



Documentation of Edible Plants in Homesteads of Khampti Tribe, Namsai District, Arunachal Pradesh, India

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Abstract

A study was conducted to document edible plant species present in homesteads of Khampti tribe of Namsai district, Arunachal Pradesh during November 2019 to February 2021. Randomly selected 225 homesteads of 15 Khampti villages were surveyed for edible plant species, taken photographs, collected samples for identification. Further, the homesteads owners (with pre-consent) were interviewed with semi-structured questionnaire and record information such as local name of the plant, category of the plant (i.e. cultivated, planted and wild), edible plant parts, mode of consumption etc. A total of 150 edible plant species belongs to 56 families were documented from the homesteads of Khampti villages during the study. Of which, 47 edible plant species were planted in their homesteads from the wild, 44 were wild and natural invaders and 59 were cultivated. The study revealed that Khampties were consumed fruits of 72 plant species, whole plant used as vegetables of 21 herb species, tender shoots of 19 plant species used as vegetables, 9 tubers, 7 rhizome, seeds of 7 plant species and leaves 6 species. They used to consume 47 plant parts as raw, 77 after cooked, 15 as pickle, 9 as chutney, 7 as spice and another 7 consumed by extracting juice etc. The study could document a considerable extent of edible plant species from Khampti homestead gardens. It indicates that Khampti homesteads were safe shelter edible plant diversity and thus they are being conserved with time and in turn provide the community needs.

Keywords: Khampti, homesteads, edible plant species, documentation

Introduction

It is a known fact that edible plants are domesticated in past from the wild habitat. Thereafter, these plant species are either cultivated in field or planted in the homesteads. It was also said that domestication of plant took place mainly in mountainous regions more or less within or near the tropics (Vavilov, 1935). Food habit of a community confined in particular locality has been build up with time and was governed mainly

by two factors such as resource availability of edible plant species and ecological factors. Further, it has governed with local ethno botanical knowledge (LEK) and traditional ecological knowledge (TEK) at community level (Hazarika *et al.*, 2015; Turreira-García *et al.*, 2015). The human population used to collect different edible plants or plant parts i.e. fruits, nuts, roots etc from the forests since nomadic stage.

Subsequently, with the progress of settled and civic nature of nomadic tribes, they domesticated plants and animals (Schaal, 2019). Use of fire and agriculture altered the food habit of human beings by and large (Zucoloto, 2011). The food habit is also influenced by some other factors such as development of indigenous knowledge, cultivation, culture, economic, social, nutritional, health status etc (Downs *et al.*, 2020; Gartaula *et al.*, 2020; Singh *et al.*, 2020; Singh *et al.*, 2010). Thus, it is assumed that within a community or a tribe with time a gradual change in food habit is build up and shaped. Accordingly people use to domesticate the plant species in their settled habitat and thereafter in homesteads. Researchers also observed that there is number of different environmental factors and socioeconomic factors such as sex, age gender, education, proximity to the market and distance to the urban areas can influence the knowledge and use of wild food plants by the local people (Bortolotto *et al.*, 2015; Ojelel *et al.*, 2015; Toledo *et al.*, 2007).

A number of scientific studies document over 27,400 plant species as edible in the world either cultivated or from wild (Garn and Leonard, 1989; French, 2019). It is estimated that, in India about 1,403 species of 184 families are consumed as food plants (Ray and Sreevidya, 2020), while in north east (NE) India is around 300 (Deka *et al.*, 2012; Murtem and Chaudhry, 2016). Even after having highest natural plant diversity and tribal communities in NE India the figure of edible plant diversity is merely low and it indicates that lots of works need to be done.

Arunachal Pradesh is hotspot of natural plant resources and rich in ethnicity as the state is an inhabitation of 28 major tribes (Khongsai *et al.*, 2011). It was also recorded that the edible plants which are found in NE India occur in Arunachal Pradesh (Ray and Sreevidya, 2020; Dutta *et al.*, 2017; Haridasan *et al.*, 1990). A good number of research studies were reported from Arunachal Pradesh at different

community level on wild edible plants (Angami *et al.*, 2006; Moyong *et al.*, 2019; Murtem and Chaudhry 2016; Tsering *et al.*, 2017; Tag and Das, 2004; Shankar *et al.*, 2016; Lungphi *et al.*, 2018; Khongsai *et al.*, 2011, Namsa *et al.*, 2011). The homesteads play important role conservation of unique diversity of edible and useful plant species to mitigate local needs and commercial important (Dilrukshi *et al.*, 2013; Hazarika *et al.*, 2014). There has been no systematic study on the edible plant species of the homesteads that are consumed by Khampti tribe of Namsai district, Arunachal Pradesh. Therefore, this study was conducted for generation of the database on edible plant species, recorded edible plant parts, mode of use etc. The study also emphasizes on the extent conservation of edible plant species by the Khampti community in their homesteads.

Materials and Methods

Study Area

The study was conducted on Khampti tribe in Namsai district, Arunachal Pradesh during November 2019 to February 2021. The district is located in between latitude 27°30' to 27°55'N and longitude 95° 52' to 96° 20' E and sharing border with Lohit and Changlang towards the east; Assam to the West; Lohit and Assam towards the North, and the south border adjoins Changlang district (Fig.1). The climate is warm and temperate. The rainfall in summers has much more than the winter. The average annual temperature is 22.8°C. Average annual precipitation is 2728 mm. High quantity of rainfall (750-800 mm) is recorded during July-August with a relative humidity of 80%. Maximum and minimum winter temperatures are 25° C and 10° C, respectively.

