

Study on the Ethnobotanical Resources Prevalent Among the Rengma Community of Karbi Anglong, Assam, India

¹Temsutola, ²T. Lirola Sangtam and ³Nidheesh KS

Department of Botany

^{1,2}St. Joseph University, Chumoukedima, Nagaland - 797115 (India)

³National Institute of Plant Science Technology,

Mahatma Gandhi University - 686560 (India)

Corresponding Author: Temsutola, Research Scholar, St. Joseph University,
Chumoukedima, Nagaland-797115 (India)

Email: temsutolawalling@gmail.com

Contact: 9089516536

Abstract

The Ethnobotanical study was conducted in two Rengma villages namely Khirang Rengma gaon and Jamerhe Borlangso Rengma Gaon under East Karbi Anglong, Assam during the month of January to December 2022. The Rengmas is one of the hill tribes of Assam living in the valley of Karbi Anglong since 1800 yet no extensive ethnobotanical study was carried out so far. Therefore, the main aim of the study is to document the plant resources used by the Rengma community as edible (Vegetable and fruit), medicine, bio fencing, fodder, construction, fish poisoning and weaving implements. Semi-structured questionnaire, personal interview, and field study method were carried out for the collection of data. The present survey enumerated 62 plant species belonging to 58 genera and 42 families. Majority of the plant species reported were used as vegetables or fruits. 17 species out of 62 were under Least Concern of IUCN Red list threatened species, 3 Data Deficient, 1 Vulnerable and 41 were Not Evaluated against any IUCN criteria.

Key words : Plant resources, Rengma community, Traditional Information, Conservation.

Ethnobotanical resources refer to Traditional Information (TI) regarding the plants that are culturally, economically, and scientifically significant to humans. Plant resources are the foundation of human knowledge and the core aspect of biodiversity upon which human survival relies. They are the quintessential resources of human

¹Research Scholar, ²Assistant Professor, ³Adjunct Faculty,

requirements including food, medicine, construction, bio fencing, agriculture, weaving implements, fish poisoning and fodder¹⁶. Ethnobotanical studies address the importance of traditional knowledge and make certain that the local values are translated into rational use of bioresources and thereby conserve plant diversity as well as cultural heritage. With the increasing world population and climate change, there is an increase in food insecurity around the globe^{18,21}. To meet the global food demand and also for discovering novel ethnomedicinal products, it is important to understand and explore the underutilized wild edible plant species through ethnobotanical studies¹⁴. Plant resources are the principal fountain of food, medicine, fodder, construction materials and other useful tools, especially for the tribal or ethnic groups of people living in remote areas. The perception of the current status of plant diversity, exploitation and conservation status is an indispensable element to conserve and ensure the sustainable use of wild plant resources. Nevertheless, the socio-economic development and the conversion of forests into agricultural land in recent years has a great impact on the loss of traditional understanding of plant resources. Therefore the main purpose of this study is to conduct an extensive research and document the traditional information associated with plant use as food, medicine, fodder, building materials, and other useful tools, and to study the conservation status.

Study area :

The present ethnobotanical study was conducted in two Rengma villages namely Khirang Rengma gaon and Jamerhe Borlangso Rengma gaon under Nilip Block, East Karbi

Anglong, Assam, India (Plate 1). Khirang gaon comprises approximately 30 houses and Jamerhe Borlangso Rengma Gaon of 40 households. Since 1800 Rengmas are living in the valley of East Karbi Anglong and are regarded as one of the major hill tribes of Assam¹¹. The Mikir hills now Karbi Anglong district is one of the 34 administrative districts of Assam. Karbi Anglong Autonomous Council administered the district. The district is surrounded by Golaghat district on the east and on the north, Nagaon and Dima Hasao district and Nagaland State on the south, and Meghalaya state and Morigaon district on the west². The district lies between 25° 30' and 26° 36' north latitude and from 92° 90' to 93° 54' east longitude¹. The river Kaliani flows through the region (Plate 1).

