *Eryngium foetidum* L., *Dillenia indica* L, *Houttuynia cordata* Thunb., *Musa balbisiana* Colla, *Phlogacanthus wallichii* C.B.Clarke, *Sterculia alata* Roxb. etc. Kar and Borthakur (2008a) reported 35 plant species used against dysentery, diarrhoea and cholera by the tribes of erstwhile Kameng District of Arunachal Pradesh. The plants used against dysentery included

Acorus calamus L, *Cyperus brevifolius* (Roxb.) Hassk., *Houttuynia cordata* Thunb., *Hydrocotyle sibthorpioides* Lamk, *Oroxylum indicum* Vent., *Paederia foetida* L, *Pogostemon benghalensis* (Burm.f.) Kuntze., *Psidium guajava* L and *Xanthoxylum armatum* DC. The plants used against diarrhoea included *Campylandra aurantiaca* Baker, *Dipsacus inermis* var. *mitis* (D.Don) Y.J.Nasir and *Swertia hookeri* C.B.Clarke. The plants used against Cholera included *Carica papaya* L, *Curcuma aromatica* Salisb., *Mangifera indica* L, *Citrus aurantifolia* (Christm.) Swingle, *Piper longum* L, *Ocimum sanctum* L and *Rhus hookeri* Sahni and Bahadur. The paper presented tribal empirical knowledge of plant medicines and their emphasis on the conservation of the indigenous plant wealth through commercial cultivation. Kar and Borthakur (2008b) recorded 57 species of wild plants used as vegetable in respect of Karbi tribe of Assam. The record highlighted the medicinal value, market price and self-life of the vegetables after harvest. The edible plants included *Abutilon indicum* (L) Swartz, *Alpinia galanga* (L) Willd, *Cassia fistula* L, *Cassia tora* L, *Chenopodium album* L, *Clerodendrum indicum* (L) O. Kuntze, *Clerodendrum serratum* (L) Spreng., *Commelina benghalensis* L, *Cycas pectinata* Griff., *Ficus hispida* L.f., *Hydrocotyle sibthorpioides* Lamk., *Ipomoea batatas* (L) Lam., *Leucas aspera* (Willd.) Link, *Paederia foetida* L, *Phlogacanthus tubiflorus* Nees, *Solanum nigrum* L, *Solanum torvum* Swartz, *Tagetes erecta* L, *Vitex negundo* L and *Zingiber zerumbet* (L) Smith.

Das *et al.* (2008) surveyed to gather information on 107 medicinal plants used by the different tribes or communities residing in different parts of Cachar District of Assam. The plants were used to cure against jaundice, diarrhoea, dysentery, cough, malarial fever, skin diseases etc. Sikdar and Dutta (2008) documented 62 medicinal plant species used by the indigenous Nath community of Assam in different types of health treatment viz. snake bite (*Cassia tora* L), asthma (*Solanum indicum* L), jaundice (*Eclipta alba* Hassk.), dropsy (*Mirabilis jalapa* L), gynecological problems (*Hydrocotyle rotundifolia* Roxb.), piles (*Mimosa pudica* L), elephantiasis (*Eclipta alba* Hassk.), rheumatism (*Ocimum gratissimum* L), cancer (*Catharanthus roseus* (L) G.Don.) etc. Mao *et al.* (2009) reviewed the plant wealth of northeast India. The authors examined a large number of medicinal plants and traditional knowledge

published by various workers from this region. According to them, some useful plants which are over exploited by medicinal plant traders were *Oroxylum indicum* Vent. (hypertension; use by Sema, Angami, and Lothat tribes), *Solanum kurzii* Brace ex Prain (Mao Naga tribes use this for allergies), *Pouzolzia hirta* Hassk. (Khasi tribe of Meghalaya use this plant for bone setting), *Lysimachia racemosa* Lam. (Khasi people use them for deworming), *Litsea cubeba* (Lour.) Pers., (Khasi and Jaintia use to treat foot and mouth disease of cattles), *Anemone revularis* Buch.-Ham.ex DC (Khasis use to treat sinus problem), *Rhus javanica* L. (tribes of Nagaland and Manipur use this for loose motion) etc. The authors also enumerated critically endangered (CR) qualified for vulnerable (VU) and endangered (EN) qualified for vulnerable (VU) plants of the northeast India. Some critically endangered plants are *Aquilaria khasiana* Hallier f., *Aquilaria malaccensis* Lam., *Lemanea australis* Atkins, *Nardostachys jatamansi* (D.Don) DC, *Rauvolfia serpentina* (L.) Benth.ex Kurz. and *Smilax glabra* Roxb.