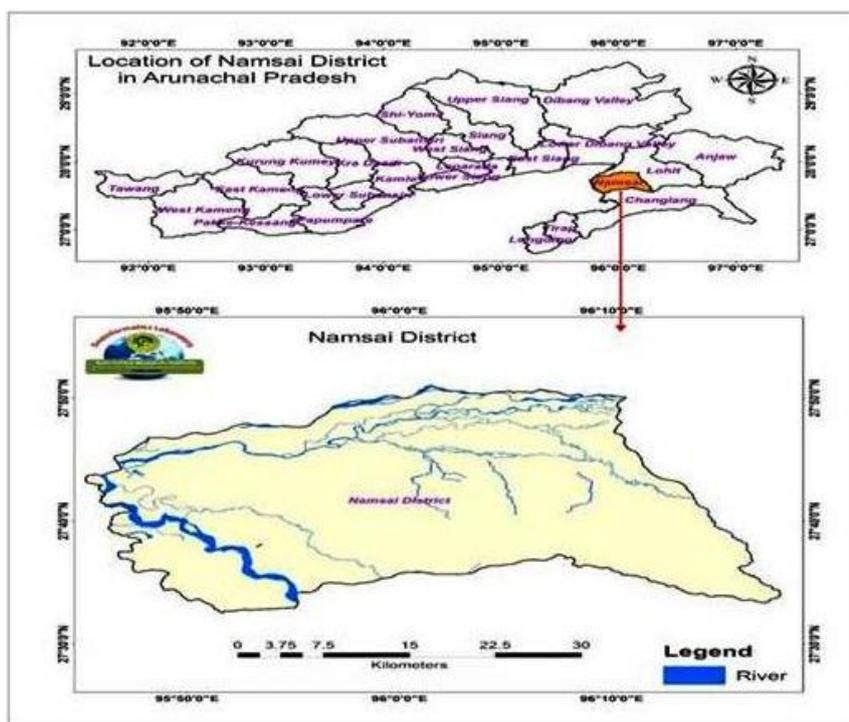


Fig 1 Location Map of Namsai district, Arunachal Pradesh

Data collection

A total of 225 Khampti homesteads from 15 Khampti villages were surveyed randomly i.e. Old Mohong, New Mohong, Lathao, New Lathao, Sulungtoo, Pathar Gaon, Piyong II, Kherem, Mankao, Marua Camp, Manphaiseng, Manmow, Wagon Pathar, Jenglai, and Wenko. Randomly selected 15 homesteads of each of the 15 Khampti villages were visited and objective of the study was clearly explained to the homesteads owner. Information of edible plant species, parts used as food, mode of use, the associated indigenous knowledge etc were collected with the interview by a semi structured questionnaire with prior informed consent (PIC) from the homestead owner. The edible plant species were also photographed along with the edible parts.

The edible plant species of their homesteads were taxonomically authenticated with the help of standard Flora of Assam (Kanjilal et al., 1934 – 1940) and Flora of Arunachal Pradesh (Hajra et al., 1996; Giri et al., 2008; Chowdhery et al., 2009), and Flora of Lower Subansiri (Pal, 1993). The accepted scientific names were verified in the website www.theplantlist.org and www.plantsoftheworldonline.org.

Results

A major plant species recorded from homesteads of Khampti villages of Namsai district were edible. There were 106 edible plant species documented from Khampti homesteads, of which, 59 were cultivated and 47 were planted and are presented in Table 1. Planted species are basically domesticated from the wild habitat as they are useful. Apart from that 44 wild species were also recorded from the homesteads of Khampti villages and are presented in Table 2. In both the tables incorporated information such as their local name, family, edible parts, mode of use etc. The survey could record a total of 149 plant species from their homesteads were edible either in raw or cooked or in other processed product form (Table 1 & 2). They belongs to 56 plant families (Fig 2.), of which Solanaceae represented with maximum 13 species, followed by Rutaceae with 10 species, 7 species belong to Cucurbitaceae and Arecaceae; Araceae and Brassicaceae with 6 plant species each; 5 species by Zingiberaceae. Other plant families such as Amaranthaceae, Apiaceae, Fabaceae, Lamiaceae, Musaceae, Rosaceae and Rubiaceae were observed to have 4 edible species each in different Khampti homesteads. Likewise, Anacardiaceae, Asteraceae,

Clusiaceae, Euphorbiaceae, Myrtaceae Polygonaceae and Piperaceae were 7 plant families found to occur 3 edible species each in the homesteads of Khampti villages. Importantly, other 11 plant families were found to have 2 edible plant species in the homesteads of different Khampti villages i.e. Alliaceae, Caryophyllaceae, Chenopodiaceae, Dioscoreaceae, Lauraceae, Oxalidaceae, Passifloraceae, Phyllanthaceae, Rhamnaceae, Sapindaceae, and Malvaceae. Only single edible plant species were detected from another 24 plant families i.e. Acantaceae, Annonaceae, Bambusaceae, Bromeliaceae, Caricaceae, Convolvulaceae, Dilleniaceae, Eleocapaceae, Eleagnaceae, Lythraceae, Melastomataceae, Myricaceae, Moraceae, Moringaceae, Pedaliaceae, Poaceae, Portulacaceae, Saururaceae, Woodsiaceae, Theaceae, Tiliaceae, Urticaceae, Verbenaceae and Vitiaceae. There was a variation in parts used within a species or among the edible plant species and are presented in fig 3. More than one part of a plant species was also recorded for a few edible plant species. Accordingly, bark. *Cinnamomum zeylenicum* was used for preparing spice. The bark of *Glycosmis pentaphylla* was used to treat Pneumonia and ripe fruit is eaten (Table 2). The flower of three plant species i.e. *Brassica oleracea* var. *botrytis*, *Phlogochanthus thyriflorus* and *Sesbania grandiflora* were recorded as edible after cooked. Fruits of 72 plant species were recorded as edible which were grown in their homesteads of which 22 were taken when ripped. The other fruit were recorded to take either in raw or after cooked. Likewise 6 plant species were recorded as edible their leaves (Table 1 & 2).