The field study was conducted in the month of January 2022 to December 2022. A total of 60 informants participated in the survey. Prior informed consent was signed by the village head and also from all the informants before conducting the research. The informants were randomly selected. The traditional information was collected through a semi-structured questionnaire, field study with the help of a field guide, personal interview, and group discussion. All the plant species were dried and preserved in the herbarium sheet. The specimen was identified with the help of available literature such as Flora of Assam⁵⁻⁹, Plant Resources of Nagaland¹³, Medicinal plant repertoire¹⁰, IUCN version 3.1³, powo.science.kew.org.¹⁵, Indian Biodiversity Portal¹⁹ and some from the herbarium of BSI, Shillong, Meghalaya, India.

The present study recorded 62 plant

species belonging to 58 genera and 41 families that are used as edible, medicine, construction, fish poisoning, bio fencing, weaving implements, tobacco, fodder, and household items (Table-1). Of the total 62 plant species, 61% were used as vegetables and fruits, 30% medicine, 7% construction and 2% others (Figure 2). The family Zingiberaceae was found to be the most dominant with 4 genera followed by Asteraceae, Poaceae, Arecaceae, and Lamiaceae with 3 species each, and families Acanthaceae, Apocynaceae, Euphorbiaceae, Fabaceae, Phyllanthaceae, Polygonaceae, Rubiaceae, Sapindaceae, Solanaceae and Utricaceae with

2 species each. Of the 62 plant species, 21 belong to shrubs, 18 herbs, 13 trees, 4 climbers, 3 grass, 2 palms, and 1 fern. Out of 62 plant species reported from the present study, 17 species were under Least Concern (LC) of the IUCN Red list of threatened species, 3 species under Data Deficient (DD), 1 species was Vulnerable and the rest 41 were Not Evaluated against any category (Figure 1). However, according to Nayar and Sastry¹¹ in Red Data Book of Indian Plant, Volume 3 *Livistona jenkinsiana* Griff. were under Endangered category.

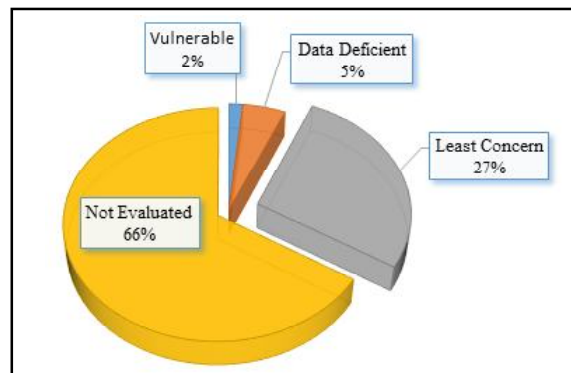


Figure 1. Pie chart showing the percentage of Plants under different IUCN categories of threatened species

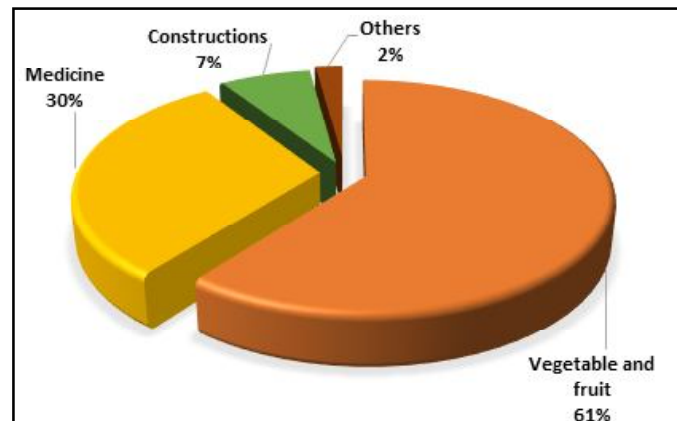


Figure 2. Pie chart showing the percentage of plant usage in different categories.