Saikia and Borthakur (2010) noted 20 plant species in respect of the indigenous knowledge of local communities on medicinal plants used for curing various veterinary diseases. The authors documented information through the practitioners of Assamese, Bodo, Mishing, Nepali, Santhal and Karbi. Some useful plants against the animal health problems/diseases were *Allium sativum* L(cattle indigestion), *Curcuma angustifolia* Roxb. (rhizome paste) (cattle injured by leech), *Cynodon dactylon* (L) Pers. (plant juice)(cattle haematuria), *Hibiscus sabdarifa* L (leaf juice) (dysentery), *Paederia scandens* (Lour) Merr. (spleen enlargement) and *Saccharum officinarum* L (placental discharge).

Das *et al.* (2011) accounted and reported 81 plants species used against diseases as sexual disease, diarrhoea, dysentery, jaundice, cough, malarial fever, rheumatic pain, gonorrhoea, cancer, bone fracture, dog bite, ring worm etc. The plants included *Aegle marmelos* (L) Correa (dysentery), *Asparagus racemosus* Willd. (dysentery), *Bombax ceiba* L (dog bite), *Carica papaya* L (dog bite), *Justicia adhatoda* Roxb. Ex. Nees (diabetes) and *Marsilea minuta* L (eye trouble). The authors

suggested to inventorize and protection of the traditional knowledge on the use of medicinal plants by Hmar tribe.

Lokho (2012) claimed the medicinal plants used by Mao Naga tribe from time immemorial. They practice folk medicinal preparation by the plants available at their surroundings. The plants of around 61 species were used to cure ailments and health problems. Among the diseases having claimed to have cured by using plants were diarrhoea, dysentery, throat/vocal cord, gastritis and fungal/bacterial infection, blood pressure, headache, fever, mumps, bone fracture, sprain, stomach ache, gas formation, abdominal pain etc. The authors recorded *Adhatoda zeylanica* Medic. to get relief from body ache and the roots of *Imperata cylindrica* (L) P. Beauv. was used for the worm expulsion. The authors further recorded that the leaves of *Clerodendrum colebrookianum* Walp. was used against high blood pressure. A handful of fruits decoction of *Rhus semialata* Murray was used for the treatment of dysentery and diarrhoea. Medhi and Borthakur (2012) reported the extensive collection and phyto-resources sold mostly by the folk women in weekly market at Haflong. The authors collected information of 254 plants or local cultivars. The authors claimed 49 edible species to be domesticated in the study area. The wild edible plants sold at Haflong market included *Alternanthera sessilis* (L) R.Br. ex DC, *Amaranthus gangeticus* L, *Amaranthus spinosus* L, *Amaranthus viridis* L, *Centella asiatica* (L) Urb., *Chenopodium album* L, *Clerodendrum colebrookianum* Walp, *Hibiscus acetosella* Welw. ex Hiern, etc. The plants bearing fruits and seeds were *Momordica cochinchinensis* Spreng and *Momordica charantia* L., *Parkia roxburghii* G.Don. (semi-wild), *Phaseolus lunatus* L, *Phaseolus mungo* L, *Phaseolus radiates* L., *Phaseolus vulgaris* L and *Pisum sativum* L (jhum cultivars). Teron and Borthakur (2012b) documented intrinsic relationship between biological objects and cultural artefacts through designs depicting indigenous flora and fauna, objects and some figures in their social, cultural and religious life in respect of Karbis of Assam. The authors concluded that “the traditional motifs and designs on textiles are not for mere display but are emotionally associated with their social and cultural and religious life”.

