

## **Ethnobotanical studies on *Yimchunger-Naga* tribe living in and around Fakim Wildlife Sanctuary in Nagaland, India**

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### **Abstract**

The present study has been carried out in and around Fakim Wildlife Sanctuary, Nagaland, to document the ethnobotanical uses of plants by the people of *Yimchunger-Naga* tribe. A total of 122 plant species representing 103 genera and 60 families which are extensively used by them as medicine, food, fodder, fibre, dye, basketry, ornamental and various other purposes for their livelihood are enumerated.

**Key words:** Ethnobotany, *Yimchunger-Naga* tribe, Nagaland

### **INTRODUCTION**

Since pre-historic times, man has been dependent on the vast resources of forest and its products around them. Nagaland, being a hilly state with diverse geographical features and climatic conditions is rich in diversity of habitats of flora and fauna and differs from other parts of India in the ethnic land use system and socio-economic conditions. The people of Nagaland, particularly in the rural areas are still dependant on the vast natural resources for their livelihood. The people have learnt the use of specific plant species for specific purpose through trial and error method. This knowledge of uses of plants as vegetables, fruits, medicine and for other purposes are well preserved, which are passed from generation to generation mostly through oral tradition and practiced by the local communities (Changkija *et al.* 2010).

Fakim Wildlife Sanctuary is situated in the foothills of Mt. Saramati (the southern offshoots of main Himalayan ranges that separate India and Myanmar) in Kiphire district of Nagaland bordering to Myanmar. It lies between 25°47' to 25°48' N latitudes and 95°02' to 95°04' E longitudes. It was declared as a Wildlife Sanctuary in the year 1986 and covers an area of 641 hectares. The altitude of the sanctuary ranges from 1700 – 3000 m amsl. The average temperature of the area is 5Ú C during winter and 29Ú C during summer with annual rainfall that varies from 200 cm to 300 cm (Anonymous 2010). Fakim is the name of the village where the sanctuary is located. The literal meaning of Fakim means “surrounded of Salt lick pool”. As the name indicates, there are as many as 50 salt lick pools in and around Fakim Wildlife Sanctuary (Rongsensashi *et al.* 2013 a,b). The villages around the sanctuary are Fakim, Tsüngdang, Sangtsong, Wongtsüwong, Thanamir and Pinkim. The local inhabitants belong to the *Yimchunger* tribe of Nagaland. The vegetation type of the region is sub-tropical evergreen to temperate broad leaved to sub-alpine forest (Champion & Seth 1968).

The sanctuary is noted for its high density of rare and endangered Tragopan (*Tragopan blytii* Jerdon) which is the state bird of Nagaland (Anonymous 2005).

There are several reports on the ethnobotanical studies of the different ethnic tribes and sub-tribes of Northeast India (Jain & Borthakur 1980; Arora 1981; Saklani & Jain 1994; Tag *et al.* 2008; Das & Choudhury 2009; Sumitra *et al.* 2009; Teron & Borthakur 2014; Chettri *et al.* 2014). Some valuable reports have also been published on the ethnobotanical knowledge as practiced by some tribes of Nagaland (Rao & Jamir 1982; Jamir & Rao 1990; Changkija 1992, 1999; Changkija *et al.* 2010; Jamir *et al.* 2008; Lanusunep & Jamir 2010; Imchen & Jamir 2011). However, so far no reports on the ethnobotanical studies from the present study area. The present paper is an attempt to bring out the traditional knowledge of forest resources of the *Yimchunger* tribe inhabiting the area surrounding Fakim Wildlife Sanctuary (FWS), Kiphire district of Nagaland in North-east India.

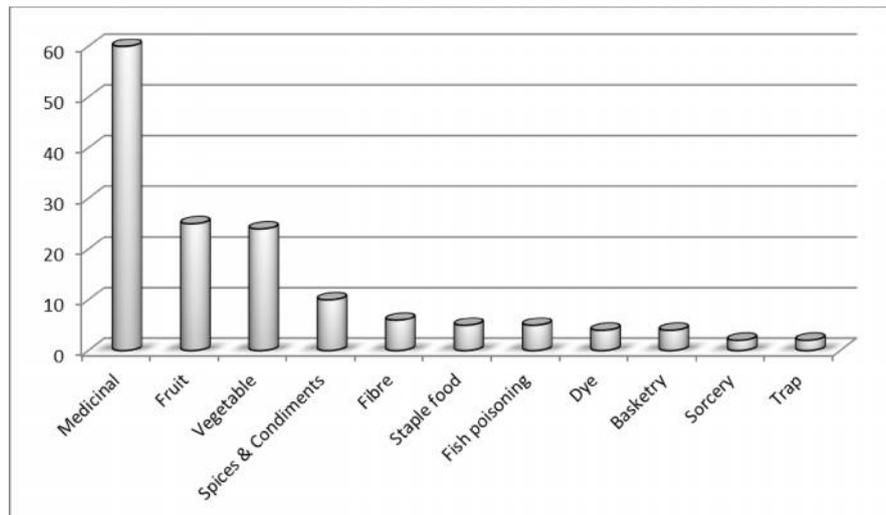
## MATERIAL AND METHODS

The study was undertaken in six villages around the FWS namely, Fakim, Tsüngdang, Sangtsong, Wongtsüwong, Thanamir and Pinkim during the years 2008 to 2011. The first hand information on the traditional uses of the plants was collected with verbal consent and prior permission from the local medicine men, village elders, farmers and local knowledgeable persons from each village. Ethnobotanical data were collected following the standard procedures of Gary (1995); Jain & Mudgal (1999). Extensive field surveys were conducted in and around the FWS covering all seasons with the help of local knowledgeable people and forest officials. Details about the usage of plants particularly of medicinal plants were specially recorded during the survey and photograph of all the species were also taken. Some of the collected plant specimens were taken to the reliable local informants to authenticate and gather detail information about those plants.