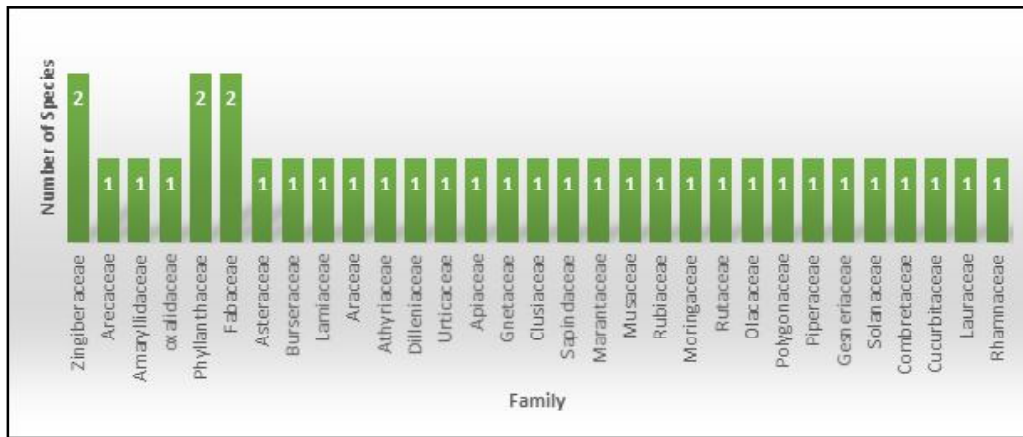


Figure 2. Bar graph showing families under plants used for food and vegetables

The plant used as vegetable and fruit (Edible):

The study disclosed 34 plants species from 31 families used as vegetables and fruits (Figure 1). Some of the most commonly used plant species as vegetables and fruit were *Allium chinensis* G.Don., *Baccaurea ramiflora* Lour., *Blumea lanceolaria* (Roxb.) Druce, *Clerodendrum laevifolium* Blume, *Colocasia esculentum* Schott., *Dillenia indica* L., *Diplazium esculentum* (Retz) SW., *Gnetum gnemon* L., *Oxalimbricata* Roxb. and *Rhynchosyris ellipticum* (Wall.ex Dietrich) A. DC. *Clerodendrum colebrookianum* Walp. and *Piper nigrum* L. were found edible and also used for medicinal purposes. The plant parts used as vegetable ranges from bulb, flower, fruit, inflorescence, leaf, pods, rhizome, stem, and young shoot. Among the plant parts used, the leaf was found to be the maximum.

Medicinal plants :

17 medicinal plants from 13 families (Figure 3) were reported from the present

study which are used for treating various diseases and ailments such as constipation, blood clotting, diarrhea, dysentery, joint pain, blood pressure, dizziness, sinus, jaundice, pneumonia, stomach-ache, cough and also to improve appetite. The mode of administration ranges from an external application to oral consumption. The leaf paste of *Ageratum conyzoides* L. and *Thunbergia grandiflora* alba Roxb. is applied externally to control bleeding, young leaves of *Calotropis gigantea* (L.) Dryand and *Ricinus communis* L. are warm in fire and applied externally to cure joint pain and swelling. The leaf of *Inula cappa* (Buch-Ham. Ex D. Don) DC is crushed and smells to get relief from dizziness. The rhizome of *Curcuma aeruginosa* Roxb. and *Zingiber zerumbet* (L.) Roscoe ex. Sm are used for dysentery and diarrhoea.

Plants used for construction purposes :

4 plant species belonging to 2 families (Figure 4, Plate 1) were recorded from the study area which are used for the construction of houses, granary, and poultry houses.