Gurumayum and Soram (2014) have recorded 45 plant species belonging to 41 genera and 28 families for the treatment of diarrhoea and dysentery. The Mao Naga tribe used leaves of the plants very often. The plants included *Polygonum orientale* L (quick relief of dysentery), *Paederia foetida* L (gastritis/acidity), *Rhus semialata* L or *Rhus chinensis* Mill. (dysentery and diarrhoea), *Gynura bicolor* DC (gastric/chronic acidity), *Justicia adhatoda* L (indigestion/appetizer), *Musa paradisiaca* L (loose motion), *Psidium guajava* L (diarrhoea and dysentery), *Mentha arvensis* L, (diarrhoea), *Hibiscus sabdariffa* L. (gastric problem), *Ageratum conyzoides* L (diarrhoea and dysentery), *Tamarindus indica* L (dysentery), *Aloe barbadensis* Mill.(dysentery), *Mikania micrantha* Kunth.(diarrhoea and dysentery), *Embllica officinalis* Gaertn.with *Adhatoda vasica* (dysentery), *Cynodon dactylon* (L) Pers.(indigestion), *Costus speciosus* Smith. (diarrhoea and dysentery) and *Parkia javanica* (Lam.) Merr. (diarrhoea and dysentery). Basumatry *et al.* (2017) emphasized the needful of a bamboo database of Kokrajhar, Assam, and noted that “bamboo serves as an important raw material for industrial sectors”

2.4. Ethnobotany of Manipur

The various researchers from the state had worked on edible wild plants, plants used by singers, plant part as tool, cultivated plants, medicinal plants used against various ailments etc.

Singh and Singh (1985) documented wild edible plants sold in the markets of Manipur. Singh *et al.* (2000) studied 25 plants with one fungus and other angiosperms use to enhance vocalism by the Manipuri singers during social, religious and cultural functions. The plants included *Allium hookeri* Thw., *Areca catechu* L, *Capsicum annuum* L, *Cinnamomum camphora* L, *Cinnamomum zeylanica* Breyn., *Citrus latipes* (Swingle) Tanaka, *Curcuma longa* L, *Meriandra benghalensis* Benth., *Nicotiana tabacum* L, *Ocimum canum* Sim, *Embllica officinalis* Gaertn. and *Schizophyllum commune* Fr. Singh *et al.* (2003) reported the use of seeds of *Adenantha pavonina* L as weight stone for measuring gold in the traditional system. Chakraborty (2003) wrote information of 47 wild species of edible plants sold in different markets of

Manipur in spring and autumn seasons. The plants included *Chenopodium album* L, *Centella asiatica* (L) Urban, *Cycas pectinata* Griff., *Ipomoea aquatica* Forsk., *Neptunia prostrata* Bail and *Oenanthe javanica* DC. Sharma *et al.* (2003) described 29 cultivated and wild monocotyledonous plants medicinally used by Manipuri community particularly by Meitei community in Manipur. Some of the plants used against the diseases were *Acorus calamus* L (worms), *Allium sativum* L (rheumatic pain), *Aloe barbadensis* Mill. (irregular menstruation and asthma), *Alpinia galanga* (L) Swartz., *Arundo donax* L (fever, asthma, worm infections), *Curcuma longa* L (conjunctivitis), *Colocasia esculenta* (L) Schott., *Cyperus rotundus* L (abortifacient), *Zingiber officinale* Rosc. (goitre) etc. The useful plants included *Allium cepa* L, *Allium hookeri* Thwaites, *Allium tuberosum* Rottl. ex Spreng., *Aloe barbadensis* Mill., *Alpinia galanga* (L) Swartz., *Ananas comosus* (L) Merr., *Arisema tortuosum* (Wall.) Schott and *Belamcanda chinensis* (L.) DC. Khumbongmayum *et al.* (2005) revealed therapeutic applications of 120 plant species in a research carried out in the four sacred groves of Manipur. They reportedly used *Bombax ceiba* L, *Ficus benjamina* L, *Callicarpa macrophylla* Vahl., and *Clerodendrum serratum* (L) Moon. against common ailments like skin disorders, ulcer, rheumatism, bronchitis etc. respectively.