The collected plant specimens were processed following the standard methods of herbarium preparation (Jain & Rao 1977) and duly identified using published regional and national Floras (Hooker 1875 – 1897; Kanjilal *et al.* 1934 – 1940; Polunin & Stainton 1984; Haridasan & Rao 1985, 1987; Sharma *et al.* 1993; Sharma & Balakrishnan 1993; Hajra *et al.* 1995; Singh *et al.* 2000). The identified specimens were later authenticated by comparing in the Herbaria of North-Eastern Hill University (NEHU), Shillong (Meghalaya) and at CAL. The voucher specimens were deposited in the Herbarium of the Department of Botany, Nagaland University. All plant names were confirmed using <http://www.theplantlist.org> (accessed on 21.04.2016).

## RESULTS AND DISCUSSION

The present survey recorded 122 plant species used by the *Yimchunger* tribals for various purposes; representing 103 genera belonging to 60 families of which 95 are dicotyledonous, 22 monocotyledonous, 3 gymnospermous and 2 pteridophytic. The plants are enumerated alphabetically in Table 1 with their botanical names followed with the family, local name, exsiccatae, parts used and uses. Most of the species are used medicinally and many plants have more than one uses (Fig. 1). Sixty-one plants are used medicinally of which *Panax pseudo-ginseng*, *Taxus wallichiana*, *Paris polyphylla*, *Campylandra wattii*, *Swertia* sp., *Valeriana wallichii*, etc. are worth mentioning (commonly used). Fruit of 25 species such as *Cornus capitata*, *Actinidia* sp., *Prunus* sp., *Docynia* sp., etc.; vegetable of 24 species such as *Asparagus* sp., *Diplazium* sp., *Viola diffusa*, *Elatostema* sp., etc.; spices



**Figure 1.** Plants being used for various purposes by the inhabitants in the study area

**Table 1.** Ethnobotanical plants used by *Yimchunger-Naga tribe* living around Fakim wildlife sanctuary in Nagaland.

Plant name [Family]; Exsicattae	Local name	Part/s used	Uses
<i>Acacia oxyphylla</i> Graham ex Craib [Mimosaceae]; Rongsen 0331	<i>Sensuh</i>	Stem	Thorny stems used in fencing
<i>Acer laevigatum</i> Wallich Sapindaceae; Rongsen 0349	<i>Troksung</i>	Stem	As posts, beams and house construction.
<i>Acmella oleracea</i> (Linnaeus) R.K. Jansen [Asteraceae]; Rongsen 1792	<i>Kohduh</i>	Whole plant	Leaves chewed to relieve toothache; plant decoction for dysentery; tender aerial parts as vegetable and fodder.
<i>Actinidia callosa</i> Lindley [Actinidiaceae]; Rongsen 1703	<i>Aremkiwi</i>	Fruit	Eaten raw
<i>Ainsliaea pteropoda</i> A.P. de Candolle [Asteraceae]; Rongsen 1724	<i>Yajen</i>	Root	Decoction is taken to relief stomach pain
<i>Albizia julibrissin</i> Durazzini [Leguminosae]; Rongsen 1720	<i>Topok</i>	Bark	Decoction is used as antidandruff
<i>Allium sativum</i> Linnaeus [Liliaceae]; Rongsen 1366	<i>Metsongnansen</i>	Bulb	Paste applied in cuts and wounds as haemostat and in hypertension, cough and body pain
<i>Alnus nepalensis</i> D. Don [Betulaceae]; Rongsen 0336	<i>Zisang</i>	Leaf, stem, root	Leaf paste applied on cuts and wounds as haemostat; root decoction is taken to treat diarrhea; trees planted in lands to improve soil fertility; stem produce good firewood
<i>Amphineuron opulentum</i> (Kaulf) Holtum [Thylypteriaceae]; Rongsen 0131	<i>Maachai</i>	Fronds	Drives away fleas and mites; whole plant is a fish poison
<i>Aralia foliolosa</i> Seemann [Araliaceae]; Rongsen 0327	<i>Chuhsang</i>	Young shoot	As vegetable
<i>Artemisia nilagirica</i> (Clarke) Pampanini [Asteraceae]; Rongsen 0360	<i>Ningro</i>	Leaf, whole plant	Leaf paste applied to bleeding nose and on cuts and wounds; also used as insecticide; plant extract mixed with decoction of <i>Camellia sinensis</i> is given to treat malaria

