

Wild edible plants sold by the *Zeme Nagas* at the makeshift market of Mahur, Dima Hasao district of Assam

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Abstract

The Mahur town of Dima Hasao district of Assam is located between 25.18011° N latitude and 93.11604° E longitude and at the elevation of 565 m amsl.

The present paper is the output of an investigational survey undertaken during the year 2010 and provides a comprehensive account of 83 species of edible plants sold by the *Zeme Nagas* in the makeshift markets of Mahur town of the district. The botanical name, vernacular name(s), parts used/ mode of use and also their local market values has been enumerated.

Study reveals that out of the total 83 recorded species; 29 are eaten as cooked vegetables (leafy vegetables and tubers), 21 are eaten cooked fruits, seeds and inflorescences, 8 are eaten cooked wild edible mushrooms, 7 are spices and condiments and 18 are fruits and seeds eaten raw.

The total recorded 83 species those belong to 69 genera and 49 families and can be grouped into fungi (8 spp.), pteridophyte (1 sp.), gymnosperm (1 sp.), monocotyledons (16 spp.) and dicotyledons (57 spp.).

INTRODUCTION

The present paper is the output of an investigational survey work undertaken during the year 2010 with an aim to document of the wild edible plants and their products sold in the makeshift weekly markets on Tuesdays at Mahur town of Dima Hasao district of Assam by the *Zeme Nagas*.

Wild plants consumption by the hill dwelling ethnic groups is mainly for sustenance and also intrinsically linked to their traditional and cultural life. These are their major dietary supplement and sales in the local makeshift markets for additional income (Angami *et al* 2006).

Description on edible plants both cultivated and wild from the Isle of Java, Indonesia (Osche 1977); native food plants of Northeastern India (Arora 1990); wild edibles from Arunachal Pradesh (Kar 2004); Meghalaya (Kayang 2007); Assam (Barua *et al* 2007); Tripura (Majumdar & Dutta 2009); Ukhrul district in Manipur (Salam *et al* 2010); Darjeeling hills (Sharma, 2012) and other published works of Bhujel *et al* 1984; Haridarsan *et al* 1990; Schultes 1992; Mahanta & Gogoi 1998; Sinha & Lakra 2005; Arora & Pandey 1996; Kala

2007, Medhi & Borthakur 2011; Medhi & Borthakur 2012b; Sarkar & Das 2012 etc. were considered as current literature for the study.

Publication works on edible plants sold at markets of Haflong (Medhi & Borthakur 2012a); Karbi Anglong (Kar & Borthakur 2007); Assam (Borthakur 1996) and Lall market of Gangtok (Hajra & Chakraborty 1981) are also important references in this aspect of present study.

The Zeme Nagas

The *Zeme Nagas* commonly known as *Zemes*, belong to *Tibeto-Burmese* racial stock. The *Zemes* of Dima Hasao district follow the patrilineal system of family structure. They have six clans viz. *Npame*, *Nkuame*, *Heneume*, *Nriame*, *Sogame* and *Panme*.

The *Zeme* villages are mainly located on the breezy hill tops and the village council headman is called *Matai*. In each village there is the boys' and girls' dormitory (*Morung*) called *Hangseuki* and *Leoseuki* respectively. The *Morung* life makes them self reliant, disciplined and also instills in them a sense of service to corporate body.

The most important community festivals celebrated are *Heleibambe*- celebrated prior to the starting of *Jhum* cultivation sometime in mid April for appeasement of *Suhprai*, the God of crops and the other is *Siame*-the harvesting festival celebrated by holding of grand feasts.

The *Jhum* cultivation, collection of forest products and weaving in loom with cotton yarns spun are the main occupation of the *Zemes* (Lalsim 2005).

As per the population census 2001, total population of the *Zemes* in the Dima Hasao district is 11,469 which occupy 6.16% of total population of the district. In terms of population *Zemes* are the second largest ethnic group in the district (Anonymous 2005).

MATERIALS AND METHODS

The Mahur town of Dima Hasao district of Assam is located between 25.18011°N latitude and 93.11604° E longitude and at the elevation of 565 m above msl and about 35 km away towards east of district head quarter town Haflong. Asalu, Tungje, Laisong, Hajuichok, Thingje, Leike, Hangrum and Songkai, etc are the *Zeme* inhabited localities directly communicates to Mahur town.

