

Study of forest base ethno wild vegetables and ethno medicinal plants among the forest fringe villages of Greater Manas Landscape, Assam

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Abstract- The present study deals with the identification, documentation and exploration of **Minor Forest Resources** (wild edible vegetables and medicinal plants) utilised by fringe villagers of Greater Manas Landscape, Assam (North-East India). A total of 48 wild edible plants and 32 medicinal plants were surveyed. Plants are the nature's gift to mankind and consumed wholly or in parts either cooked or raw. These are delicious, refreshing and chief sources of vitamins, minerals and protein. Vegetables constitute a major part of daily food intakes and play an important role in well-balanced diet and maintain healthy living. Many plants are used for different ethno medical purposes, including tuberculosis, asthma, paralysis, jaundice, earache, constipation, weakness, snake poisoning, etc. The utilization of wild plant resources in day-to-day life of Bodo tribes has been an old-age practice and recently popularity of the same has declined. Hence, prime importance should be given to them in order to maintain and popularize this important source of non-conventional food supply. In this paper, the scientific names along with family, local names in Bodo, time of availability, parts used and method of use are presented.

Index Terms- Wild edible vegetables, wild medicinal plants, Kokrajhar district and Chirang District, Assam

I. INTRODUCTION

Forest forms the most important source of wild foods for rural households and forest inhabitants. It offers a huge repository of diverse medicinal plants and vegetables with high potential for alleviating poverty and thus boosting rural economy while conserving the valuable resources. Forests occupy the largest landmass in India after agriculture, and are the storage of herbal plants' resource of the country, specially, for its rural people [1].

The Bodoland Territorial Council (BTC) of lower Assam covers 3539.95 sq. km. area of forest which is located along the international boundary with Bhutan. The entire northern belt of the forest is situated in sub Himalayan alluvial tract of typical formation known as Bhabar tract. The demography of BTC is

dominated by Bodos, an aboriginal tribal community of Assam and has distinct culture and heritage [1].

The Bodos in the course of time have synthesized a vast knowledge in respect of acquiring and gathering knowledge of herbal medicines and vegetables out of wild plants for healing and curing of ailments and they are culturally and socially intertwined with forest around them [2]. Plants have a great socio-economic significance because of their food and medicinal values. Wild edible vegetables and medicinal plants are obtained from forests or wild areas and play a very important role in the livelihoods of tribal communities. Wild edible vegetables not only serve as alternatives to staple food during periods of food deficit but they play as a valuable supplement for a nutritionally balanced diet [3].

Many plants are used for different ethno medical purposes, including tuberculosis, asthma, paralysis, jaundice, earache, constipation, weakness, snake poisoning etc [4].

These are also a good source of income for many poor communities in rural areas. A scientific investigation of wild edible vegetables, medicinal plants and wild animals is urgently needed to assess the potentiality which would be utilized at the time of food deficit or cultivated as a source of food material for an ever increasing population [5].

Research interest activities in the areas of ethno botany and ethno medicine have increased tremendously in the last decade. Since the inception of the disciplines, scientific research in ethno botany and ethno medicine has made important contributions to understanding traditional subsistence and medical knowledge and practice. But in India the traditional knowledge system is fast eroding due to urbanization. So there is an urgent need to inventories and record all ethno botanical, ethno biological and ethno medicinal information among the different ethnic communities before the traditional cultures are completely lost [5].

II. OBJECTIVES OF THE STUDY

- To document the ethno botanical items used by the fringe villagers of Greater Manas landscape.
- To study ethno-medicinal items used by the fringe villagers of Greater Manas landscape.
- To share knowledge and design future intervention for livelihood development.
- To explore possibilities to introduce some of the species in agricultural practices to make them available within reach Biological diversity register at community level.