Apart from leaves entire plant of 21 herb species were recorded as edible. They are *Alternanthera sessilis*, *Amaranthus hybridus*, *Brassica juncea*, *Brassica napus*, *Brassica oleracea* var. *capitata*, *Brassica pekinensis*, *Celosia argentea*, *Centella asiatica*, *Chenopodium album*, *Coriandrum sativum*, *Drymaria cordata*, *Ecliptica prostrata*, *Eryngium foetidum*, *Hedyotis scandens*, *Houttuynia cordata*, *Hydrocotyl sibthorpioides*, *Malva verticiliata*, *Oxalis corniculata*, *Rumex vasicarius*, *Spinacia oleracea* and *Stellaria media*. Of which, *Amaranthus hybridus*, *Brassica juncea*, *Brassica napus*, *Brassica oleracea* var. *capitata*, *Brassica pekinensis*, *Coriandrum sativum*, *Malva verticiliata*, *Rumex vasicarius* and *Spinacia oleracea* were recorded as cultivated vegetables in their homesteads and the others are wild herb and come naturally in their growing season.

The tender shoots of 21 plant species were recorded as edible by the Khampti tribe, of which two were cultivated in their homesteads i. e. *Mentha piperata* and *Hibiscus subdarifa*. Other 14 were grown naturally in homesteads (Table 1&2). Moreover *Raphanus sativus* is cultivated to eat root.

The survey also recorded that seeds of 7 plant species found in Khampti homesteads were cultivated for edible purposes (Fig 3). The Khampti are also practicing to take rhizome of the plant species as food. Seven such plant species found in their homesteads were *Alpinia galanga*, *Colocasia affinis*, *Colocassia esculenta*, *Colocasia antiquorum*, *Curcuma longa*, *Homalonema aromatica* and *Zingiber officinalis*. Of which, *Curcuma longa* and *Zingiber officinalis* are popular spice among them.

Mode of consumption these edible plants as food was also evaluated during the survey and presented in the table 1 and 2. Accordingly, five plant parts were consumed after boiling, nine plant species were recorded to intake as chutney, 77 plant parts/ plants were taken as cooked vegetables, 4 plant were consumed after dry; Juice of 7 plants were taken and 1 plant used as beverage. Apart from that 15 plant parts were utilized as pickle, 3 of them are use as medicine, seven were as spice and 47 plant species parts were recorded to take as raw (Fig 4). Photographs of few plants species and market product of Khampti homesteads of Namsai district presented in Fig 5.

Table 1 Planted/Cultivated edible plant species recorded in the homesteads of Khampti villages of Namsai district, Arunachal Pradesh

SI No	Species Name & Family	Khampti Local name	Time of availability	Habit/ Habitat	part used	Mode of use
1	<i>Aegle marmelos</i> (L.) Corrêa (Rutaceae)	Bel	April to May	Tree/ planted	Ripe fruit	Raw
2	<i>Allium cepa</i> L. (Alliaceae)	Plumuh/Piaj	Nov.-Dec.	Herb/ cultivated	Tuber	Raw/ cooked as vegetable
3	<i>Allium sativum</i> L. (Alliaceae)	Plosing /Naharu	Nov.-Dec.	Herb/ cultivated	Tuber	Raw/ Cooked as vegetable
4	<i>Alocasia macrorrhizos</i> (L) Schott.(Araceae)	Panam mon/ Bor man Kasu	Sept to January	Herb/cultivated	Leaves / corm	Cooked /boiled
5	<i>Amomum subulatum</i> Roxb. (Zingiberaceae)	Bor Elachi	September-October.	Herb/cultivated	Seed	Spice
6	<i>Amaranthus hybridus</i> L. (Amaranthaceae)	Pu-hom lung/ Morisa sag	March to August	Herb/ cultivated	Whole plant	Cooked as vegetable
7	<i>Ananus comosus</i> (L.) Merr. (Bromeliaceae)	Mati kathal	May-August.	Herb/ cultivated	Ripe Fruit	Raw
8	<i>Andrographis paniculata</i> Wall.ex. Nees (Acanthaceae)	Hirota /Kalmegh	September	Herb/ cultivated	Whole plant	Medicinal
9	<i>Annona squamosa</i> L. (Annonaceae)	King hom/ Atlos	September to Novembe	Tree/ planted	Ripe Fruit	Raw
10	<i>Areca catechu</i> L. (Arecaceae)	Mak mow/ Tamul	June – December	Tree/ planted	Fruit	Raw
11	<i>Artocarpus heterophylla</i> Lamk (Moraceae)	Maalang/ Kothal	July-August	Tree/ planted	Ripe friut	Raw
12	<i>Averrhoa carambola</i> L. (Oxalidaceae)	Me phung/ Kordoi	June to February	Tree/ planted	Ripe Fruit	Raw
13	<i>Baccaurea ramiflora</i> Lour. (Euphorbiaceae)	Ma phai/ Leteku	July to August	Tree/ planted	Ripe Fruit	Raw
14	<i>Benincasa hispida</i> (Thunb.) Cog. (Cucurbitaceae)	Kumura	August to November	climber/ cultivated	Fruit	Cooked as vegetable
15	<i>Brassica juncea</i> (L.) Czern. (Brassicaceae)	Hariuh/ Sarioh	November	Herb / cultivated	Leaves	Leaves are cooked as vegetable
16	<i>Brassica napus</i> L. (Brassicaceae)	Khow hariuh/ Boga sariah	November	Herb/ cultivated	Plant	Cooked as vegetable
17	<i>Brassica oleracea var.botrytis</i> (Brassicaceae)	Phul kobi	November-February	Herb/ cultivated	Flower	Cooked as vegetable
18	<i>Brassica olracea var capitata</i> (Brassicaceae)	Bondha Kobi	November-March	Herb/ cultivated	Plant	Cooked as vegetable