Khan and Yadava (2010) documented the precious traditional knowledge about the uses of 54 plant species in treating diabetes by different ethnic communities in Thoubal District, Manipur. The plants included *Averrhoa carambola* L, *Enhydra fluctuans* Lour., *Ficus hispida* L, *Hibiscus syriacus* L, *Morus indica* L, *Nelumbo nucifera* Gaertn., *Phlogacanthus tubiflorus* Nees., *Sesbania sesban* (L) Merr., *Syzygium cumini* (L) Skeels. and *Xanthoxylum acanthopodium* DC. It was also reported the existing practice of magico-religious practice of *Maiba* and *Maibi* (local or village physicians).

Romila *et al.* (2010) reviewed large number of plants for the treatment of diabetes disease. This demonstrated the importance of herbal plants viz., *Ficus benghalensis* L, (Khongnang bot), *Gymnema sylvestre* R.Br., *Momordica charantia* L (Karot akhabi), *Tinospora cordifolia* Willd. (Ningthou khonglee), *Murraya koenigii* L

(Curry patta), *Pterocarpus marsupium* Roxb., *Psidium guajava* L (Pongdon) and *Phyllanthus urinaria* L (Chakpa heigru) for the treatment of diabetes.

Salam *et al.* (2011) reported medicinal plants viz., *Butea monosperma* (Lam.) Kuntze. (Pangong), *Mussaenda glabra* Vahl.(Hanurei), *Carthamus tinctorius* L (Kushumlei), *Oenanthe javanica* (Blume) DC (Komprek), *Melothria maderaspatana* (L) Cogn.(Lam thabi), *Albizia lebbek* Benth.(Khok), *Hedyotis diffusa* Willd. (Linmarei). Singh (2011) reported 25 plants used in urban and rural area for the treatment of diabetes mellitus. Some useful plants against the disease were *Acacia arabica* (Lam.) Willd., *Aegle marmelos* (L) Correae, *Azadirachta indica* A.Juss., *Beta vulgaris* L, *Biophytum sensitivum* (L) DC, *Bombax ceiba* L, *Brassica juncea* (L) Czern., *Caesalpinia bonducella* (L) Roxb., *Cajanus cajan*(L) Missp., *Capparis decidua* (Forssk.) Edgew, *Citrullus colocynthis* (L) Schrad, *Coccinia indica* Wight.& Arn. Deb *et al.* (2011) documented some medicinally useful plants for the treatment of ailments and would like to extend their work with the aim of confirmation of the claims. Further they would like to record safe use of plants *vis-a-vis* sustainable development of ethno-medicinal bio-resources. The plants and the ailments in the treatment were *Clerodendrum colebrookianum* Walp., *Zingiber zerumbet* Smith (cough and fever, diabetes), *Eupatorium nodiflorum* Wallich., *Psidium guajava* L (diarrhoea), *Anneslea fragrans* Wallich. (kidney stone), *Oroxylum indicum* Vent.(piles) and *Cassia alata* Roxb. Devi *et al.* (2011) revealed a total of 73 plant species important in the treatment of diabetes from Manipur. Some plants were *Alocasia indica* Roxb. (rhizome), *Ardisia colorata* Roxb. (leaf), *Artocarpus lakoocha* Roxb. (bark and fruit), *Butea monosperma* (Lam.) Taub. (whole plant), *Cyperus esculentus* L (fruit and root), *Ficus benghalensis* L (bark), *Lemanea australis* Atkins. (whole plant) and *Nyctanthes arbortritis* L (flower) were taken for the treatment of diabetes.

Sanglakpam *et al.* (2012) documented plants used by Chothe tribe and brought to light their valuable heritage of traditional customs in relation with religious ceremonies (*Arundo donax* L, *Bambusa pallida* Munro., *Bombax ceiba* L, *Ficus*

benjamina, L.) food (*Alocasia indica* (Lour) Spach., *Amaranthus spinosus* L, *Bambusa tulda* Roxb., *Benincasa hispida* L, *Euphorbia hirta* Roxb., *Parkia timoriana* (DC) Merr.), beverages (*Albizia myriophylla* Benth., *Alocasia indica* (L), Schott., *Coix lacryma-jobi* L, *Musa paradisiaca* L, *Phoenix humilis* (L) Cav., *Tectona grandis* L.f.), herbal medicines (*Achyranthes aspera* L., *Acorus calamus* L, *Alpinia galanga* (L) Willd., *Garcinia xanthochymus* Hook.Ex.T.Anderson., *Asparagus racemosus* Willd., *Bombax ceiba* L, *Clerodendrum serratum* (L) Moon, *Euphorbia hirta* L, *Oroxylum indicum* (L) Kurz., *Melothria perpusilla* (Bl.) Cogn., *Paederia foetida* L, *Phyllanthus niruri* G.L. Webster and *Plectranthus parviflorus* Talbot).