III. MATERIALS AND METHODS

Data were obtained through field survey conducted from the month of February, 2014 till January, 2015 by performing interview with around 100 families in different villages of Chirang and Kokrajhar district to collect information about traditional knowledge regarding use of wild vegetables and medicinal plants. Questionnaire was prepared for the collection of data such as local name, part of the produce used, season, availability, and distance from forest boundary, amount collected, and amount used to eat. These informants were local herbalists, healers, farmers, and midwives. The Informants are between 40–74 age groups. Photographs were taken and interacted with local vegetable vendors and villagers for local identification and to assess the traditional knowledge on wild edible plants. The plant species were identified by interacting and discussing with the local vegetable vendors and villagers, and by referring relevant scientific literatures [6].

IV. STUDY AREA

The field survey was carried out in four places namely Nabin Nagar village under Kochugaon division, Jharbari village under Haltugaon division and Koilamoila and Daranga village under Chirang division. All these villages fall under the greater Manas Landscape.

Nabin Nagar and Jharbari village falls under Ripu reserve forest. The forest has contiguous habitat, in extreme western Assam bordering West Bengal and Bhutan. It is also a part of the Buffer zone of Manas Tiger Reserve. Since 1989 a third of these forests have been cleared felled and encroached upon due to insurgency related problems. Located in the Northern part of Kokrajhar district and nestling in the foot hills of the Bhutan Himalaya, Ripu have some of the finest examples of Bhabar forest with Sal *Shorea robusta* as the dominate species. These reserve forest is easily accessible from Kokrajhar district Headquarters about 25 km away. Besides dense tropical semi evergreen and tropical moist deciduous forest, riverine forest with light woodland and grassland are also found. Ripu is vital habitats that serve as a corridor linking Manas National Park.

Koilamoila and Kuklung village under Chirang District. Both of these villages are fringe villages of Greater Manas Landscape. Chirang is one of the 27 districts of Assam state in north eastern India. In 1990 Chirang district became home to Manas National Park. Chirang reserve forest falls under the Haltugaon forest division of the Western Assam Circle Conservancy. The RF lies in between 26⁰54'1.95"N latitude and 90⁰12'03.76"E to 90⁰29'07.02"E Longitude covering an area of 592.54 sq. Km (11).Manas is located in the foothills of Eastern Himalayas. The dynamic ecosystem processes support broadly three types of vegetation: semi evergreen forests, mixed moist and dry deciduous forests and alluvial grasslands. The range of habitats and vegetation also accounts for high plant diversity that includes 89 tree species, 49 shrubs, 37 under shrubs, 172 herbs and 36 climbers. Fifteen species of orchids, 18 species of fern and 43 species of grasses that provide vital foliage to a range of ungulate species also occur here.

The present study was mainly conducted in the villages surrounding the Ripu reserve forest and Manas reserve forest. Most of the information was collected from the *Boro* people, which are living around the above mentioned forests villages.