Plant name [Family]; Exsiccatae	Local name	Part/s used	Uses
<i>Asparagus filicinus</i> D. Don [Liliaceae]; Rongsen 1791	Komoktsurong	Tender shoot	As vegetable; boiled shoots given in digestive disorder
<i>Bauhinia glauca</i> ssp. <i>tenuiflora</i> Wight & Arnott [Leguminosae]; Rongsen 1531	Tafili	Seeds, stem	Roasted seeds are eaten to regulate blood pressure; ropes made from stem is used for house construction, fencing and as Mithun binder
<i>Begonia palmata</i> D. Don [Begoniaceae]; Rongsen 2176	Futsa	Root, leaf	Rhizome eaten as pain relief during body ache; leaf as vegetable
<i>Berberis asiatica</i> Roxburgh ex A.P. de Candolle [Berberidaceae]; Rongsen 0356	Merimejepsang	Fruit, spine	Conjunctivitis, jaundice, hemorrhoids, itching, menorrhagia, urinogenital disorder and ulcerative conditions; spine for tattooing
<i>Betula alnoides</i> Buch.-Hamilton ex D. Don [Betulaceae]; Rongsen 1563	Pingkisang	Bark, stem	Fresh bark is chewed to improve digestion; infusion is used during body-ache and fever; stem for making tool handles; trees are planted around the villages to protect against strong winds
<i>Boehmeria rugulosa</i> Weddell [Urticaceae]; Rongsen 0143	Nenitongsang	Bark	Bark yield strong fibre, which is pleated into fine rope and used in making strings of bow that are used during hunting
<i>Brassaiopsis glomerata</i> (Blume) Regel [Araliaceae]; Rongsen 1742	Chuisang	Bark, fruit	Bark paste is applied to treat bone fracture and sprain; dried fruit used as ornamental earring
<i>Calamus erectus</i> Roxburgh [Arecaceae]; Rongsen 2905	Turi	Stem, seed	For making baskets, winnower and binding purposes; seeds for indigestion
<i>Campylandra wattii</i> Baker [Liliaceae]; Rongsen 1735	Sangshisan gjing	Leaf, fruit	Decoction used against malaria and dysentery; fruit eaten raw; used to treat heart diseases
<i>Castanopsis indica</i> (Roxburgh) A.P. de Candolle [Fagaceae]; Rongsen 0145	Sherepaso	Stem, nut	Planking, poles and pillars; fuel wood; nuts eaten after roasted
<i>Cephalotaxus mannii</i> Hooker f. [Cephalotaxaceae]; Rongsen 0308	Kelingsang	Stem, leaf	As posts during construction of house and granary; twigs and leaves for decoration during festivals; leaves and roots extract used to treat tumour
<i>Chaerophyllum villosum</i> Wallich [Umbelliferae]; Rongsen 1733	Tongoneket rang	Leaf	As vegetable
<i>Chenopodium album</i> Linnaeus [Chenopodiaceae]; Rongsen 1365	Rotsu	Leaf, seed	As vegetable and fodder; seed for baking and to make local wine
<i>Chimonobambusa griffithiana</i> (Munro) Nakai [Poaceae]; Rongsen 0167	Tumi	Stem	For making huts, fencing and fishing trap; the Yimchunger tribals beliefs that the tooth decays faster when the shoot is eaten
<i>Chloranthus glaber</i> (Thunberg) Makino [Chloranthaceae]; Rongsen 0359	Ongjinaro	Fruit	Much valued for their red fruit, mostly used as ornamental during Christmas
<i>Cinnamomum verum</i> J. Presl [Lauraceae]; Rongsen 2107	Sangchisang g	Bark, leaf	Dried as well as fresh leaves are boiled with tea and used as aromatic drink; powdered bark smoked to treat asthma, cough and tuberculosis; also used as spice in curry
<i>Clematis montana</i> var. <i>manipurensis</i> Bruehl [Ranunculaceae]; Rongsen 0119	Shipak	Leaf	During scarcity, leaf is used as a substitute of chilli, owing to its pungency
<i>Coix lachryma-jobi</i> Linnaeus [Poaceae]; Rongsen 1367	Konkor	Grain	As one of their main staple food
<i>Cornus capitata</i> Wallich [Cornaceae]; Rongsen 1518	Muzuibusang g	Fruit	Eaten raw
<i>Cymbidium trigrinum</i> Parish ex Hooker [Orchidaceae]; Rongsen 1589	Nelichipam	Whole plant	Grown as an ornamental
<i>Debregeasia longifolia</i> (Burman f.) Weddell [Urticaceae]; Rongsen 0310	Tesang	Bark, fruit	Fruit eaten raw, leaf for fodder; bark yield coarse fibre used for making bow strings