Pfoze *et al.* (2012) reported the ethnobotany of two communities i.e. Nagas and Kukis of Senapati District. They discussed 120 plants for the treatment of mostly gastro-intestinal diseases such as diarrhoea (*Rhus semialata* Murray); dysentery (*Artemisia nilagirica* (Clarke.) Pamp; gastritis (*Phlogacanthus curviflorus* Nees) and stomach-ache (*Erythrina arborescens* Roxb.). Yumnam and Tripathi (2012) reported Traditional Knowledge (TK) of eating raw leaves, young inflorescences, tender stalks and other plants parts of altogether 64 plants claimed to have medicinal benefits. The plants included *Allium hookeri* Thw. (leaves), *Allium tuberosum* Rottl. ex Spreng (leaves), *Alocasia indica* Spach., *Alternanthera philoxeroides* (Mart.) Griseb. (aerial parts), *Cardamine hirsuta* L (whole plants except roots), *Cycas pectinata* Hamilton (young shoots), *Elsholtzia blanda* Benth. (leaves and dried inflorescences), *Eryngium foetidum* L, (whole plant except old inflorescences), *Euphorbia hirta* L (young twigs and inflorescences), *Gynura nepalensis* DC. (young twigs and young inflorescences), *Houttuynia cordata* Thunb. (whole plant except flowers) and *Ocimum basilicum* L (leaves and young shoots).

Nanda *et al.* (2013) studied 50 ethno-medicinal plants of Thadou tribe of Manipur against various ailments. Some of the plants and the ailments were *Acmella uliginosa* (Swartz) Cassini (intestinal worms), *Benincasa hispida* (Thunberg.) Cogn. (anti-dysenteric, kidney stone), *Brucea javanica* Merrill. (diarrhoea), *Bombax ceiba* L (dysentery), *Carica papaya* L (anthelmintic), *Clerodendrum colebrookianum* Walp.

(diabetes), *Costus speciosus* (Koenig. ex Retzius) Sm. (ear infection), *Elsholtzia communis* (Col. and Hemsley) Diels. (Tonsillitis), *Mikania micrantha* Kunth. (anti-malaria), *Mimosa pudica* L (kidney stone), *Rhus semialata* Murray (diarrhoea), *Sapindus emarginatus* Vahl. (tooth ache) and *Schima walichii* (DC) Korthals (snake bite).

Mikawlawng *et al.* (2014) reviewed the use of medicinal plants as antiurolithiatic agents in Manipur. It documented 107 plants currently used by different ethnic communities as antiurolithiatic agents. Singh and Devi (2018) carried out ethno-pharmacological survey of medicinal plants in Andro village of Manipur and reported the plants claimed to cure diseases i.e. *Acacia farnesiana* (L) Willd. (skin disease), *Allium sativum* L (hypertension), *Alocasia macrorrhizos* (L) G.Don (arthritis), *Azadirachta indica* A. Juss. (burn), *Curcuma longa* L (cough), *Cynodon dactylon* Pers (cuts and wounds), *Eclipta prostrata* (L) L (typhoid fever), *Lindernia ruellioides* (Colsm.) Pennel (diuretic), *Oxalis corniculata* L (indigestion), *Phyllanthus emblica* L (asthma), *Tagetes erecta* L (insect bite), *Xylosma longifolia* Clos. (liver disorder) etc. Singh *et al.* (2018) studied bamboo diversity, distribution and utility in forest fringe villages of Manipur. The study concluded that “bamboo is one of the most vital wealth of forest fringe villages of Manipur and is wanted for house construction to handicrafts preparation and from edible food stuff to preparation of various medications”.