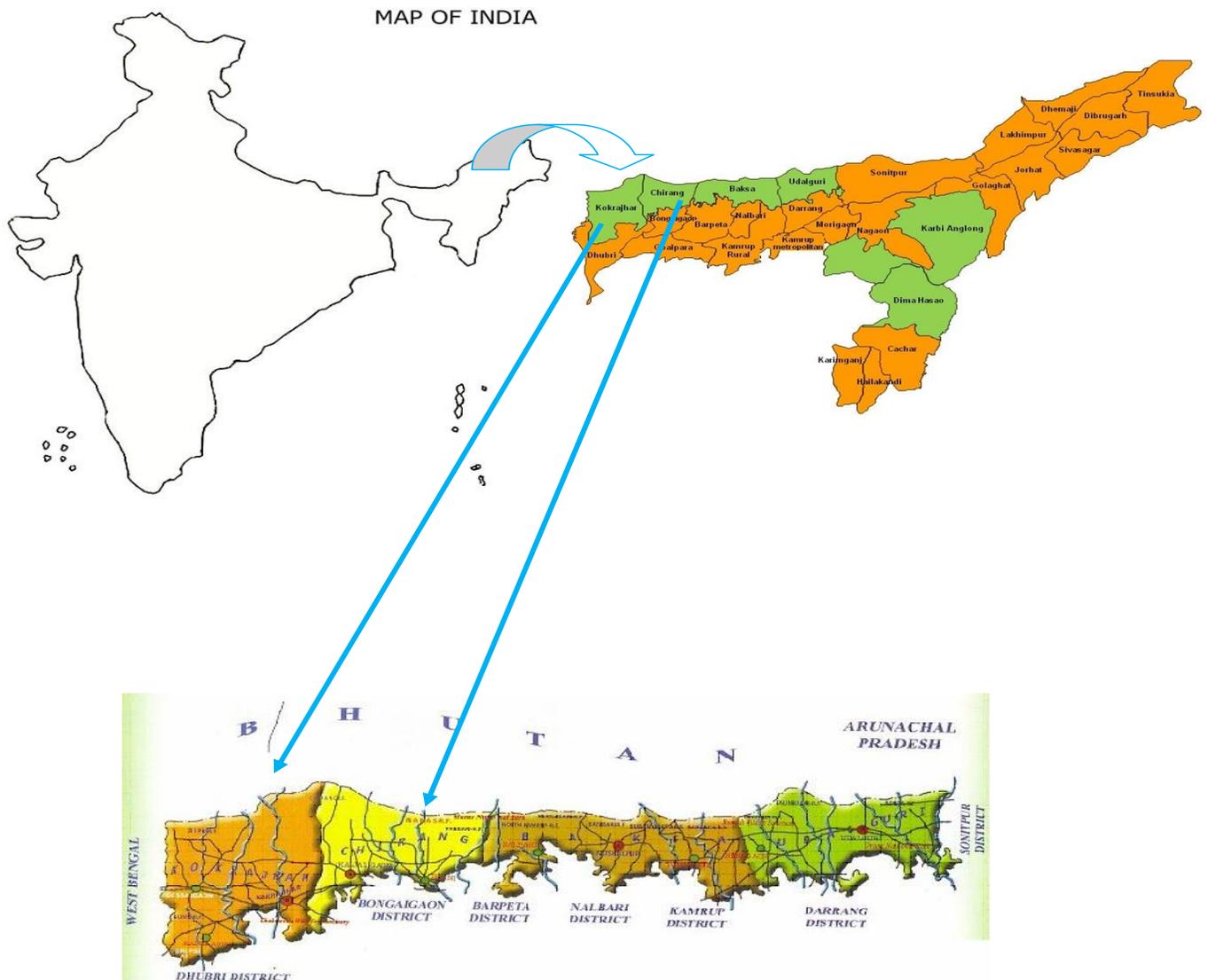


Figure 1: Map showing the study area.

V. RESULTS AND OBSERVATIONS

The present study could document 48 wild edible plant species and 32 medicinal plant species that have been used by fringe villagers of greater Manas landscape. The table-1 and table-2 are the alphabetical enumeration of recorded species together with scientific name, family, local name(s), time of availability, part of the produce used and availability.

Leaves, young shoot, stem, fruits, flowers, roots and seeds of the documented plant species are used as vegetables and medicines. The plants are consumed either cooked or raw.

The collection of the species of wild edible plants and wild medicinal plants varies greatly with season. It is seen that the highest amount of wild edible vegetables are collected in the month of April- October and the least collection is on the month of February- April. In case of medicinal plants the highest amount of collection occurs throughout the year, of which the

least collection was during the month of August- March as shown in Figure 2(a) and 2(b).

Study shows that the distance of minor forest resources collected from the forest boundary ranges from 1-4 km to 12 km and above. Most of the minor forest resources are collected from the distance of about 1-4 km from the forest boundary. Few of the rare species are collected at the distance of about 12 km and above from the forest boundary.

The list of wild edible vegetables and medicinal plants used by fringe villagers of Greater Manas landscape with their scientific name, vernacular name, time of availability, part of the produce used and availability are shown in **Table 1** and **Table 2** respectively.