Plant name [Family]; Exsiccatae	Local name	Part/s used	Uses
<i>Dendrobium densiflorum</i> Wallich ex Lindley [Orchidaceae]; Rongsen 1785	<i>Nelichipam</i>	Leaf, bulb, seed	Crushed bulb and seed powder applied on burns and cuts; leaf paste is plastered on fractured bone; also grown as an ornamental
<i>Dioscorea bulbifera</i> Linnaeus [Dioscoreaceae]; Rongsen 2153	<i>Kakuli</i>	Tuber, bulbils	Eaten after cooked; used for jaundice and head-ache
<i>Dioscorea pentaphylla</i> Linnaeus [Dioscoreaceae]; Rongsen 1796	<i>Kakuli</i>	Tuber, bulbils	Eaten after cooked; paste applied in swellings and as general tonic
<i>Diospyros kaki</i> Linnaeus [Ebenaceae]; Rongsen 2122	<i>Pipakinsang</i>	Fruit, stem	Eaten raw; used in the treatment of cough; stems good source of fuel wood
<i>Diplazium esculentum</i> (Retzius) Sweet [Athriaceae]; Rongsen 0133	<i>Letsi</i>	Fronde	Boiled frond for constipation and as vegetable
<i>Docynia indica</i> (Wallich) Decaisne [Rosaceae]; Rongsen 2114	<i>Mekukin</i>	Fruit, stem	Eaten raw or pickled; fruits are preserved and made into refreshing drinks; stem for making agricultural implements and mortars
<i>Duchesnea indica</i> (Andrews) Focke [Rosaceae]; Rongsen 0320	<i>Laklaksübakang</i>	Fruit	Fruit edible and as tonic for liver
<i>Elaeocarpus floribunda</i> Blume [Elaeocarpaceae]; Rongsen 0341	<i>Shutiki</i>	Fruit, stem	Fruit eaten raw, cooked or pickled; stem as fuel wood
<i>Elatostema platyphyllum</i> Weddell [Urticaceae]; Rongsen 1508	<i>Mechijakem</i>	Leaf	As vegetable
<i>Elaeagnus pyriformis</i> Hooker f. [Elaeagnaceae]; Rongsen 1576	<i>Merimejepki</i>	Fruit, seed	Fruit pulp eaten raw; also used in jellies; seed as stimulant in cough
<i>Elsholtzia blanda</i> Benthham [Lamiaceae]; Rongsen 2183	<i>Arem napa</i>	Whole plant	Plant paste applied in cuts, wounds, sores, bee sting and skin diseases; decoction for kidney and urinary trouble
<i>Eupatorium adenophorum</i> Sprengel [Asteraceae]; Rongsen 0361	<i>Burmaka</i>	Stem, leaf	Leaf paste as haemostat; stem used in sorcery
<i>Fagopyrum acutatum</i> (Lehmann) Mansfeld ex K. Hammer [Polygonaceae]; Rongsen 1757	<i>Lomfoli</i>	Leaf, root	As vegetable; roots used against intestinal worms
<i>Gaultheria fragrantissima</i> Wallich [Ericaceae]; Rongsen 1705	<i>Longpentsaksang</i>	Leaf, fruit	Leaves are chewed to get relief from headache; fruit eaten raw
<i>Glycine max</i> (Linnaeus) Merrill [Fabaceae]; Rongsen 1340	<i>Tsuso/Pongtritsi</i>	Seed	As food; seeds are boiled, fermented and made into cake locally called 'Pongtri'; powdered seeds are eaten to stop dysentery
<i>Gonatanthus pumilus</i> (D. Don) Engler & Krause [Araceae]; Rongsen 0321	<i>Sangshipni</i>	Whole plant	Fed to pig and cattle to expel maggot from their wounds and injuries
<i>Helwingia himalaica</i> Hooker f. & Thomson [Helwingiaceae]; Rongsen 1543	<i>Aksula</i>	Whole plant	Whole plant poisonous for pig
<i>Herpetospermum pedunculatum</i> (Seringe) Clarke [Cucurbitaceae]; Rongsen 1578	<i>Wangkusu/Neshulai</i>	Leaf	Tender shoots and leaves as vegetable
<i>Holboelia latifolia</i> Wallich [Lardizabalaceae]; Rongsen 1738	<i>Linglangjang</i>	Leaf, fruit	Fruit eaten raw; used to cure stomach ailments; crushed leaves applied on burns
<i>Hypericum elodeoides</i> Choisy [Hypericaceae]; Rongsen 1800	<i>Memosangto</i>	Whole plant	Used as antiviral during fever
<i>Illicium griffithii</i> Hooker f. & Thomson [Illiciaceae]; Rongsen 1520	<i>Sangsongsang</i>	Fruit	As spice; fruits are eaten to keep their body warm during hunting and fishing
<i>Illicium manipurensense</i> Watt ex King [Illiciaceae]; Rongsen 2164	<i>Sangsongsang</i>	Flower, fruit	As vegetable and fruit as spice
<i>Imperata cylindrica</i> Linnaeus [Poaceae]; Rongsen 0102	<i>Meshu</i>	Leaf, root	Leaf for thatching and making broom; roots as wormicide
<i>Juglans regia</i> Linnaeus [Juglandaceae]; Rongsen 2184	<i>Tekosiung</i>	Leaf, fruit, nut	Unripe fruit and leaves are crushed and used to intoxicate fish; fruit for tanning and dyeing; roasted nuts are eaten