During the market survey the edible plants/plant parts collected and vernacular name(s), used plant parts, method of preparation and makeshift market rate of the plant resources were recorded and verified carefully from vegetable vendors of market and also by the assistance of local informants.

Collected plants were made into herbarium following standard techniques (Jain & Rao 1977) and later identified with the help of local floras and other available references. The voucher specimens on which this study is based were deposited in the Herbarium of Department of Botany, Gauhati University (GUBH) for future reference.

RESULTS AND DISCUSSION

During the present investigational study a total of 83 species were recorded and the findings can be broadly categorized as into the following:

A. Eaten cooked: leafy vegetables and tubers 29 species (Table 1.a); fruits, seeds and inflorescences 21 species (Table 1.b); wild edible Mushrooms 8 species (Table 1.c) and spices and condiments 7 species (Table 2).

B. Eaten uncooked or raw: fruits and seeds of 18 species (Table 3).**Wild edible plants sold at makeshift markets of Mahur town:****A. Eaten cooked:****Table: 1.a:** Leafy vegetables and Tubers

Botanical name [Family]; Exsiccatae	Zeme name	Parts used/Mode of use	Price in local market
<i>Amaranthus viridis</i> Linnaeus [Amaranthaceae]; PM – 862	<i>Inhmuntiek</i>	Young shoot - Vegetable	Rs.5/ bundle of ± 250 g
<i>Amorphophallus bulbifera</i> (Roxburgh) Blume [Araceae]; PM – 863	<i>Kebei</i>	Tuber-Vegetable	Rs.10/ kg
<i>Aralia armata</i> (Wallich) Seemann <i>ex</i> Kurz [Araliaceae]; PM – 864	<i>Ture/ Saifok</i>	Young shoot - Vegetable	Rs.5/ bundle of ±5 shoots
<i>Bambusa balcooa</i> Roxburgh [Poaceae]; PM – 868	<i>Hepai/Pum</i>	Shoot-Vegetable/ fermented <i>chutney</i>	Rs.10-15/ kg
<i>Begonia palmate</i> D. Don [Begoniaceae]; PM – 895	<i>Mping</i>	Leaf/ Shoot-Vegetable	Rs.5/ bundle of ±10 shoots
* <i>B. roxburghii</i> De Candole [Begoniaceae]; PM-865	<i>Mping</i>	i. Leaf/ Shoot-Vegetable ii. Juice antidiysenteric	Rs.5/ bundle of ± 10 shoots
<i>Blumea lacera</i> De Candole [Asteraceae]; PM-875	<i>Peau</i>	Leaf-Vegetable (mostly preferred with Brinjal)	Rs.5/ bundle of ± 10 shoots
<i>Calamus rotang</i> Linnaeus [Arecaceae]; PM-883	<i>Heart</i>	Soft pith-Vegetable/ <i>Chutney</i>	Rs.20 /stick of 100-120 cm
<i>Centella asiatica</i> (Linnaeus) Urban [Apiaceae]; PM-884	<i>Krimbua</i>	Entire plant/Leaf-Vegetable/ <i>Chutney</i>	Rs.5/ bundle of ± 150 g
<i>Chenopodium album</i> Linnaeus [Chenopodiaceae]; PM-866	<i>Geteuheu</i>	Entire plant/Leaf-Vegetable/ <i>Chutney</i>	Rs.5/ bundle of ± 150 g
<i>Chonemorpha macrophylla</i> G. Don [Apocynaceae]; PM-911	<i>Peau krimbua</i>	Leaf-Vegetable	Rs.5/ bundle of ± 250 g
* <i>Clerodendrum colebrookianum</i> Walpers [Verbenaceae]; PM-896	<i>Mpingbua</i>	i. Leaf-Vegetable ii. hypertension medicine	Rs.5/ bundle of ± 250 g
<i>Crassocephalum crepidioides</i> (Benthum) Moore [Asteraceae]; PM-867	<i>Impingi</i>	Leaf-Vegetable	Rs.5/ bundle of ± 250 g
<i>Diplazium esculentum</i> (Retzius) Swartz [Polypodiaceae]; PM-912	<i>Nchubua</i>	Leaf-Vegetable	Rs.5/ bundle of ± 500 g
<i>Dysoxylum gobara</i> (Buchanan-Hamilton) Merrill [Meliaceae]; PM-919	<i>M'bukbua</i>	Young shoot with inflorescences as vegetable	Rs. 10/ bundle of ± 500 g