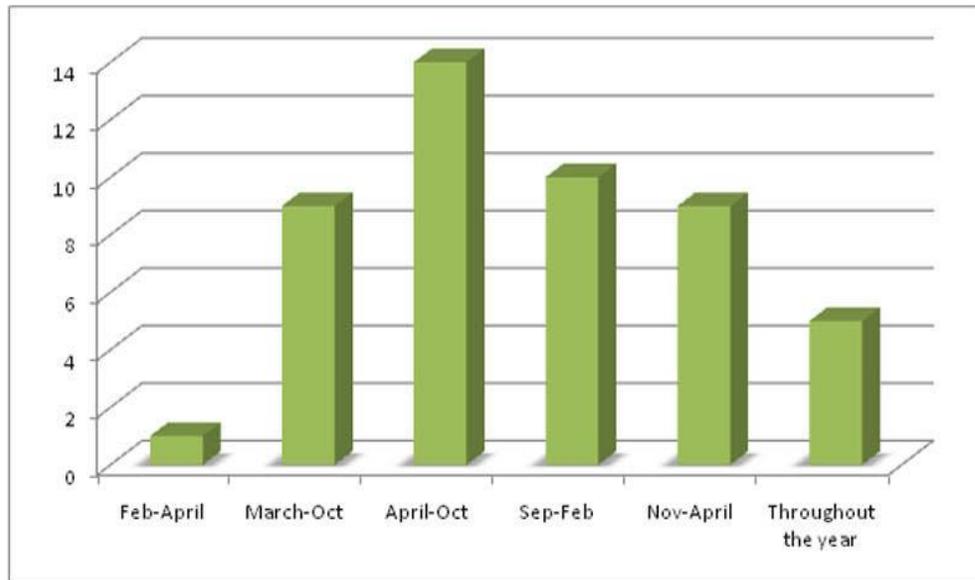


Fig: 2(a) Seasonal availability of wild edibles vegetables out of 48 surveyed species

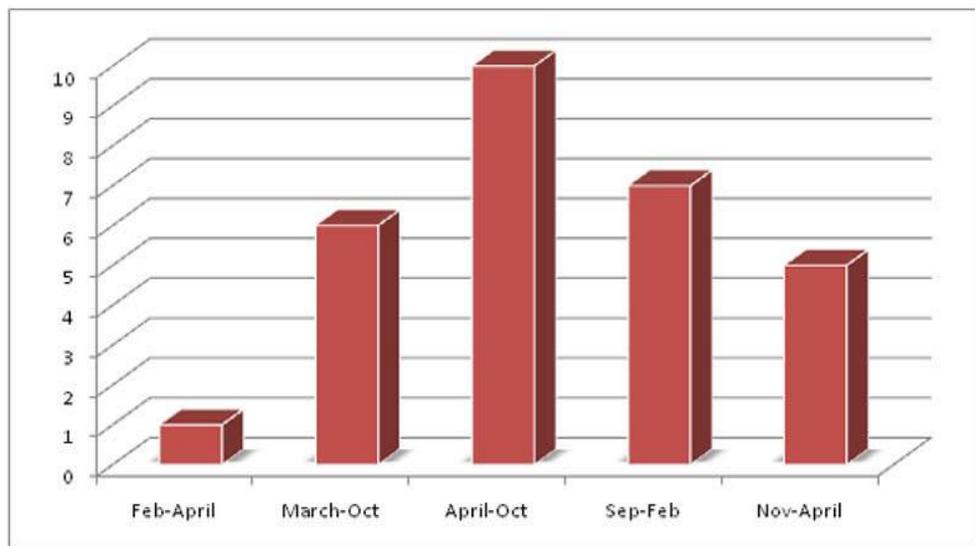


Fig: 2(b) Seasonal availability of wild medicinal plants out of 32 surveyed species.

Table: 1. List of wild edible vegetables.