Plant name [Family]; Exsicattae	Local name	Part/s used	Uses
<i>Leucosceptrum canum</i> Smith [Lamiaceae]; <i>Rongsen 0366</i>	<i>Muyuben/Sangpenki</i>	Flower	Flower nectars are taken (sucked) as a refreshing and energizing juice
<i>Lithocarpus pachyphylla</i> (Kurz) Rehder [Fagaceae]; <i>Rongsen 0146</i>	<i>Tongpajen</i>	Stem, nut	For planking, building purposes, fuel wood; nut eaten after roasted
<i>Litsea citrata</i> Blume [Lauraceae]; <i>Rongsen 1776</i>	<i>Ningtrong sang</i>	Bark, root, fruit	Powdered bark and roots are applied to relief muscular pain; fruit used as spices in chutney and curry
<i>Loranthus gracilifolius</i> Schultes [Loranthaceae]; <i>Rongsen 2185</i>	<i>Ninesang</i>	Fruit	Gum extract is applied on bamboo sticks which are used for trapping birds; fruit eaten raw
<i>Maesa chisia</i> Buchanan-Hamilton ex Don [Myrsinaceae]; <i>Rongsen 1748</i>	<i>Pangpang</i>	Leaf, fruit	As vegetable; fruit eaten raw
<i>Magnolia griffithii</i> Hooker f. & Thomson [Magnoliaceae]; <i>Rongsen 0344</i>	<i>Thurosiung</i>	Stem	For planking, making furniture, plates and spoons
<i>Magnolia carthartii</i> (Hooker f. & Thomson) Nootboom [Magnoliaceae]; <i>Rongsen 0325</i>	<i>Thurosiung</i>	Stem	For planking, house construction, carving, and making gun butt
<i>Mahonia napaulensis</i> D. Don [Berberidaceae]; <i>Rongsen 1778</i>	<i>Sesakin</i>	Root, stem, fruit	Fruit eaten raw; yellow dye is obtained from root and stem; stem for wood carving
<i>Melodinus monogynus</i> Roxburgh [Apocynaceae]; <i>Rongsen 2117</i>	<i>Rükniik</i>	Stem, fruit	Stem as rope, for binding, construction of hut, fencing; fruit eaten raw
<i>Milletia pachycarpa</i> Benthham [Fabaceae]; <i>Rongsen 1339</i>	<i>Süli</i>	Root, pod	Roots and pods used for fish poisoning
<i>Molinera recurvata</i> (Dryand) Herbert [Hypoxidaceae]; <i>Rongsen 2159</i>	<i>Piyaknok</i>	Root, leaf	Infusion of root stock is applied to treat conjunctivitis and ear ache; paste as poultices, haemostat and as antiseptic; leaves for baking bread and as binder
<i>Mussaenda roxburghii</i> Hooker f. [Rubiaceae]; <i>Rongsen 1338</i>	<i>Noksangjipen</i>	Twig, leaf	Leaf paste as haemostat; aqueous extract of young twigs is taken orally to relieve hiccup
<i>Myrica esculenta</i> Hamilton ex D. Don [Myricaceae]; <i>Rongsen 0345</i>	<i>Metiyong</i>	Bark, fruit	Fruit eaten raw or pickled; used for indigestion and to prepare refreshing drink; decoction of bark is used in asthma, affliction in lungs and bronchitis
<i>Oenanthe stolonifera</i> Wallich [Apiaceae]; <i>Rongsen 2180</i>	<i>Pangpangl a</i>	Whole plant	As vegetable, either cooked or raw; whole plant for diabetes
<i>Oxalis corniculata</i> Linnaeus [Oxalidaceae]; <i>Rongsen 1781</i>	<i>Fenonotsub o</i>	Leaf, fruit	Fruits eaten raw; aerial parts eaten raw to cure dysentery; leaves are also used against toothache
<i>Paederia foetida</i> Linnaeus [Rubiaceae]; <i>Rongsen 1789</i>	<i>Jihli</i>	Leaf	Leaf chewed to treat dysentery, diarrhoea and stomach disorder
<i>Panax pseudo-ginseng</i> Wallich [Araliaceae]; <i>Rongsen 1714</i>	<i>Yongka</i>	Root, leaf	Dried roots are made into powder taken orally for the treatment of heart problems, diabetes, cancer, ulcers, tuberculosis; also taken as aphrodisiac; leaves as vegetable; fruits are eaten by <i>Tragopan blythii</i> (Tragopan )
<i>Panax assamicus</i> R.N. Banerjee [Araliaceae]; <i>Rongsen 0351</i>	<i>Yongka</i>	Root, leaf	Same as <i>Panax pseudo-ginseng</i>
<i>Paris polyphylla</i> J.E. Smith [Liliaceae]; <i>Rongsen 1783</i>	<i>Shingko</i>	Rhizome	Raw rhizomes are eaten in small quantity while doing strenuous work and during hunting to give strength; also eaten during fever
<i>Phoebe hainesiana</i> Brandis [Lauraceae]; <i>Rongsen 0332</i>	<i>Müsang/Tilak</i>	Stem, fruit	For making log drums, planking, house construction, making furniture, rice bowls and dishes; fruit eaten raw. (The most dominant tree species and finest commercially and locally used timber tree)