19	<i>Brassica pekinensis</i> (Lour.) Rupr. (Brassicaceae)	Pakkat/ Pa kag/ Lai Sag	November- February	Herb/ cultivated	Plant	Cooked as vegetable
20	<i>Camellia sinensis</i> (L.) Kuntze(Theaceae)	Toon neng/ Sah	Whole year	Shrub/ planted	Tender leaves	Leaf extract used as beverage
21	<i>Capsicum annum</i> L. (Solanaceae)	Me fit/Jalokia	Whole year	Herb/ cultivated	Fruit	Raw/ cooked
22	<i>Capsicum chinensis</i> Jacq. (Solanaceae)	Me fit- kong/ Bhut jalokia	Whole year	Herb/ cultivated	Fruit	Raw /cooked
23	<i>Capsicum frutescens</i> L. (Solanaceae)	Me fit khow/ Boga jolokia	Whole year	Herb/ cultivated	Fruit	Raw / cooked
24	<i>Carica papaya</i> L. (Caricaceae)	Mak saan phow/ Amita	Whole year	small tree/ cultivated	Fruit	Raw /cooked
25	<i>Cinnamomum zeylenicum</i> Br. (Lauraceae)	Dalcheni	May and again in November	small tree/ planted	Bark	Spice
26	<i>Citrus limon</i> (L.) Osbeck (Rutaceae)	Hattal/ Kaghzi-nemu	July- September	Shrub/ planted	Fruit	Raw/pickle / juice
27	<i>Citrus maxima</i> (Burm) Meer (Rutaceae)	Mak lung/ Bortenga	November- January.	Shrub/ planted	Fruit	Raw juice
28	<i>Citrus medica</i> L. (Rutaceae)	Mak sa neng/ Robab Tenga	November- January.	Shrub/ planted	Fruit	Raw juice
29	<i>Citrus reticulata</i> Blanco (Rutaceae)	Mak mighi/ Komolatenga (1)	November- January.	Shrub/ planted	Fruit	Raw/ juice
30	<i>Citrus x sinensis</i> (L.) Osbeck (Rutaceae)	Mingi/ Komolatenga	November- January.	Shrub/ planted	Fruit	Raw/ juice
31	<i>Cocos nucifera</i> L. (Arecaceae)	Mowon/ Narikol	Whole year	Tree/ planted	Fruit	Raw
32	<i>Colocasia affinis</i> Schot. (Araceae)	pi pok	November- January	Herb/ cultivated	Tuber	Cooked as vegetable
33	<i>Colocassia esculenta</i> (L.) Schott (Araceae)	Phewk/ Kala-kochu	November- December	Herb/ cultivated	Tuber	Cooked as vegetable
34	<i>Corchorus olitorius</i> L. (Tiliaceae)	pi seng/Chbang /Mora pat	April- May	Herb/ cultivated	Tender plant	Cooked as vegetable
35	<i>Coriandrum sativum</i> L. (Apiaceae)	Pi ki/ Dhania	January- February	Herb/ cultivated	plant/ seed	Chutney /Cooked
36	<i>Cucumis sativis</i> Linn. (Cucurbitaceae)	Teng/Tianh	Whole year	Climber/ cultivated	Fruit	Chutney/ cooked as vegetable

37	<i>Cucurbita pepo</i> L. (Cucurbitaceae)	Ma pak kham/ Rongalau	August - December	climber/ cultivated	Fruit	Cooked as vegetable
38	<i>Curcuma longa</i> L. (Zingiberaceae)	Khow main/ Halodhi	December- January	Herb/ cultivated	Rhizome	Spice
39	<i>Dendrocalamus hamiltonii</i> (Bambusaceae)	Kako Banh	April to June	Cultivated	Rhizome	Cooked/pickle
40	<i>Dillenia indica</i> L. (Dilleniaceae)	Makchan/Ou- tenga	July- Feb	Tree/ planted	Fruit	Cooked/pickle
41	<i>Dioscorea pentaphylla</i> L. (Dioscoreaceae)	Kuan mung/ Panchpotia Alu	Dec-Jan	Climber/ cultivated	Tuber	Boiled as vegetable
42	<i>Dioscoria alata</i> L. (Dioscoreaceae)	Malang/Kath alu	December	climber/ cultivated	Tuber	Boiled as vegetable
43	<i>Dimocarpus longan</i> Lou r. (Sapindaceae)	Nagalitchu	July- Oct.	Small tree/ planted	Fruits	Raw
44	<i>Elaeis guineensis</i> Jacq. (Arecaceae)	Plam oil	June- August	Tree/ exotic	Fruit	Ripe fruit eaten raw
45	<i>Elaeocarpus floribundus</i> Blume. (Elaeocarpaceae)	Jalphai	August to October.	Tree/ planted	Fruit	Raw / pickle
46	<i>Eleagnus latifolia</i> L. (Eleagnaceae)	Mu lot Mirika Tenga	August to October.	Climbing Shrub/planted	Fruit	Pickle
47	<i>Emblica officinalis</i> L., (Euphorbiaceae)	Amlokhi	August to October.	tree/planted	Fruit	Raw /pickle
48	<i>Garcinia cowa</i> Roxb. (Clusiaceae)	Kuji thekera	July- September	Tree /planted	Fruit	Pickle/ dry
49	<i>Garcinia lanceifolia</i> Roxb. (Clusiaceae)	Rupohi Thekera	July- September	Shrub/planted	Fruit	Chutney/ pickle
50	<i>Garcinia pendunculata</i> Roxb. ex Buch._ Ham (Clusiaceae)	Mannang Bor thekera	April to August	Tree/ planted	Fruit	Chutney/ pickle/ dry
51	<i>Hibiscus subdarifa</i> L. (Malvaceae)	Tenga mora	April to August	Herb/cultivated	Tender shoot	Cooked as vegetable
52	<i>Houttuynia cordata</i> Thunb. Saururaceae	Punkyo/ Masandari	Whole year	Herb/cultivated	whole plant	Cooked as vegetable
53	<i>Ipomoea batatas</i> (L.) Lamk. (Convolvulaceae)	Mitha alu	June- January	climber/ cultivated	tuber	Cooked as vegetable
54	<i>Lagenaria siceraria</i> (Molina) Standl. (Cucurbitaceae)	Jatilau	Throughou t the year	Climber/cultivat ed	fruit	Cooked as vegetable
55	<i>Livistona jenkinsiana</i> Griff. (Arecaceae)	Tongko/ Tokow	Dec- January	Tree/ planted/En	Nut	Raw
56	<i>Litchi chinensis</i> Sonn. (Sapindaceae)	Lichu	May and June.	Tree/ planted	Ripe fruit	Raw