S L N o.	Scientific name	Family	Vernacular name	Time of availability	Edible part used	Availability
1	<i>Basella alba</i> L. var. <i>Rubra</i> (L.) Stewart.	Basellaceae	Mwifrai	May-July	Young shoot/ Leaves Fruits	Available
2	<i>Argyreia speciosa</i> Sweet	Convolvulaceae	Kawasang	February- April	Young leaves	Rare

3	<i>Alocasia indica</i> (Lour.) Koch.	Araceae	Mana Thaso	September-February	Young shoot/ Tuber	Rare
4	<i>Antidesma acidum</i> Retz.	Phyllanthaceae	Lapasaiko	March-October	Leaves	Available
5	<i>Amorphophallus sylvaticus</i>	Araceae	Olodor	March-June	Young leaves/petiole	Available
6	<i>Amaranthus viridis</i> L.	Amaranthaceae	Kuduna (pisa)	September - January	Young shoot/ Leaves	Available
7	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Kuduna (su gwnang)	September - January	Young shoot/ Leaves	Available
8	<i>Spilanthes paniculata</i> Wall. ex D.C	Asteraceae	Usumwi	Throughout the Year	Leaves	Available
9	<i>Premna herbacea</i> Roxb	Verbenaceae	Keradapini	March-June	Leaves/young Shoots	Rare
10	<i>Casearia glomerata</i> Roxb ex DC.	Balsaminaceae	Daopenda	April-October	Young shoots/leaves	Available
11	<i>Vitis rependa</i> W & A	Vitaceae	Dausrem	March-June	Leaves	Available
12	<i>Lasia spinosa</i> (L.) Thaw	Araceae	Sibru	April-August	Leaf petioles	Rare
13	<i>Pteris ensiformis</i> Burm.f.	Pteridaceae	Dingkia	April-October	Leaves	Available
14	<i>Alpinia nigra</i> (Gaertn) Burt.	Zingiberaceae	Tharai	March-September	Young shoot/ leaves, rhizome	Available
15	<i>Oroxylum indicum</i> (L.) Vent.	Bignoniaceae	Karokandai	March-July	Young shoot/ Leaves/ Flowers	Available
16	<i>Enhydra fluctuans</i> Lour.	Asteraceae	Alangshi	April-June	Leaves/Shoot	Rare
17	<i>Dillenia indica</i> L.	Dellineaceae	Taigir	September-November	Fruit (fleshy calyx)	Available
18	<i>Bambusa tulda</i> Roxb.	Poaceae	Auwa gubwi	April-July	Young shoot	Available
19	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Manimuni (gidir)	November-April	Leaves/stem	Available
20	<i>Hydrocotyle sibthorpioides</i> Lamk.	Araliaceae	Manimuni (pisa)	November-March	Whole plant	Available
21	<i>Chenopodium album</i> L.	Chenopodiaceae	Butua	November-March	Tender shoots	Available
22	<i>Lippia geminate</i> H. B. & K.	Verbenaceae	Ontaibajab	April-October	Leaves	Available
23	<i>Justicia adhatoda</i> L.	Acanthaceae	Barsika	April-June	Flowers	Available
24	<i>Plectranthus ternifolius</i> D. Don	Lamiaceae	Jwглаori	June-November	Young Shoots	Available