Botanical name [Family]; Exsiccatae	Zeme name	Parts used/Mode of use	Price in local market
<i>Eurrya acuminata</i> De Candolle [Theaceae]; PM-920	Misimbua	Leaf cooked with Pork meat	Rs.5/ bundle of \pm 500 g
<i>Gnetum gnemon</i> Linnaeus [Gnetaceae]; PM-869	Keigi	Leaf-Vegetable	Rs.5/ bundle of \pm 500 g
* <i>Homalomena aromatica</i> Schott [Araceae]; PM-870	Kebeib	i. Leaf sheath-vegetable ii. Consumes boiled stock after childbirth	Rs.10/ 500 g
<i>Lasia spinosa</i> Linnaeus [Araceae]; PM-871	Kebeibua /Nchew	Young shoot-Vegetable	Rs.5/ bundle of \pm 400 g
<i>Melocanna buccifera</i> (Roxburgh) Kurz [Poaceae]; PM-928	Kaucheu	i. Shoot-Vegetable ii. fermented Chutney	Rs.10-15/ kg
* <i>Paederia foetida</i> Linnaeus [Rubiaceae]; PM-929	Hebeheu-Nria	i. Leaf-Vegetable ii. Used to cure gastritis	Rs.5/ bundle of \pm 500 g
<i>Persicaria perfoliata</i> (Linnaeus) H. Gross [Polygonaceae]; PM-913	Heganturia	Leaf -Vegetable	Rs.5/ bundle of \pm 300 g
<i>Portulaca oleracea</i> Linnaeus [Portulacaceae]; PM-931	Krimbua	Young shoot-Vegetable	Rs.5/ bundle of \pm 300 g
<i>Rhynchosyche ellipticum</i> (Wallich ex Dietrich) A. de Candolle [Gesneraceae]; PM-933	Endroigi	Leaf-Vegetable	Rs.5/ bundle of \pm 10 shoots
<i>Sarchochlamys pulcherrima</i> (Roxburgh) Gaudichaud [Urticaceae]; PM-872	Endaugi	Young leaf-Vegetable preferred with Banana inflorescence	Rs.5/ bundle of \pm 300 g
<i>Smilax china</i> Linnaeus [Smilacaceae]; PM-930	Reucheu	Tuber-Vegetable & boiled stock as revitalizer	Rs. 20/ kg
<i>Solanum spirale</i> Roxburgh [Solanaceae]; PM-932	Nkabua	Young shoot-Vegetable	Rs.5/ bundle of \pm 350 g
<i>Spilanthes acmella</i> var. <i>oleracea</i> (Linnaeus) Hooker f. [Asteraceae]; PM-885	Klungbua	i. Leaf-Vegetable ii. Inflorescences used against toothache	Rs.5/ bundle of \pm 500 g
<i>Spilanthes acmella paniculata</i> Wallich [Asteraceae]; PM-910	Klungbua	i. Leaf-Vegetable ii. Inflorescences used against toothache	Rs.5/ bundle of \pm 500 g



PLATE - I: A., B. & C. Zeme women selling Wild edibles at Mahur; D. *Diospyros lanceaeifolia*; E. *Plectocomia assamica*; F. *Willoughbeia edulis*; G. *Dysoxylum gobara*; H. *Eurya acuminata*; I. *Blumea lacera*; J. *Aralia armata*; K. *Rhynchotechum ellipticum*; L. *Travesia palmata*; M. *Toddalia asiatica*; N. *Alpinia nigra*; O. *Persicaria posumbu*