Plant name [Family]; Exsicattae	Local name	Part/s used	Uses
<i>Pinus kesiya</i> Royle ex Gardon [Pinaceae]; <i>Rongsen 1337</i>	<i>Lhosang</i>	Stem, resin	Building purposes, furniture; hard wood to make fire or as torch wood; resin extract is used to treat sore and various skin diseases
<i>Piper griffithii</i> A.P. de Candolle [Piperaceae]; <i>Rongsen 0663</i>	<i>Sangshing</i>	Leaf	As bee repellent (leaf is crushed and the pungent fume is employed to rebel bee); also mixed with 'Pongtri' (fermented soya bean) to make local delicacy
<i>Piper longum</i> Linnaeus [Piperaceae]; <i>Rongsen 1731</i>	<i>Sangshing</i>	Leaf	Leaves are dried on hot pots and the dried leaves are crushed and applied on allergies
<i>Plantago major</i> var. <i>major</i> Linnaeus [Plantageniaceae]; <i>Rongsen 2124</i>	<i>Lenkimao</i>	Whole plant	As vegetable; leaf paste applied on cuts and wounds
<i>Persicaria chinensis</i> (Linnaeus) Nakai [Polygonaceae]; <i>Rongsen 1708</i>	<i>Lilipong</i>	Leaf, fruit	Leaf as vegetable; fruit eaten raw
<i>Potentilla fulgens</i> Wallich ex Hooker [Rosaceae]; <i>Rongsen 1551</i>	<i>Lalipen</i>	Root	Crushed roots applied in toothache; decoction is taken orally to treat diarrhea
<i>Pouzolzia sanguinea</i> (Blume) Merrill [Urticaceae]; <i>Rongsen 1511</i>	<i>Nenitongsang</i>	Shoot	Young shoots are made into paste, applied on the wheel of the Cart as a substitute of grease to reduce friction
<i>Prunus nepaulensis</i> (Seringe) Steudel [Rosaceae]; <i>Rongsen 0350</i>	<i>Meshijang</i>	Fruit	Eaten raw; juice of the fruit is made into refreshing drinks; stem for fuel wood
<i>Pyrus pashia</i> Buchanan-Hamilton ex D. Don [Rosaceae]; <i>Rongsen 0337</i>	<i>Asanomeku ikinsu</i>	Fruit, stem	Ripe fruit eaten raw or pickled; stem for making pestle for husking paddy
<i>Quercus lamellosa</i> Smith [Fagaceae]; <i>Rongsen 2171</i>	<i>Chikoso</i>	Stem	For planking, making agricultural implements, fuel wood, poles and pillars
<i>Quercus semicarpifolia</i> Smith [Fagaceae]; <i>Rongsen 2902</i>	<i>Yotelem</i>	Stem	For building, fuel wood, making pestle for husking paddy
<i>Quercus serrata</i> Thunberg [Fagaceae]; <i>Rongsen 1788</i>	<i>Chikoso</i>	Stem	For making threshing tridents and as fuel wood
<i>Rhaphidophora hookeri</i> Schott [Araceae]; <i>Rongsen 1504</i>	<i>Taktakvi</i>	Leaf	Wrapping boiled soya bean for fermentation; also used in decoration during festivals
<i>Rhaphidophora decursiva</i> (Roxburgh) Schott [Araceae]; <i>Rongsen 0302</i>	<i>Sangamangu</i>	Whole plant	Used in decoration during festivals
<i>Rhododendron arboreum</i> Smith [Ericaceae]; <i>Rongsen 2105</i>	<i>Metapen/T open</i>	Flower	As vegetable; sweet nectars are sucked and believed to give energy and strength; flowers for ornamentation
<i>Rhus semialata</i> Murray [Anacardiaceae]; <i>Rongsen 1730</i>	<i>Tanmo</i>	Stem, leaf, fruit	Fruit eaten raw or preserved; decoction of dried, powdered fruit is taken for indigestion, food poisoning and stomach ache; paste applied in allergies; wood consider as best fire wood due to low biomass content, even the freshly cuts stem are used as fire wood
<i>Rubia manjith</i> Roxburgh ex Fleming [Rubiaceae]; <i>Rongsen 0365</i>	<i>Sangshep</i>	Stem, root	A valuable yellow and red dye is obtained from roots and stems
<i>Rubia sikkimensis</i> Kurz [Rubiaceae]; <i>Rongsen 2182</i>	<i>Sangshep</i>	Stem, root	Stem and roots are used to extract red dye
<i>Rubus ellipticus</i> J.E. Smith [Rosaceae]; <i>Rongsen 1777</i>	<i>Sosanese kin</i>	Root, shoot, fruit	Roots extract used in fever; decoction of young shoot used in stomach trouble; fruit eaten raw
<i>Rubus paniculatus</i> J.E. Smith [Rosaceae]; <i>Rongsen 1587</i>	<i>Pinakin</i>	Leaf, spine, fruit	Fruit eaten raw; leaf for diarrhoea and stomach disorder; spine for tattooing
<i>Sarcochlamys pulcherrima</i> Gaudichaud [Urticaceae]; <i>Rongsen 2199</i>	<i>Laji</i>	Shoot, leaf, bark	Young shoots and leaves as vegetable; bark yield strong fibre, made into ropes which are used for carrying baskets