57	<i>Luffa cylindrica</i> M.Roem. (Cucurbitaceae)	Jika	June to October	Climber/ cultivated	Fruit	Cooked as vegetable
58	<i>Lycopersicon esculenta</i> L. (Solanaceae)	Bor bilahi	October- February	Herb/ cultivated	Fruit	Raw /cooked
59	<i>Lycopersicum pimpinifolium</i> (L.)Mill (Solanaceae)	Konbilahi	October- February	Herb/ cultivated	Fruit	cooked
60	<i>Magnifera indica</i> L. (Anacardiaceae)	Momung/ Aam	June- August	Tree/ planted	Ripe Fruit	Raw
61	<i>Malva verticiliata</i> L. (Malvaceae)	Lofa saag	October- February	Herb/ cultivated	Whole plant	Cooked as vegetable
62	<i>Manihot esculenta</i> Crantz. (Euphorbiaceae)	Simolu Alu	October- February	Shrub/ cultivated	Tuber	Cooked as vegetable
63	<i>Mentha piperata</i> Linn (Lamiaceae)	Piche hun/ Pudina	March to August	Herb/ cultivated	Tender shoot	Chutney
64	<i>Momordica charantia</i> Linn. (Cucurbitaceae)	Makhaie Khum/ Tita kerela	March to August	climber/ cultivated	Fruit	Cooked as vegetable
65	<i>Moringa oleifera</i> Lam. (Moringaceae)	Sajina	February to May	Tree/ planted	Pod	Cooked as vegetable
66	<i>Musa acuminata</i> Colla. (Musaceae)	Koi/ Mem-Jatikol	Whole year	Tree/ cultivated	Ripe Fruit	Raw
67	<i>Musa balbisiana</i> Colla. (Musaceae)	Bhim kol	Whole year	Tree/ planted	Ripe Fruit	Raw
68	<i>Musa cavendish</i> Lamb. (Musaceae)	Jahaji	Whole year	Tree/ planted	Ripe Fruit	Raw
69	<i>Musa paradisiaca</i> L. (Musaceae)	Koi athia/ Kach kol	Whole year	Tree/ planted	Ripe Fruit	Cooked as vegetable
70	<i>Myrica esculenta</i> Ham. (Myricaceae)	Noga tenga	September -October.	Tree/ planted	Ripe Fruit	Pickle/ raw
71	<i>Passiflora edulis</i> Sims. (Passifloraceae)	Rasna	September -October.	climber/ cultivated	Fruit	Fruit Juice
72	<i>Passiflora quadrangularis.</i> L. (Passifloraceae)	Lota bel	May to November	climber/ cultivated	Fruit	Cooked as vegetable
73	<i>Phaseolus vulgaris</i> L. (Fabaceae)	Tho nin/ Mati mah	December	climber/ cultivated	Seed	Raw /cooked
74	<i>Phlogachanthus thyrsiflorus</i> Nees. (Rubiaceae)	Mochomkhum / Titaphul	May to August	Climber/ planted	Flower	Cooked as vegetable
75	<i>Phoenix dactylifera</i> L. (Arecaceae)	Khejur	June or early July.	Tree/ planted	Fruit	Raw
76	<i>Pogostemon benghalensis</i> (Burm. f.) O. Kuntze (Lamiaceae)	Ya kin phit /Suklati	Whole year	Herb/ planted/ escapices	Tender shoot	Cooked as vegetable
77	<i>Polygonum pangianum</i> (G.D.Pal & Maiti)R.C.Srivast. (Polygonaceae)	--	Whole year	Herb/ planted	Tender shoot	Spice

78	<i>Phyllanthus embilica</i> L. (Phyllanthaceae)	Makhaam/ Amlokhi	October- November	Tree/ planted	Fruit	Raw/ pickle/ dry
79	<i>Phyllantus acidus</i> (L.) Skeels. (Phyllanthaceae)	Por Amlokhi	October- November	Tree/ planted	Fruit	Raw/ pickle
80	<i>Piper betel</i> L. Piperaceae	Pan	Whole year	climber/ cultivated	Leaves	Raw
81	<i>Piper nigrum</i> L. (Piperaceae)	Imphitlom Jaluk	November to February	climber/ cultivated	Seed	Spice
82	<i>Pisum sativum</i> L. (Fabaceae)	Mantaka/ Motormah	May to August	Climber/cultivat ed	Seed	Raw
83	<i>Prunica granatum</i> L. (Lythraceae)	Dalim	April- September	Shrub/planted	Fruit	Raw
84	<i>Prunus persica</i> (L.) Batsch Rosaceae	Nara Bogori	October- November	small tree/planted	Fruit	Raw
85	<i>Psidium guajava</i> L. (Myrtaceae)	Mantaka/ Modhuri	November- December	Tree/ cultivated	Tender shoot	Cooked as vegetable
86	<i>Pyrus communis</i> L. (Rosaceae)	Naspoti(1)	October- November	Tree/ planted	Ripe Fruit	Raw
87	<i>Pyrus pyriflora</i> (Burm.) Nak. (Rosaceae)	Naspoti (2)	October- November	Tree/planted	Fruit	Raw
88	<i>Raphanus sativus</i> (L.)Domin (Brassicaceae)	Mula	November to January	Herb/ cultivated	Root	Raw chutney/ cooked as vegetable
89	<i>Rumex vasicarius</i> L. (Polygonaceae)	Suka sag	November -January	Herb/ cultivated	Whole plant	Cooked as vegetable
90	<i>Saccharum officinarum</i> L. (Poaceae)	Oei/ Kuhiyar	November to January	Herb/ cultivated	Whole plant	Juice/ Molasses
91	<i>Seasamum indicum</i> L (Pedaliaceae)	Till	December	Herb / cultivated	Seed	Spice
92	<i>Sesbania grandiflora</i> (L.) Poir. (Fabaceae)	Bog phul	November to February	Shrub/ planted	Flower	Cooked as vegetable
94	<i>Solanum intregrifolium</i> L (Solanaceae)	garden egg plant	February to July	Herb/ cultivated	Fruit	Cooked as vegetable
95	<i>Solanum lycopersicum</i> L. (Solanaceae)	Bilahi	November to February	Herb / cultivated	Fruit	Cooked as vegetable
96	<i>Solanum melongena</i> L. (Solanaceae)	Makhw/ Bengena	February to July	Herb/ cultivated	Fruit	Cooked as vegetable