Table 1.b: Fruits, seeds and inflorescences

Botanical name [Family]; Exsiccatae	Zeme name	Parts used/Mode of use	Local market rate
<i>Acacia farnesiana</i> (Linnaeus) Willdenow [Mimosaceae]; PM-873	<i>Nkampi-chibe</i>	i. Fruit-Vegetable ii. Dry fish <i>Chutney</i>	Rs.10/ bundle of 10 fruits
<i>Acacia pinnata</i> (Linnaeus) Willdenow [Mimosaceae]; PM-921	<i>Tingchi-heu</i>	i. Young shoot/Tender pods-Vegetable ii. Dry fish <i>Chutney</i>	Rs.5/ bundle of ± 250 g
<i>Canavalia ensiformis</i> De Candolle [Fabaceae]; PM- 908 & 909	<i>Kangianeteu pi</i>	Tender pods /Seeds-Vegetable	Rs.10/ four fruits
<i>Canavalia gladiata</i> (Jacquin) De Candolle [Fabaceae]; PM- 914	<i>Namtaipee</i>	Tender pods /Seeds-Vegetable	Rs.10/ five fruits
** <i>Cyphomandra betacea</i> (Cavanilles) Sendtner [Solanaceae]; PM-897	<i>Pebang tigi chi</i>	Fruit-Vegetable	Rs.10/ five fruits
** <i>Dillenia indica</i> Linnaeus [Dilleniaceae]; PM-886	<i>Thaudi chi</i>	Fruit-Vegetable	Rs.5/ two fruits
* <i>Garcinia pedunculata</i> Roxburgh [Clusiaceae/Guttiferaceae]; PM-874	<i>Ngai-chi</i>	i. Dry sliced Fruit-Curry ii. Boiled stock used to cure loose motion	Rs.5/ one fruit
** <i>Hodgesonia macrocarpa</i> (Blume) Cogniaux [Cucurbitaceae]; PM-934	<i>Nsui chi</i>	Seeds/Endosperm	Rs.5/ five seeds
<i>Lycopersicon pimpinellifolium</i> Miller [Solanaceae]; PM-922	<i>Tekit chi</i>	i. Fruit-Vegetable ii. <i>Salad/Chutney</i> with dry fish	Rs.25/ kg
<i>Momordica charantia</i> var. <i>muricata</i> (Willdenow) Chakravarty [Cucurbitaceae]; PM-907	<i>Kagai chi</i>	Young Fruit-Vegetable	Rs. 5/250 g
* <i>Musa bulbisiana</i> Colla [Musaceae]; PM-915	<i>Numpui chi</i>	i. Tender fruits-Vegetable ii. Ripe Fruit eaten raw	Rs.10/ dozen fruits
** <i>Musa sp.</i> [Musaceae]; PM-935	<i>Numpui chi</i>	Young Fruit/soft pith-Vegetable	Rs.10/ four fruits
<i>Musa sp.</i> [Musaceae]; PM-936	<i>Gumjui</i>	Inflorescence (Thin-long green)-Vegetable	Rs. 10/ two Inflorescences
<i>Musa velutina</i> Wendelbo [Musaceae]; PM-937	<i>Gumjui</i>	Inflorescence (Small-short purple)-Vegetable	Rs. 10/ three Inflorescences
<i>Oroxylum indicum</i> (Linnaeus) Benthum ex Kurz [Bignoniaceae]; PM-923	<i>Baklong chi</i>	Fleshy corolla-vegetable	Rs.5/ five fleshy corollas
<i>Parkia roxburghii</i> G. Don [Mimosaceae]; PM-945	<i>Nkampi</i>	Young Pod/Seeds-Vegetable	Rs.10/ four fruits
** <i>Passiflora edulis</i> Sim.f. <i>flavicarpa</i> A. Degen [Passifloraceae]; PM- 887	<i>Karora chi</i>	Young Shoot-vegetable, Fruit-Eaten raw	Rs.2/ one fruit
<i>Phlogacanthus curviflorus</i> Nees [Acanthaceae]; PM-906	<i>Geurim-heu</i>	Dry/fresh Inflorescence-Vegetable	Rs.5/ ten inflorescences

Botanical name [Family]; Exsiccatae	Zeme name	Parts used/Mode of use	Local market rate
<i>Phlogacanthus tubiflorus</i> Nees [Acanthaceae]; <i>PM-916</i>	<i>Geurim-heu</i>	Dry/fresh inflorescence; Vegetable	Rs.5/ ten inflorescences
<i>Solanum indicum</i> Linnaeus [Solanaceae]; <i>PM-876</i>	<i>Karinchi</i>	Fruits; vegetable	Rs.5/ unit of ± 200 g
<i>Travesia palmata</i> (Roxburgh) Visiani [Araliaceae]; <i>PM-898</i>	<i>Kotbel chi</i>	Inflorescence; vegetable	Rs.5/ unit of ± 300 g