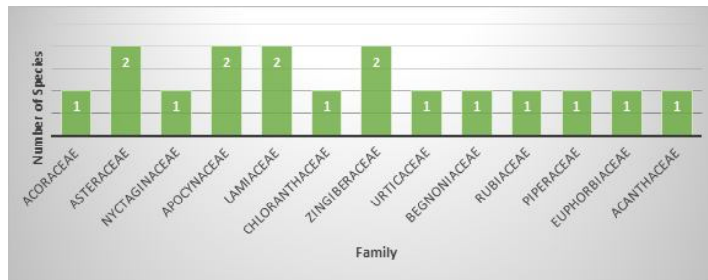


Figure 3. Bar graph showing different families under medicinal uses

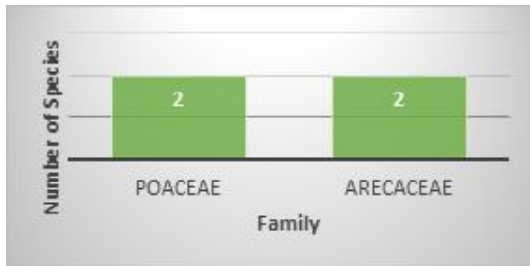


Figure 4. Bar graph showing families of plants used for construction purposes

Bambusa tulda Roxb., *Bambusa balcooa* Roxb., and *Calamus erectus* Roxb. are found to use more frequently. *Livistona jenkinsiana* Griff. which is used for making roofs and outdoor broom were under endangered category and endemic to north east India^{4, 20, 12} arising great concern over their conservation status. However, a study conducted by Singh, *et. al.*,¹⁷ on the conservation of *Livistonia jenkinsiana* Griff. and Adi community rejected the categorization of the said plant as endangered because of the luxuriant growth

and conservation of the plant species that are culturally associated with the community.

Others :

Plants such as *Aesculus assamica* Griff. and *Persicaria hydropiper* (L.) Delabre were found to be used for catching fish as fish poisoning. The species *Aesculus assamica* Griff. under the category Vulnerable should be given importance in its conservation as they are in high risk of extinction in the wild. *Codiaeum variegatum* (L.) A. Juss and *Thunbergia erecta* (Benth.) T. were used as bio fencing. The leaves of *Ricinus communis* L. were found to use as fodder for silkworms and also used medicinally for curing joint paint. *Sida acuta* Burm. F. and *Thysanolaena maxima* (Roxb.) Kuntze were used for making broom, *Nicotiana tobaccum* L. as a tobacco product, and the hardwood of *Mesua ferrea* L. was found to use for making weaving implements such as beating swords, cloth beams, and warp beams.

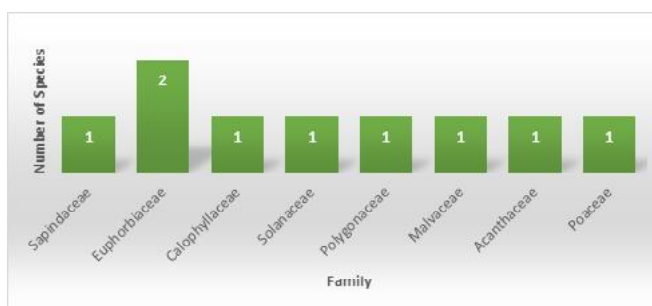


Figure 5. Bar graph showing families under others category

Plate 1. Photographs of Study area and the plant products.



Raft made of *Bambusa tulda* Roxb.



River Kaliani



Weaving implements made from the hard wood of *Mesua ferrea* L.



House made from Bamboo Sp. and roof from the leaves of *Livistonia jenkinsiana* Griff.



Khirang Rengma Gaon



Jamerhe Borlangso Rengma gaon

Table-1. List of documented plant species from the study area

Sl. no.	Botanical name/ Family/ Conservation status	Local name	Common name	Habit	Purpose of use	Uses
1	<i>Acorus calamus</i> L. Acoraceae (LC)	Lamba	Sweet Flag	Herb	Medicine	The fresh rhizome is taken raw or boil for constipation and is also used to get rid of bad spirit
2	<i>Ageratum conyzoides</i> L. Asteraceae (LC)	Kengkhu- üpvu	Billy goat weed/ chickweed	Herb	Medicine	The leaf paste is applied externally on the cut and wound to control bleeding
3	<i>Alpinia nigra</i> (Gaertn.) B.L. Burtt. Zingiberaceae (LC)	Lamaten	Black galangal	Herb	Edible	The young stem is consumed as a vegetable
4	<i>Amomum dealbatum</i> Roxb. Zingiberaceae (DD)	Changrhi sha	East Himalayan cardamom	Herb	Edible	The young inflorescence are cooked and eaten as a vegetable.
5	<i>Areca catechu</i> L. Arecaceae(DD)	Karu	Betel nut	Palm	Edible	The young and mature fruit are eaten.
6	<i>Allium chinense</i> G. Don. Amaryllidaceae (LC)	Son-i	Japanese scallion	Herb	Edible	The leaves and bulb are eaten raw as salad as well as cooked.
7	<i>Aesculus assamica</i> Griff. Sapindaceae (VU)	Disen mui	East Himalayan Horse Chestnut	Tree	Fish poisoning	The crushed leaf is used for killing the fish in the river.
8	<i>Averrhoa carambola</i> L. Oxalidaceae (NE)	Chordo sha	Star fruit	Tree	Edible	The fruit is eaten raw.
9	<i>Baccaurea ramiflora</i> Lour. Phyllanthaceae (LC)	Tenyhu sha	Burmese grape	Tree	Edible	The ripe fruit is eaten raw
10	<i>Bambusa balcooa</i> Roxb. Poaceae (NE)	Gwatharang	Balcooa bamboo	Grass	Constru- ction	The bamboo culm is used for house construction
11	<i>Bambusa tulda</i> Roxb. Poaceae (NE)	Güyang	Indian timber bamboo	Grass	Constru- ction	The bamboo culm is used for making raft, houses, boundary fencing, poultry house, and agriculture implements.
12	<i>Bauhinia glauca</i> (Benth.) Wall. Ex Benth. Fabaceae (LC)	Pakgü nyi	Climbing Bauhinia	Shrub	Edible	The young leaves are eaten as a vegetable.