97	<i>Solanum tuberosum</i> L. (Solanaceae)	Mangkla/ Alu	December - January	Herb/ cultivated	Tuber	Cooked as vegetable
98	<i>Spinacia oleracea</i> L. (Chenopodiaceae)	Paleng	December to February	Herb/ cultivated	Whole plant	Chutney/ cooked
99	<i>Spondias pinnata</i> (L.f.) Kurz (Anacardiaceae)	Mokog Amora	August–September	Tree/ planted	Fruit	Pickle/ raw
100	<i>Syzygium cumini</i> (L.) Skeels. (Myrtaceae)	Jamuk Kolajamu	June- July	Tree /planted	Ripe Fruit	Raw
101	<i>Syzygium jambos</i> (L.) Alston (Myrtaceae)	Golapi Jamun	May- June	small tree/ planted	Ripe Fruit	Raw
102	<i>Tamarindus indica</i> L. (Fabaceae)	Mekeng Teteli	March- April	Tree/ planted	Ripe fruit	Raw
103	<i>Zanthoxylum armatum</i> DC. (Rutaceae)	Mekat Masala pat	Whole year	Shrub / planted	Leaves	Spice/ chutney
105	<i>Zingiber officinalis</i> Roscoe. (Zingiberaceae)	Hing/Khing Ada	Dec- January	Herb/ cultivated	Rhizome	Spice
106	<i>Zizyphus mauritiana</i> Lam. (Rhamnaceae)	Mokho Apple Bogori	Nov- January	small tree/ cultivated	Ripe Fruit	Raw

Table 2 Wild edible plant species recorded in the homesteads of Khampti villages of Namsai district, Arunachal Pradesh

SI No	Species Name & Family	Khampti Local name	Time of availability	Habit/ Habitat	part used	Mode of use
1	<i>Alpinia galanga</i> (L.) Willd. (Zingiberaceae)	King Pang/ Khing pang/ Gandha Tota	Oct. to March	Herb/ wild	Rhizome	Cooked as vegetable
2	<i>Alpinia nigra</i> (Gaertn.) B.L.Burt (Zingiberaceae)	Monhioo/ Tora gajali	Oct. to March	Herb/wild	tender shoot	Cooked as vegetable
3	<i>Alternanthera sessilis</i> (L). RBr. Ex DC (Amaranthaceae)	Yachnung/ Mati kaduri	March to October	Herb/ wild	Whole plant	Cooked as vegetable
4	<i>Alternanthera aquatica</i> (Parodi) Chodat. (Amaranthaceae)	Leheti sak	March- June	Herb/ Wild	Tender shoot	Cooked as vegetable
5	<i>Amaranthus spinosus</i> L. (Amaranthaceae)	Po hom nam/ Hati Khutora	March- Oct	Herb/wild	Tender shoot	Cooked as vegetable
6	<i>Blumea lanceolaria</i> (Wall. ex Roxb.) Druce. (Asteraceae)	Yanang	Whole year	Herb/wild	Tender plant	Cooked as vegetable
7	<i>Caryota urens</i> L. (Arecaceae)	Kunhang/ Sewa Tamul	Dec- Feb	Tree/ wild	Fruit	Raw