Table 1.c: Wild edible Mushrooms

Botanical name [Family]; Exsiccatae	Zeme name	Parts used/Mode of use	Local market rate
<i>Auricularia polysticha</i> (Montagne) Saccardo [Auriculariaceae]; <i>PM-889</i>	<i>Pachei</i>	Cooked with dry fish	Rs.10/ 200 g
<i>Cantharellus</i> sp. [Cantharellaceae]; <i>PM-890</i>	<i>Thaikompa</i>	Cooked with dry fish	Rs.10/ 200 g
<i>Pleurotus citrinopileatus</i> (Persoon) Morgan [Pleurotaceae]; <i>PM-877</i>	<i>Nriepa</i>	Cooked with dry fish	Rs.10/ 200 g
<i>Pleurotus ostreatus</i> (Jacquin Fries) Kummer [Pleurotaceae]; <i>PM-888</i>	<i>Patak</i>	Cooked with dry fish	Rs.10/ 200 g
<i>Pleurotus pulmonarius</i> Fries [Pleurotaceae]; <i>PM-939</i>	<i>Pachei</i>	Cooked with dry fish	Rs.10/ 200 g
<i>Pleurotus squarrosulus</i> (Montagne) Singer [Pleurotaceae]; <i>PM-938</i>	<i>Nguiepa/Patak</i>	Cooked with dry fish	Rs.10/ 200 g
<i>Schizophyllum commune</i> Fries [Schizophyllaceae]; <i>PM-878</i>	<i>Tingchapa</i>	Cooked with dry fish	Rs.10/ 200 g
<i>Tricholoma imbricatum</i> (Fries & Fries) Kummer [Tricholomataceae]; <i>PM-940</i>	<i>Pane</i>	Cooked with dry fish	Rs.10/ 200 g

Table 2: Spices and condiments

Botanical name [Family]; Exsiccatae	Zeme name	Parts used/Mode of use	Local market rate
<i>Alpinia nigra</i> (Gaertner) Burnett [Zingiberaceae]; <i>PM-879 & 880</i>	<i>Aihre kebeb</i>	Pith/Inflorescence	Rs.5/ unit of ± 350 g
<i>Amomum maximum</i> Roxburgh [Zingiberaceae]; <i>PM-905</i>	<i>Aihre bua</i>	Fruits used as chutney	Rs.5/ five fruits
** <i>Houttyunia cordata</i> Thunberg [Saururaceae]; <i>PM-941</i>	<i>Majoukhom bua</i>	i. Leaf /creeping stem for flavouring curry ii. Eaten cooked to cure Dysentery	Rs.10/ bundle of ± 300 g
<i>Persicaria posumbu</i> (Buchanan-Hamilton ex D. Don) Nakai [Polygonaceae]; <i>PM-891</i>	<i>Singjo bua</i>	Leaf-Spice/ Chutney	Rs.5/ bundle of ± 500 g
<i>Rhus semialata</i> Murray [Anacardiaceae]; <i>PM-944</i>	<i>Kemeu</i>	Seeds eaten raw as Chutney	Rs.10/unit of 50 gm chutney
<i>Toddalia asiatica</i> (Linnaeus) Lamarck [Rutaceae]; <i>PM-899</i>	<i>Keizi</i>	Young fruits eaten raw as Chutney	Rs.10/ bundle of ± 500 g
<i>Zanthoxylum armatum</i> De Candolle [Rutaceae]; <i>PM-881</i>	<i>Nech chi</i>	Young shoot-Vegetable	Rs.5/ bundle of ± 350 g