25	<i>Paederia foetida</i> L.	Rubiaceae	Kipibendwng	May-October	Leaves/ tender twigs	Available
26	<i>Costus speciosus</i> (Koen. Ex Retz.) Smith	Costaceae	Buritokon	April-May	Young shoot	Rare
27	<i>Houttuynia cordata</i> T Hunb.	Saururaceae	Maisundri	April-October	Leaves	Available
28	<i>Hedyotis diffusa</i> (Willd.) Roxb.	Rubiaceae	Daosriateng	December-February	Leaves	Rare
29	<i>Murraya koenigii</i> (L.) Spreng.	Rutaceae	Nwrsing	April-November	Leaves	Available
30	<i>Drymaria cordata</i>	Caryophyllaceae	Jabsri	September-January	Leaves	Rare
31	<i>Gmelina arborea</i> Roxb.	Lamiaceae	Gambari	January-April	Flower	Available
32	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Nasraikoro	Through the Year	Leaves	Rare
33	<i>Bambusa balcooa</i> Roxb.	Poaceae	Auwa burka	April-July	Young shoot	Available
34	<i>Monochoria hastata</i> L.	Pontederiaceae	Ajinai	April-July	Flower bud	Rare
35	<i>Nymphaea nouchali</i> Burm. f.	Nympheaceae	Toblo	May-October	Fruit, leaf petiole, seed and root	Rare
36	<i>Oxalis corniculata</i> L.	Oxalidaceae	Singri	October-February	Leaves/ Stem	Available
37	<i>Oldenlandia corymbosa</i> Roxb.	Rubiaceae	Tuntini	November-March	Whole plant	Available
38	<i>Portulaca oleracea</i>	Portulacaceae	Hangswgar ma	September-May	Leaves/stem	Available
39	<i>Stellaria media</i> L.	Caryophyllaceae	Nabiki	September-march	Whole plant	Rare
40	<i>Vitex negundo</i> L.	Lamiaceae	Nisinda	Throughout the Year	Leaves	Rare
41	<i>Smilax zeylanica</i> L.	Smilacaceae	Soima Jaseb		Young shoot	Rare
42	<i>Sesbania grandiflora</i>	Fabaceae	Bogbibar	March-May	Flower	Rare
43	<i>Somchus arvensis</i>	Asteraceae	Mwiratikini	Throughout the year	Leaf	Available
44	<i>Momordica dioca</i>	Cucurbitaceae	Kaila	November – April	Fruit	Available
45	<i>Nyctanthes arbortristis</i>	Oleaceae	Sefali	November-February	Flower	Available
46	<i>Eryngium foetidum</i>	Apiaceae	Gongar dundia	Throughout the year	Leaf	Available
47	<i>Moringa oleofera</i>	Moringaceae	Swrjwna	November-April	Leaf, Fruit and flowers	Available
48	<i>Coccinia indica</i>	Cucurbitaceae	Tainasi	November-April	Fruit	Available

Table2: List of medicinal plants:

SL No.	Scientific Name	Family	Vernacular Name	Time of availability	Part of the produce used	Application
1	<i>Centella asiatica</i> (Linn.) Urban.	Apiaceae	Manimuni(gidir)	November-April	Whole plant	Used in dysentery, liver trouble, nerve Disorders and stomach problems. It stimulates appetite, taken with milk to improve memory, good for skin disease and a blood purifier, given to women after Childbirth.
2	<i>Hedyotis diffusa</i> (Willd.) Roxb.	Rubiaceae	Daosriateng	December-February	Leaves	Used in stomach problem.
3	<i>Justicia adhatoda</i> L.	Acanthaceae	Barsika	April-June	Flowers	Used in cough, cold and allergy.
4	<i>Oxalis corniculata</i> L.	Oxalidaceae	Singri	October-February	Leaves/ Stem	Used in dysentery and blood pressure.
5	<i>Premna herbacea</i> Roxb	Verbenaceae	Keradapini	March-June	Leaves/young shoots	It is considered as medicinal in fever, sleeping sickness and jaundice.
6	<i>Paederia foetida</i> L.	Rubiaceae	Kipibendwng	May-October	Leaves/ tender Twigs	Used in stomach ache, gastric problem, etc.
7	<i>Spilanthes paniculata</i> Wall. ex D.C.	Asteraceae	Usumwi	Throughout the Year	Leaves	Used in sore mouth, tooth ache, wounds etc.
8	<i>Solanum nigrum</i> L.	Solanaceae	Mwisung	November-February	Young leaves	It is considered highly medicinal for burns.
9	<i>Solanum indicum</i> L.	Solanaceae	Kuntainara	May-November	Fruit	Used in worm infection and skin diseases.
10	<i>Clerodendum infortunatum</i> Gaertn.	Verbenaceae	Lwkwna	Throughout the Year	Leaves	Used in jaundice.
11	<i>Terminalia chebula</i> Retz.	Combretaceae	Seleka	October-December	Fruit	Used in stomach ache, gastric problems, etc .
12	<i>Terminalia bellirica</i> Roxb.	Combretaceae	Bhaora	December-February	Fruit	Used in treating diarrhoea and leprosy.
13	<i>Cannabis sativa</i> Linn	Cannabinaceae	Bhang	March-June	Leaves/ flower	Dried flower is used medicinally as Sedative, analgesic, narcotic.
14	<i>Garcinia cowa</i> Roxb.	Clusiaceae	Taika	June-July	Fruit	Used in stomach ache.
15	<i>Colocasia esculenta</i> (L.) Schott	Araceae	Thaso gswm	Throughout the year	Young leaves/ tuber/flower	Leaves used for blood coagulation in small Injuries, roots used in pharyngitis.
16	<i>Diplazium esculentum</i> (Retz.) Sw.	Athyriaceae	Dingkia	March-August.	Leaves	Used in urinal complaints and to enhance sexual power. www.ijsrp.org