13	<i>Blumea lanceolaria</i> (Roxb.) Druce Asteraceae (NE)	Makung-marhi	Chapa	Herb	Edible	The leaves are cooked and eaten as a vegetable.
14	<i>Bougainvillea spectabilis</i> Willd. Nyctaginaceae (NE)	Kagosnyen	Great bougainvillea	Shrub	Medicine	Leaf decoction is taken for diarrhoea.
15	<i>Calamus erectus</i> Roxb. Arecaceae (NE)	Rüphinyuben	Viagra palm	Shrub	Construction	The stem is used for binding purposes during the construction of houses.
16	<i>Calotropis gigantea</i> (L.) Dryand Apocynaceae (NE)	Jangnyipvu	Crown flower	Shrub	Medicine	The leaves are warm near fire and applied externally for joint pain and swelling
17	<i>Canarium strictum</i> Roxb. Burseraceae (NE)	Nthing sha	Black dammar	Tree	Edible	The fruits are eaten raw and also boil with salt and sundried for future used
18	<i>Catharanthus roseus</i> (L.) G. Don Apocynaceae (NE)	-	Cape periwinkle	Herb	Medicine	The leaves are boiled and taken to lower high pressure.
19	<i>Clerodendrum glandulosum</i> Lindl. Lamiaceae (NE)	Hingcheren	East Indian glory bower	Shrub	Edible Medicine	The young leaves are cooked and eaten as a vegetable. The leaves are also used as medicine to lower the blood pressure
20	<i>Clerodendrum laevifolium</i> Blume Lamiaceae (NE)	Heng shen	Bridal veil	Shrub	Edible	The young leaves are cooked and eaten as vegetable
21	<i>Chloranthus officinalis</i> Blume Chloranthaceae (NE)	Nyenchen	Tall Chloranthus	Shrub	Medicine	The roots are boiled and taken orally for treating joint pain.
22	<i>Codiaeum variegatum</i> (L.) A. Juss. Euphorbiaceae (LC)	-	Variegated croton	Shrub	Bio fencing	The plant are used as bio fencing
23	<i>Colocasia esculentum</i> Schott. Araceae (NE)	Cho biryü	Yam	Herb	Edible	The young leaves are cooked and eaten as a vegetable.
24	<i>Curcuma aeruginosa</i> Roxb. Zingiberaceae (LC)	Gülomogi	Pink and blue ginger	Herb	Medicine	The rhizome is taken for dysentery and diarrhea.
25	<i>Diplazium esculentum</i> (Retz) SW. Athyriaceae (LC)	Süro	Vegetable Fern	Fern	Edible	The young leaves are cooked and eaten as a vegetable.