(B). Eaten uncooked or raw:**Table 3:** Fruits and seeds

Botanical name & Family; Coll. no.	Zeme name	Parts used/Mode of use	Local market rate
<i>Aegle marmelos</i> (Linnaeus) Correll [Rutaceae]; PM-900	<i>Chilongpak chi</i>	Fruits	Rs.5/two fruits
<i>Baccaurea ramiflora</i> (Roxburgh) Muller Argoviensis [Euphorbiaceae]; PM-892	<i>Kauchi</i>	Fruits	Rs.10/ unit of \pm 30 fruits
<i>Castanopsis indica</i> (Roxburgh) de Candolle [Fagaceae]; PM-924	<i>Thingsa chi</i>	Fruits	Rs.5/ 250g
<i>Citrus hystrix</i> de Candolle [Rutaceae]; PM-943	<i>Satkorachi</i>	Pulp	Rs. 5/ two fruits
<i>Citrus sinensis</i> (Linnaeus) Osbeck [Rutaceae]; PM-904	<i>Gareu chi</i>	Fleshy bark & less juice edible	Rs. 5/ three fruits
<i>Diospyros lanceaefolia</i> Roxburgh [Ebenaceae]; PM-918	<i>Chauchi</i>	Fruits	Rs.10/ unit of 300 g fruits
* <i>Elaeagnus latifolia</i> Linnaeus [Elaeagnaceae]; PM-925	<i>Matau chi</i>	i. Fruits eaten raw; ii. Fruits Jelly prepared locally	Rs.10/ kg
<i>Phyllanthus emblica</i> Linnaeus [Euphorbiaceae]; PM-942	<i>Jauka chi</i>	Fruits	Rs.10/ kg
<i>Ficus glomerata</i> Roxburgh [Moraceae]; PM-927	<i>Dermi chi</i>	Fruits	Rs.5/ 15 fruits
<i>Flacourtia cataphracta</i> Roxburgh [Flacourtiaceae]; PM-882	<i>Jaukau chi</i>	Fruits	Rs.5/ 250 g
<i>Juglans regia</i> Linnaeus [Juglandaceae]; PM-926	<i>Juart chi</i>	Fruits	Rs.5/ unit of 200 g fruits
<i>Mangifera sylvatica</i> Roxburgh [Anacardiaceae]; PM-901	<i>Hnamba chi</i>	Fruits	Rs.10/ kg
<i>Plectocomia assamica</i> Griffith [Arecaceae]; PM-917	<i>Heart/Jui chi</i>	Fruits	Rs.5/ unit of \pm 20 fruits
<i>Prunus nepaulensis</i> (Seringe) Steudel [Rosaceae]; PM-902	<i>Ngau chi</i>	Ripe Fruits	Rs.10/ unit of 500 g
<i>Rubus rosaefolius</i> Smith [Rosaceae]; PM-946	<i>Mantum chi</i>	Fruits	Rs.5/ unit of 150 g
** <i>Spondias pinnata</i> (Linnaeus f.) Kurz [Anacardiaceae]; PM-894	<i>Njing-chi</i>	Fruits	Rs.5/ ten fruits
<i>Syzygium cumini</i> (Linnaeus) Skeels [Myrtaceae]; PM-903	<i>Mui-chi</i>	Fruits	Rs.10/ kg
<i>Willughbeia edulis</i> Roxburgh [Apocynaceae]; PM-893	<i>Hren chi</i>	Ripe Fruits	Rs.5/ five fruits

* =More than one parts/ having different modes of use e.g. Fruit & Veg.

**=Can be eaten both cooked & raw.

Out of the total recorded 83 species that belongs to 69 genera and 49 families and the numerical analysis of these species can be categorically shown as in the following Table-4.

Table 4: Species, Genus and Family analysis of different plant groups.

Plant groups	Species	Genus	Families
Fungi	8	5	5
Pteridophytes	1	1	1
Gymnosperms	1	1	1
Monocotyledons	16	13	7
Dicotyledons	57	49	35
Total:	83	69	49

The wild edibles have very good demand among the town dwellers of different ethnic groups due to their traditional life style and food habit (Medhi & Borthakur, 2012a). Again, to feed the increasing ethnic population inhabited in the hilly terrains of the district has resulted in the decrease of *Jhum* cycle for the demand of more food production which directly causing habitat destruction as well as depletion of flora and fauna at large scale.

In different localities of the district a numbers of community based wild edible plants garden can be a effective measure for conservation and sustainable management of wild edibles throughout the year for food security and income generation of the ethnic people (Medhi & Borthakur 2012a). It may also open up new vistas for earning by selling of such plants/plant products as these are totally organic edibles.

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