17	<i>Amaranthus spinosus</i> Linn.	Amaranthaceae	Kuduna (su gwnang)	September - January	Roots/Stems	Used as antidote against snakebite, given to cows to increase the flow of milk. The root is good for menorrhagia, gonorrhoea.
18	<i>Amaranthus viridis</i> Linn.	Amaranthaceae	Kuduna (pisa)	September - January	Stem/ Leaves	Stem is used as antidote against snakebite. Leaves are good against scorpion sting.
19	<i>Mimosa pudica</i> Linn.	Mimosaceae	Daosa mwkreb	March-December	Leaves	Leaf juice with milk is used as a good Remedy for piles.
20	<i>Leucas aspera</i> Spreng.	Labiatae	Kansingsa	March-December	Whole plant	Used against rabies; leaf juice mixed with garlic is good for the stomach, liver and Spleen.
21	<i>Azadirachta</i> A.Juss;	Meliaceae	Neem	March-October	Leaf	Used in treatment of malaria.
22	<i>Tabernaemontana divaricata</i> R.Br. ex Roem & Schult.	Apocynaceae	Daodwi pul.	September-April	Roots	Roots are used in dropsy.
23	<i>Murraya koenigii</i> (Linn.) Spreng.	Rutaceae	Nwrsing	April-November	Leaves	Leaves are used in diarrhoea, dysentery, digestion problems, as memory enhancer and for curing vomiting.
24	<i>Piper longum</i> Linn.	Piperaceae	Katimal	November-April	Leaf	Used in cough and fever.
25	<i>Ocimum sanctum</i> Linn.	Lamiaceae	Tulsi	Throughout the year.	Leaf	Leaves made into paste applied to the fingers to relieve from fever. Seeds are used as remedy for dysentery. Leaves are used in skin disease.
26	<i>Scoparia dulcis</i> L.	Plantaginaceae	Bongpang rakeb	Throughout the year.	Leaf	Used in treatment of Malaria.
27	<i>Stephania glandulifera</i>	Menispermaceae	Ponel kuga	Throughout the year	Leaf	Used treatment of jaundice.
28	<i>Terminalia arjuna</i> (Roxb) Wight & Arn.	Combretaceae	Arjun	Throughout the year	Bark	Used in stomach problem and digestion problem.

29	<i>Maranta arundinaceae</i>	Marantaceae	Bonsini	Throughout the year	Rhizome	Used in treatment of wounds.
30	<i>Alstonia scholaris</i>	Apocynaceae	Sitaona	Throughout the year.	Bark	Bark is used for the treatment of abdominal pains and fevers
31	<i>Crinum asiaticum.L</i>	Amaryllidaceae	Kanari	Throughout the year	Leaf	Used in bleeding, wound, swelling & pain etc.
32	<i>Hodgsonia heteroclite</i> Hook.f.& Thomson.	Cucurbitaceae	Hagrani jwgwnar	January-April	Fruits	Used in the treatment of diabetes, sugar etc.