26	<i>Dillenia indica</i> L. Dilleniaceae (NE)	Thadyü sha	Elephant apple	Tree	Edible	The fruits are eaten raw
27	<i>Elatostema sesquifolium</i> (Reinw. Ex Blume) Hassk Urticaceae (NE)	Hingbu	Elatostema	Herb	Edible	The leaves are cooked and eaten as a vegetable.
28	<i>Eryngium foetidum</i> L. Apiaceae (NE)	Mimi thü	Long coriander	Herb	Edible	The leaves are eaten raw as well as cooked.
29	<i>Gnetum gnemon</i> L. Gnetaceae (LC)	Hing penneh	Gnemon/paddy oats	Shrub	Edible	The leaves are cooked and eaten as a vegetable. The ripe fruit is eaten after boiled.
30	<i>Garcinia lanceifolia</i> Roxb. Clusiaceae (NE)	Shen nyu rasha	Rupohi thekera	Shrub	Edible	The ripe fruit is edible.
31	<i>Hodgsonia heteroclita</i> (Roxb.) Hook. F. & Thomson Cucurbitaceae (NE)	Shiphu sha	Oil nut	Climber	Edible	The fruit/nut is eaten as a vegetable
32	<i>Inula cappa</i> (Buch-Ham. Ex D. Don) DC Asteraceae (NE)	Jangnyet	Sheep's ear	Herb	Medicine	The leaf is crushed and applied externally to cure dizziness.
33	<i>Laportea crenulata</i> (Roxb.) Gaud. Urticaceae (NE)	Jambo kadagi	Stinging tree	Shrub	Medicine	The leaves are boiled and taken to cure body aches and also to improve appetite.
34	<i>Leucas aspera</i> Link Lamiaceae (NE)	-	Common Leucas	Herb	Medicine	The leaves are crushed and the extract is applied for curing sinus.
35	<i>Lepisanthes senegalensis</i> (Poir.) Leenh. Sapindaceae (NE)	Tenrhü sha	Senegal cherry	Tree	Edible	The ripe fruits are eaten raw
36	<i>Litsea citrata</i> Blume Lauraceae (NE)	Jenh Temü Sha	Litsea	Shrub	Edible	The fruit is eaten raw.
37	<i>Livistona jenkinsiana</i> Griff. Arecaceae (NE)	Kunyi ben	Major Jenkins palm	Palm	Construction	The leaves are used for making roofs and broom. The fruit are eaten raw
38	<i>Maranta arundinacea</i> L. Marantaceae (NE)	Rachokenhrü	West Indian arrowroot	Herb	Edible	The rhizome are cooked and eaten
39	<i>Mesua ferrea</i> L. Calophyllaceae (NE)	Khing keri ben	Indian rose chestnut	Tree	Weaving implement	Hardwood is used for making weaving tools.

40	<i>Musa acuminata</i> Colla Musaceae (NE)	Thayabi	Wild Banana	Shrub	Edible	The inflorescence are cooked and eaten as a vegetable.
41	<i>Mussaenda roxburghii</i> Hook.f. Rubiaceae (NE)	Tebimenh	East Himalayan mussaenda	Shrub	Edible	The young shoot and leaves are cooked and eaten as vegetable.
42	<i>Moringa oleifera</i> Lam.Moringaceae (LC)	Sagina	Drumstick tree	Tree	Edible	The flower and fruit are cooked and eaten as a vegetable.
43	<i>Murraya koenigii</i> (L.) Spreng. Rutaceae (LC)	Curry ben	Curry leaf tree	Tree	Edible	The leaves are cooked and eaten
44	<i>Nicotiana tabacum</i> L. Solanaceae (NE)	Makaü ben	Tobacco	Herb	Smoking/ chewing	The dried leaves are used as tobacco for smoking and chewing
45	<i>Olox imbricata</i> Roxb. Olacaceae (LC)	Misi hing	South Asian olax	Shrub	Edible	Tender shoots and leaves are eaten as a vegetable
46	<i>Oroxylum indicum</i> (L.) Benth. ex. Kurz. Bignoniaceae (NE)	Nchupo	Trumpet flower	Tree	Medicine	The bark is boiled and taken orally for jaundice and pneumonia.
47	<i>Persicaria chinense</i> (L.) H. Gross Polygonaceae (NE)	Tukü nyi	Chinense knot wood	Climber	Edible	The young shoot are cooked and eaten as vegetable.
48	<i>Persicaria hydropiper</i> (L.) Delabre Polygonaceae (LC)	Nyeginyu tü	Water pepper	Herb	Fish poisoning	The whole plant is crushed and mixed in water for capturing fish in the river
49	<i>Paederia foetida</i> L. Rubiaceae (NE)	Thabyi-e	Stink vine	Climber	Medicine	The young leaves and roots are boiled and taken orally for stomach aches and constipation
50	<i>Parkia roxburghii</i> (DC.) Merr. Fabaceae (LC)	Panchipho	Tree bean	tree	Edible	The tender, as well as mature pods, are eaten as vegetable.
51	<i>Piper nigrum</i> L. Piperaceae (NE)	Gulmohar	Black pepper	Herb	Edible / medicine	The fruits are eaten as a spice. It is also used medicinally for coughs and colds.
52	<i>Ricinus communis</i> L.Euphorbiaceae (NE)	Yongtu	Castor bean	Shrub	Medicine/ fodder	The leaves are warm and applied eternally to cure swelling and joint pain. The leaves are used as fodder for silkworms.