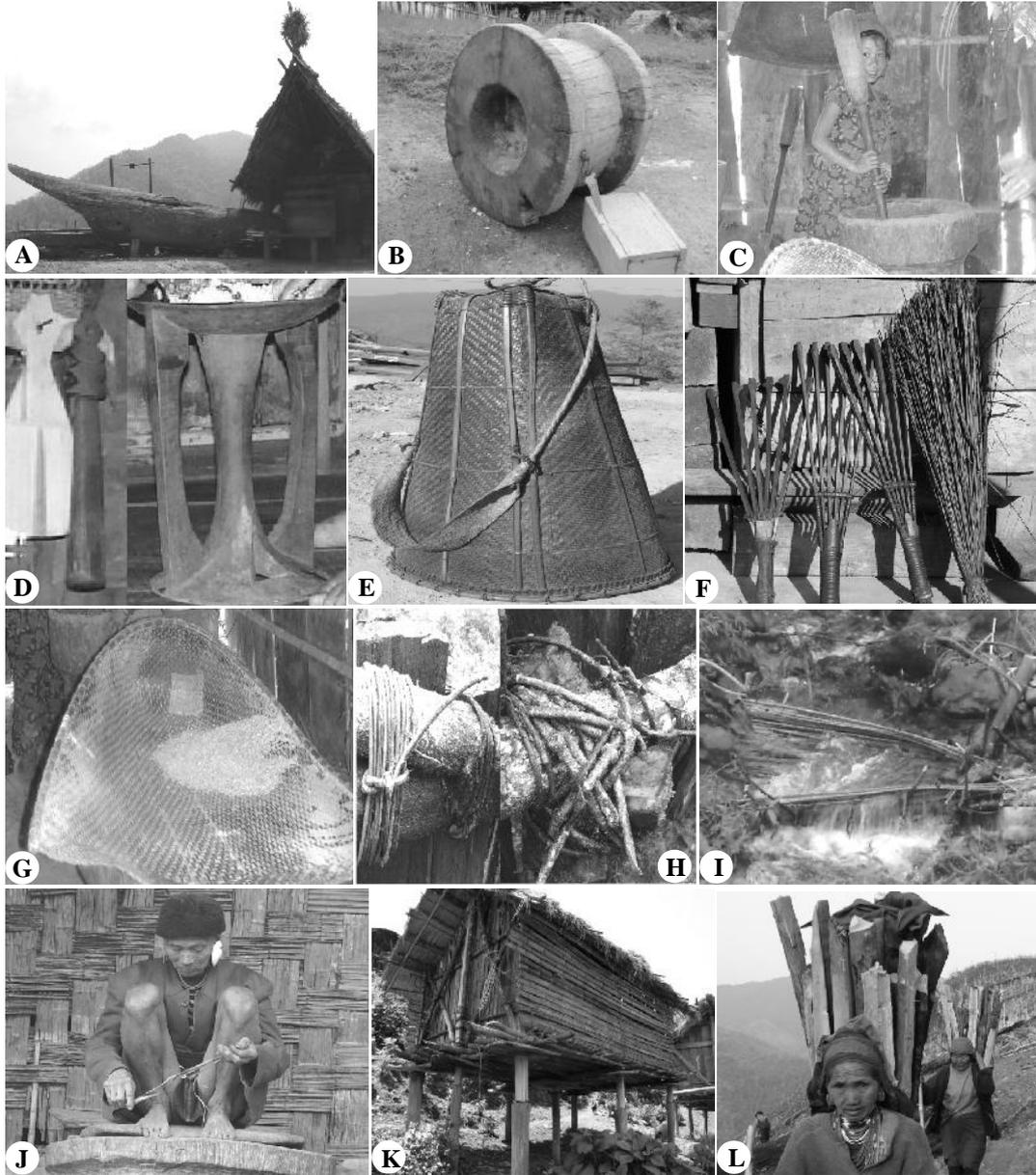
Plant name [Family]; Exsiccatae	Local name	Part/s used	Uses
<i>Schima khasiana</i> Dyer [Theaceae]; Rongsen 1527	<i>Mimososing</i>	Leaf, bark	Young leaves antipyretic; bark allergic; used to poison fishes; stem as fuel wood
<i>Schizostachyum capitatum</i> (Munro) Majumdar [Poaceae]; Rongsen 0195	<i>Lulaksü-i</i>	Stem	Thin strips of culms are woven into baskets that are used to carry heavy load, storing grain, vegetables; also used to make straps to carry the baskets and other heavy objects
<i>Setaria italica</i> (Linnaeus) P. Beauvois [Poaceae]; Rongsen 1399	<i>Mantsü</i>	Grains	Grains are used to make local wine; also used as staple food
<i>Sinarundinaria rolloana</i> (Gamble) Chao & Renv. [Poaceae]; Rongsen 0174	<i>Mi</i>	Stem, twig	Culm used in making comb (Culm is cut into small pieces which are tied together with thread in the middle); twigs are made into broom; culm for making bird trap
<i>Solanum myriacanthum</i> Dunal [Solanaceae]; Rongsen 2125	<i>Kamonglüzuh</i>	Fruit	Dried fruit made into powder is applied to cure tooth decay and tooth-ache; crushed fresh fruits used as alternative for soap
<i>Solanum americanum</i> Miller [Solanaceae]; Rongsen 0311	<i>Leptongnevo</i>	Leaf, fruit	As vegetable; fruits either eaten raw or boiled and sun-dry to check high blood pressure and to cure bladder infection
<i>Stephania elegans</i> Hooker f. & Thomson [Menispermaceae]; Rongsen 1522	<i>Jangrou</i>	Tuber	Tubers are crushed and the juice extract are applied in eye injuries and skin diseases, also for asthma
<i>Streptolirion volubile</i> Edgeworth [Commelinaceae]; Rongsen 1798	<i>Pongtolepjok</i>	Whole plant	As vegetable
<i>Swertia bimaculata</i> Hooker f. & Thomson [Gentianaceae]; Rongsen 1577	<i>Weyangsangpen</i>	Whole plant	Decoction is taken during malarial fever
<i>Taxus wallichian</i> Zuccarini [Taxaceae]; Rongsen 1554	<i>Merinuhu</i>	Bark, leaf	Bronchitis, epilepsy, giddiness; antiseptic, aphrodisiac, sedative, anticancer.
<i>Thalictrum foliolosum</i> A.P. de Candolle [Ranunculaceae]; Rongsen 1725	<i>Metsubi</i>	Root	Roots extract is used for malarial fever
<i>Thysanolaena latifolia</i> (Roxburgh ex Hornemann) Honda [Poaceae]; Rongsen 0175	<i>Atsung/Chukcha</i>	Leaf, inflorescence	Matured inflorescence used to make broom; leaf is used as a tool in supernatural practices (sorcery) to trace lost animals and things
<i>Toddalia asiatica</i> (Linnaeus) Lamarck [Rutaceae]; Rongsen 1760	<i>Liuaso/Lapuk</i>	Root, fruit	Fruit eaten raw; root as tonic
<i>Toona ciliata</i> Roemer [Meliaceae]; Rongsen 0358	<i>Tsungkongkisang</i>	Stem	For house construction, planking, furniture, making plates, spoon and mortar for husking paddy and other wooden household items
<i>Urtica dioica</i> Linnaeus [Urticaceae]; Rongsen 1779	<i>Kimbo</i>	Shoot	Tender shoot as vegetable and fodder
<i>Valeriana wallichii</i> A.P. de Candolle [Valerianaceae]; Rongsen 2119	<i>Lomfoli</i>	Whole plant	Used in colic, epilepsy, fever, hysteria, liver disorder, skin diseases and weak eyesight
<i>Vanda coerulea</i> Griffith ex Lindley [Orchidaceae]; Rongsen 0385	<i>Nelichipam</i>	Seed	Paste applied on cuts, injuries and fire burn; also grown as ornamental
<i>Viola diffusa</i> Ging. [Violaceae]; Rongsen 0315	<i>Shobrak</i>	Leaf	As vegetable
<i>Viscum articulatum</i> Burman [Loranthaceae]; Rongsen 1793		Whole plant	Paste of the plant applied to cure bone fracture and bruises
<i>Zanthoxylum acanthopodium</i> A.P. de Candolle [Rutaceae]; Rongsen 0376	<i>Metsa ashi</i>	Leaf, fruit	Fruits as condiment; crushed fruits are used as fish poison; tender leaves and shoots as vegetable