8	<i>Centella asiatica</i> (L.) Urb. (Apiaceae)	Panang lung Bor-manimuni	March - Sept	Herb/wild	Whole plant	Cooked as vegetable
9	<i>Chenopodium album</i> L. (Chenopodiaceae)	Puku/ Polom Jilmilsak	Dec - March	Herb/ wild	Tender shoot	Cooked as vegetable
10	<i>Clerodendron colebrookianum</i> Walp . (Verbenaceae)	Patak khai /Helle Yasak/ Nefafu	March- Oct	Shurb/ wild	Tender shoot	Cooked as vegetable
11	<i>Coccinea grandis</i> (L) Voight. (Cucurbitaceae)	Lok khoi kang wan/ Belipoka	Mar- Sept.	Climber/ wild	Fruit	Cooked as vegetable
12	<i>Colocasia antiquorum</i> Schott Melet(Araceae)	Mon-lai/ Adolia Kosu	Feb to Sept	Herb/ wild	Stem	Cooked as vegetable
13	<i>Diplazium esculentum</i> (Retz.) Sw. (Woodsiaceae)	Pu kut Dhekia	April- Nov.	Herb/ wild	Tender shoot	Cooked as vegetable
14	<i>Drymaria cordata</i> (L.) Willd. Ex Schult (Caryophyllaceae)	Laijabori	March - Oct	Herb/ wild	Whole plant	Cooked as vegetable/ medicine
15	<i>Ecliptica prostrata</i> L. (Asteraceae)	Kanraj /Kehraj	March - Sept	herb/wild	Tender plant	Cooked as vegetable
16	<i>Eryngium foetidum</i> L. (Apiaceae)	Man dhania	March - Sept	Herb/ wild	Plant	Chutney
17	<i>Glycosmis pentaphylla</i> (Retz.) DC (Rutaceae)	Chauldhuwa Hengena poka	July – August	Shrub/wild	Bark/Ripe fruits	Medicine/ Raw
18	<i>Hedyotis scandens</i> Roxb. (Rubiaceae)	Kanjaua/ Bonjaluk	April to Sept	Herb/wild	whole plant	Cooked as vegetable
19	<i>Homalonema aromatica</i> Roxb. (Araceae)	Suanpa/ Gandha kosu	Entire year	Herb/wild	Rhizome	Cooked as vegetable
20	<i>Hedyotis scandens</i> Roxb. (Rubiaceae)	Kanjaua /Bonjaluk	Entire year	Herb/wild	Whole plant	Cooked as vegetable
21	<i>Hydrocotyl sibthorpioides</i> Lam. (Apiaceae)	Panang on/ Saru manimuni	Entire year	Herb/wild	whole plant	Cooked
22	<i>Lasia spinosa</i> L. (Araceae)	Sengmora	Entire year	Herb/ wild	Tender shoot	Cooked as vegetable
23	<i>Leucas aspera</i> (Willd.) Link . (Lamiaceae)	Dulon bon/ Durun	Entire year	Herb/ wild	Tender shoot	Cooked
24	<i>Litsea cubeba</i> (Lour). Pers. (Lauraceae)	Rukmeer/ Mejankori	April to July	Tree / wild	Fruit	Cooked
25	<i>Mangifera sylvetica</i> L (Anacardiaceae)	Momung/ Bon Aam	April to July	Tree/ wild/ En	Ripe Fruit	Raw
26	<i>Melastoma malabathricum</i> L. (Melastomataceae)	Mohapatta Phutuka	Throughout the year	Shrub / wild	Ripe Fruit	Raw
27	<i>Murraya koenigii</i> (L.) Spreng (Rutaceae)	Hom/ Narasingha	Whole year	Shrub/ wild	Leaf	Chutney
28	<i>Oxalis corniculata</i> L. (Oxalidaceae)	Yasompi/ Tengesi	Whole year	Herb/ wild	whole plant	Cooked

29	<i>Paederia foetida</i> L. (Rubiaceae)	Sankar/ Bhedai Iota	Whole year	Climber/ wild	Leaves	Cooked
30	<i>Perilla frutescens</i> (L.) Britt (Lamiaceae)	Nga khaw/ Naga Machala	Whole year	Lamiaceae	Herb/cultivated/ escapist	
31	<i>Physalis minima</i> L. (Solanaceae)	Pokmou	April to Aug.	Herb/ wild	Fruit	Raw/ cooked
32	<i>Pinanga gracilis</i> Bl. (Arecaceae)	Gerugatamul	September-October	Shrub/ wild	Fruit	Raw
33	<i>Piper mullesua</i> D. Don (Piperaceae)	Imphitlom thon/ Pipoli	Whole year	Climber/ wild	Spike	Raw / spice
34	<i>Portulaca oleracea</i> L. (Portulacaceae)	Yayinu/ Malbhug Khutara	Sept to June	herb/wild	Whole plant	Cooked as vegetable
35	<i>Rubus ellipticus</i> Sm. (Rosaceae)	Jetulipoka	February and April.	Climber/ wild	Fruit	Eaten ripe fruit
36	<i>Sarcochlamys pulcherrima</i> (Roxb.) Gaud.	Bon-tejpat, Mesaki	Whole year	Shrub/Wild	Leaves	Cooked
37	<i>Solanum aculeatissimum</i> Jacq. (Solanaceae)	Miyangkom/ Tita bekuri	May to sept	Herb/ wild	Fruit	Cooked
38	<i>Solanum myriacanthum</i> Dunal. (Solanaceae)	Kutahi-benegna	May to sept	Herb/ wild	Fruit	Cooked
39	<i>Solanum nigrum</i> Linn. (Solanaceae)	Hor/ Rambengena	March to Nov.	Herb/ wild	Fruit	Raw
40	<i>Stellaria media</i> (Linn.) Vill. (Caryophyllaceae)	Morolia sak	April to Oct.	Herb/ wild	Whole plant	Cooked
41	<i>Tetrastigma thomsonianum</i> Planch (Vitaceae)	Nol- tenga	Whole year	Climber/ wild	Tender shoot	Cooked as vegetable
42	<i>Xanthium strumarium</i> Linn Asteraceae	Agora	December-February	Herb/Wild	Tender plant	Cooked as vegetable
43	<i>Zanthoxylum oxyphyllum</i> Edgew. (Rutaceae)	Mezenga	Whole year	Climber/ wild	Tender shoot	Cooked as vegetable
44	<i>Zizyphus oenoplia</i> L. (Rhamnaceae)	Mokho on Bogori	Nov- Dec	small tree/ wild/ cultivated	Ripe Fruit	Raw