53	<i>Rhyncho- techum ellipticum</i> (Wall. ex Dietrich) A.DC. Gesneriaceae (NE)	Hingchweng merü	Rhyncho- techum	Shrub	Edible	The young leaves are eaten as a vegetable
54	<i>Solanum torvum</i> Solanaceae (NE)	Buda sha	Devil's fig	Shrub	Edible	The fruit is eaten as a vegetable.
55	<i>Sida acuta</i> Burm. f. Malvaceae (NE)	-	Wireweed	Shrub	Broom	The whole plant after drying is used for making a broom.
56	<i>Souropus androgynus</i> (L.) Merr. Phyllanthaceae (NE)	Heng techen	Sweet leaf	Shrub	Edible	The young shoot and leaves are eaten as a vegetable
57	<i>Terminalia chebula</i> Retz. Combretaceae (LC)	Kangkhü sha	Black chebulic myrobalan	Tree	Edible	The dried and fresh fruits are eaten raw
58	<i>Thunbergia erecta</i> (Benth.) T. Anderson Acanthaceae (NE)	-	Violet king's mantle	Shrub	Bio fencing	The plant is used for bio fencing
59	<i>Thunbergia grandiflora</i> alba Roxb. Acanthaceae (NE)	Tenghedu ranyu	Bengal trumpet	Climber	Medicine	The leaf paste is applied on cuts by rocks to control bleeding.
60	<i>Thysanolaena maxima</i> (Roxb.) Kuntze. Poaceae (NE)	Kakhüsen ben	Broom grass	Grass	Broom	The whole inflorescence is used for making a broom.
61	<i>Zingiber zerumbet</i> (L.) Roscoe ex. Sm. Zingiberaceae (DD)	Melinyu gü	Wild ginger	Herb	Medicine	The rhizome is taken for diarrhea
62.	<i>Ziziphus mauritiana</i> Lam. Rhamnaceae (LC)	Bogori ben	Indian jujube	Tree	Edible	The ripe fruits are eaten raw or make pickle

LC- Least Concern, DD- Data Deficient, NE- Not Evaluated, Sha – fruit, Ben – Tree, (-) – Unknown

From the present study it is concluded that the traditional information regarding ethnobotanical resources is still common among the Rengma community. The Rengmas is well connected with the natural resources and conserved some economically important

plants available in their vicinity. The poor road connectivity and the remoteness of the region make the community more dependent on the nature for their daily used. The study also highlighted that majority of the plant species were not evaluated (66%) against any categories

of IUCN Red List criteria and 5% were under Data Deficient. Therefore, it is necessary to assess the global status of conservation for sustainable use of plant resources. Though 27% were in the category Least Concern and 2% under Vulnerable, it is vital to monitor and enhance major conservation activity to prevent them from becoming endangered or extinct species shortly. Awareness programme on the conservation of plant resources are required in the region. To improve their livelihood and to conserve the plant diversity, indigenous communities should be encouraged to grow more economic important plants and also the wild edible plants in their locality or homegardens. Further, study on the region and the tribe could yield beneficial information regarding pharmaceutical, economic, and commercially important plant species.

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