Solanum indicum (Kuntainara)



Eryngium foetidum (Gongar dundia)



Lippia geminate (Ontaibajab)



Houttuynia cordata (Maisundri)



Coccinia indica (Tainasi)



Casearia glomerata (Daopenda)



Premna herbacea (Keradapini)



Vitis rependa (Dausrem)



Moringa oleofera (Swrijwna)



Gmelina arborea (Gambari)



Murraya koenigii (Nwrsing)



Enhydra fluctuans (Alangshi)



Piper longum (Katimal)



Stephania glandulifera (Ponel kuga)



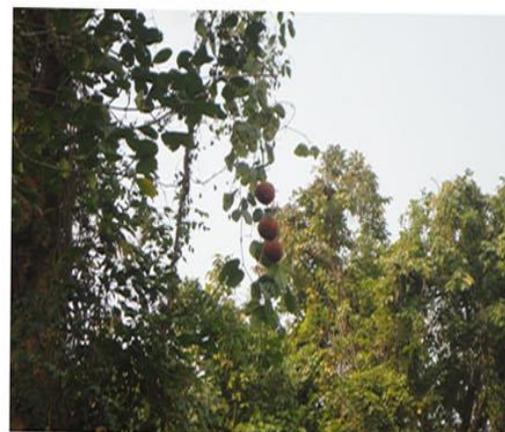
Cinchona sp. (Quinine bipang)



Leucas aspera (Kansingsa)



Oxalis corniculata (Singri)



Hodgsonia heteroclite
(Hagrani jwgwnar)



Basella alba (Mwifrai)



Spilanthes paniculata (Usumwi)



Plectranthus ternifolius (Jwглаori)



Chenopodium album (Butua)

VI. DISCUSSION AND CONCLUSION

The traditional knowledge about the various uses of plant species i.e. food, medicine etc. is preserved from generation to generation by the community people living around the forest and they depend mainly on the forest resources for their survival.

The wild edible vegetables need to be popularized as many of them have high nutritive and medicinal value. By growing them the local people can earn remunerative prices for their livelihoods. Collections of wild vegetables are going on their natural habitat. Therefore their populations are decreasing day to day so, immediate attention is needed to protect them.

The developments of medicinal plants from production to consumption are yet to be maintained and integrated to boost rural communities of this region. Traditional knowledge of herbal remedies for treating human diseases is fast declining in many parts of the world, including India. Even today, tribal and certain local communities in India still practice herbal medicine to cure a variety of diseases and disorders. They collect and preserve locally available and wild plant species from forest regions. Medicinal plants obtained from the forest regions have the efficiency to heal many diseases. The rural communities of the state prepare herbal drugs in their own mode to cure diseases like bleeding from the nose, fever, malarial fever, asthma, tuberculosis, calculi, kidney stones, gallbladder and urinary troubles, hypertension, diabetes, stomach ache, stomach ulcer, dysentery, diarrhoea, jaundice, hepatomegaly, bone fractures, gynaecological disorders, snake bite, etc. Medicinal plants obtained from the forest regions have the efficiency to heal many diseases. The rural communities of the state prepare herbal drugs in their own mode to cure diseases like bleeding from the nose, fever, malarial fever, asthma, tuberculosis, calculi, kidney stones, gallbladder and urinary troubles, hypertension, diabetes, stomach ache, stomach ulcer, dysentery, diarrhoea, jaundice, hepatomegaly, bone fractures, gynaecological disorders, snake bite, etc.

From the survey record it is found that the community peoples have to enter the forest up to 10 km, in the name of collection of such forest resources. Such enter inside the forest sometimes seems risky as there are Elephants in the forest.

Due to frequent collection of wild edible plants species the forest is under threat and the plant species are becoming endangered. Various medicinal plants are also under threat of getting endangered. Since the area is rich in forest resources, it is needed the proper utilization of it.

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