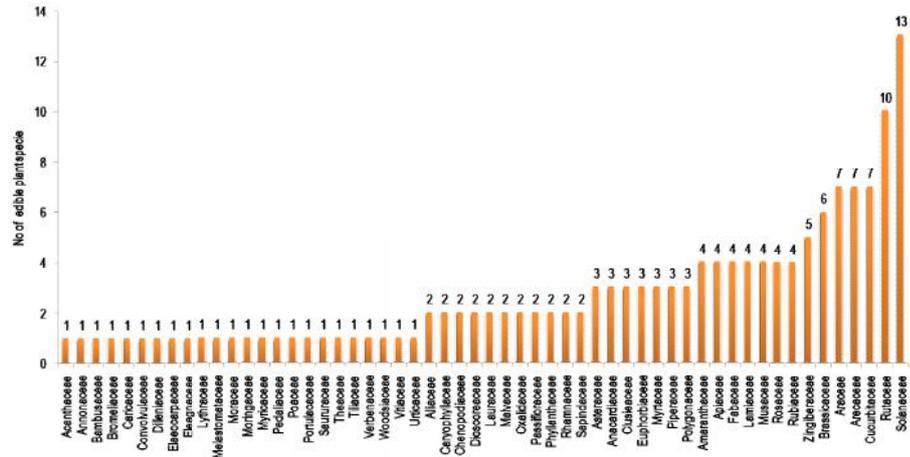


Fig.2 Number of edible plant species and their plant families

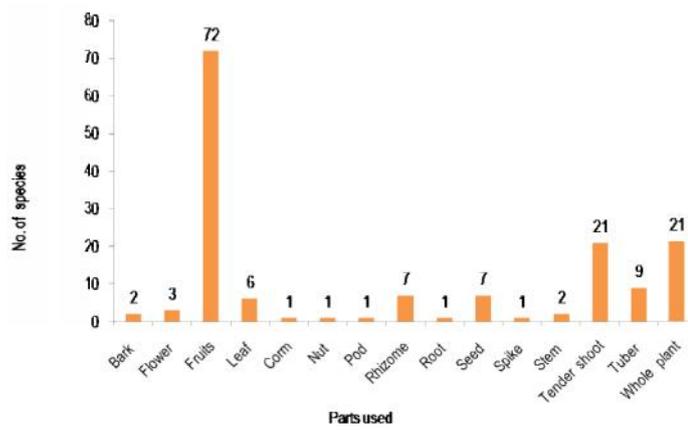


Fig.3 Number of different parts of edible plant species consumed by Khampti tribe

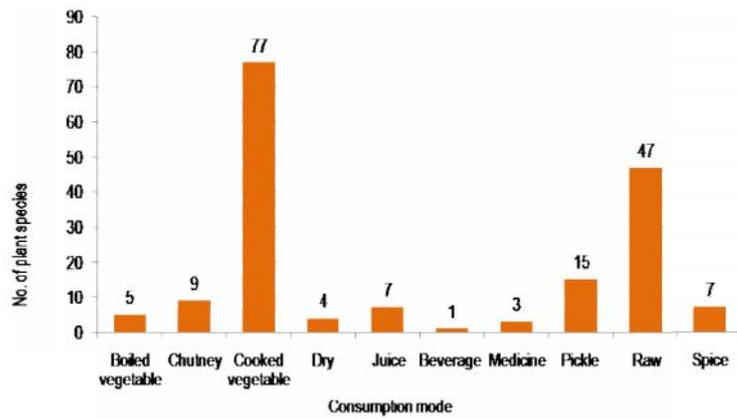


Fig.4 Different mode of consumption edible plant by Khampti tribe



Fig 5 A few edible plant species of homesteads of Khampti tribes, Namsai district Arunachal Pradesh (A) *Piper betel*; (B) *Melastoma malabathricum* ; (C) *Clerodendron colebrookianum*; (D) *Eryngium foetidum* ;(E) *Phlogachanthus thyrsoiflorus*; (F) *Murraya koenigii* ; (G) *Annona squamosa*; (H) *Sarcochlamys pulcherrima* ; (I) *Eleagnus latifolia* ; (J) *Dillenia indica* ; (K) *Alocasia macrorrhizos* ; (L) *Sesbania grandiflora*; (M) *Manihot esculenta* ; (N) *Alternanthera aquatica* ; (O) *Homalonema aromaticum*; (P) *Garcinia lanceifolia* ; (Q) *Pinanga gracilis*; (R) *Glycosmis pentaphylla*; (S) *Blumea lanceolaria*; (T) Bamboo shoots (Right), Cane shoots (Middle) *Dillenia indica* fruits (Left) sold in local market (U) Tender shoot of *Zanthoxylum oxyphyllum* sold in local market.

Discussion

The Khampti homesteads were also multi-story plant composition herb, shrub and trees of agriculture, forestry and food production systems to mitigate social, cultural and economic requirements. They have been played as a key food source to manage malnutrition, hunger and livelihoods. Similar observations were also reported from Sri Lanka (Dilrukshi *et al.*, 2013) and a few case studies from Ethiopia, Kenya, Tanzania and Uganda (Johnson-Welch, 2000). Although, more than a dozen of research literatures described the status of wild edible plants (WEP) used by the tribal communities in Arunachal Pradesh (Angami, *et al.*, 2006; Gajurel and Doni, 2020; Haridasan *et al.*, 1990; Namsa, *et al.*, 2011) but none of them were found to emphasize the importance of homesteads/ home gardens as a safe shelter of many wild plant species as well as cultivated crops. The study could document 45 planted species which are domesticated by the Khampti tribes in their homesteads from the wild habitat by planting them with time as a source of food yielding plants. It was also found that most of them are planted for edible fruits and vegetables. In addition to these planted species the Khampti tribe has shown to conserve 60 cultivated plant species of which, majority were local varieties except a few commercial crops. Hazarika *et al* (2014) studied on homesteads of four communities of Assam and described as people choice biodiversity conservation sites of useful plants domestication from the wild with time and need. Indeed, homesteads of Khampti villages are playing a vital role conserving over a 44 numbers of wild edible plant species. As a whole homestead gardens of this tribe may be a potential landmass for household and community level food security and habitat for considerable number of edible plant species. The study also observed that the soil fertility management systems of Khampti homesteads were unique and managed through animal manure and organic residues, no chemical fertilizers and pesticides were reported to use so far. The study has given new interpretation about the importance of home gardens as community choice conservation of plant species and also no prior work on documentation has been carried out for edible plant species at community level in homesteads. Documentation of edible plant species of Khampti tribe could help for planning future research on biodiversity conservation in general and food security at community level. Authors are hopeful the work could contribute in future research planning for promotion of livelihood, adopt technology for production/ value addition skills depending upon demand and resource availability.

Conflict of interest: There is no room for conflict of interest among the authors.

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