Plant name [Family]; Exsicattae	Local name	Part/s used	Uses
<i>Zanthoxylum armatum</i> A.P. de Candolle [Rutaceae]; Rongsen 2151	Ayangau	Leaf, fruit	As vegetable; dried fruit are chewed to relief tooth ache; fruit as condiment
<i>Zanthoxylum khasianum</i> Hooker f. [Rutaceae]; Rongsen 1591	Kotashishikit	Fruit	As condiment
<i>Zea mays</i> Linnaeus [Poaceae]; Rongsen 1400	Yamtsüngri	Grain	For making local drinks; also as food and fodder
<i>Zingiber officinale</i> Roscoe [Zingiberaceae]; Rongsen 1336	Sungmok	Rhizome, leaf	Decoction of rhizome is taken during cough; also used as condiment; leaf & inflorescence as vegetable
<i>Ziziphus incurva</i> Roxburgh [Rhamnaceae]; Rongsen 1588	Yangrisang	Stem, fruit	Fruit eaten raw; stem for making handles of agricultural implements

**Table 2.** List of priority plants for conservation and cultivation from around Fakim wildlife sanctuary

Botanical Name	Status	Market value	Remarks
<i>Cephalotaxus mannii</i>	Vulnerable	+	Ornamental, easily cultivable
<i>Cinnamomum verum</i>	Threatened	+	Spice and condiments, high demand, easily cultivable
<i>Cymbidium trigrinum</i>	Rare & endangered	-	Ornamental, need conservation. Endangered due to habitat loss
<i>Gaultheria fragrantissima</i>	Abundant	+	Cultivable
<i>Illicium griffithii</i>	Endangered	+	Condiments, cultivable
<i>Panax pseudo-ginseng</i>	Rare & Endangered	+	High demand, over exploited, need conservation
<i>Panax assamicus</i>	Rare & Endangered	+	High demand, over exploited, need conservation
<i>Paris polyphylla</i>	Endangered	+	High demand, over exploited, need conservation
<i>Rhododendron arboreum</i>	Threatened	-	Ornamental, need conservation
<i>Swertia bimaculata</i>	Vulnerable	+	Weeds, easily cultivable
<i>Rubia</i> spp.	Vulnerable	-	Weeds, easily cultivable
<i>Taxus wallichiana</i>	Rare & endangered	+	High demand, cultivable, need conservation
<i>Thalictrum foliolosum</i>	Vulnerable	-	Weeds, easily cultivable
<i>Valeriana wallichii</i>	Vulnerable	+	High demand, cultivable
<i>Vanda coerulea</i>	Endangered	+	Ornamental, easily cultivable
<i>Zanthoxylum acanthopodium</i>	Abundant	+	Vegetable and condiments, easily cultivable

and condiments of 10 species such as *Illicium griffithii*, *Zanthoxylum* spp., *Cinnamomum* sp., *Litsea* sp., etc.; fibre yielding plants of 6 species such as *Boehmeria* sp., *Debregeasia* sp., *Sarcochlamys* sp., etc.; apart from rice (*Oryza sativa*) staple food of 4 species namely *Setaria italica*, *Zea mays*, *Coix lachryma-jobi*, *Chenopodium album* constitute their main food items. Fish poisoning plants of 5 species such as *Juglans regia*, *Mellitia* sp., *Schima* sp., *Zanthoxylum* spp., etc.; dye yielding plant of 4 species such as *Rubia* spp., *Mahonia nepaulensis* etc.; basketry of 4 species such as *Calamus* sp., *Schizostachyum* sp., *Sinarundinaria* sp., *Chimonobambusa* sp., are used. Two species viz. *Eupatorium adenophorum* and *Thysanolaena latifolia* are used in supernatural practices (sorcery). Species of *Loranthus*, *Sinarundinaria* and *Chimonobambusa* are used for making bird



**PLATE-I: Fig. A-L:** A. Log drum & Morung; B. Mortar carved out from wood of *Toona ciliata*; C. Yimchung child husking paddy in their traditional method; D. Spoon, pestle & dish made from wood of *Magnolia* sp.; E. A typical basket made from bamboo & cane; F. Implements for threshing paddy made from Bamboo and *Imperata* sp.; G. Winnower prepared from bamboo and *Calamus* sp.; H. Vines of *Melodinus* sp. used in fence as binder; I. Fish trap made of *Chimonobambusa* sp.; J. An old Yimchung casting lots to find his lost cow using leaf of *Thysanolaena latifolia*; K. A typical Yimchung granary; L. Yimchung women carrying firewood

and fish traps, respectively. Plants commonly used for house construction, planking, carpentry works, furniture and household utensils, fencing etc. are *Toona ciliata*, *Magnolia griffithii*, *Phoebe hainesiana*, *Pinus kesiya*, *Quercus* spp., *Lithocarpus* spp., *Cephalotaxus* sp., *Betula* sp., *Acer* sp., etc., except herbaceous plants all other species are used as sources of

firewood. After consultation with the local inhabitants and with the relevant literatures, and personal observation of plants in use, some species are prioritized (Table 2).

It is also noted that the villages lack basic amenities like medical centre, electricity and good drinking water. Also, the villages are not well connected by roads. The area is about 43 km away from the nearest town and the inhabitants are solely dependent on the natural resources available around them for their livelihood and sustenance. Agriculture is the main occupation of the tribals in the area. The people are dependent on the forest resources for food, fodder, shelter, timber, basic healthcare, tools and agricultural implements and for their economy. Timber and other forest products are the major sources of income for the people around the sanctuary.

### CONCLUSION

From the study conducted it is evident that the tribals have great relationship with the plants of their environment and are mostly dependent on forest resources for their various needs.

*Jhum* cultivation, forest fire, over exploitation of plant resources especially medicinal plants and orchids, logging for commercial purposes, hunting of animals and birds and other socio-economic developmental activities have lead to the depletion of surrounding forest wealth of the area at alarming rate which is the main threat to the biodiversity of the region. Therefore, effective conservation strategies need to be implemented to preserve and protect the rich bioresources of the region.

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