



A checklist of traditional edible bio-resources from Ima markets of Imphal Valley, Manipur, India

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Abstract: A study was conducted at seven important markets of Imphal Valley, Manipur in northeastern India, which are run exclusively by women and are popularly known as “the Ima markets”. The two year study was to find out the important edible bio-resources which are consumed daily by the local people of Manipur. Regular surveys were conducted at the selected markets at least three times a month. A total of 45 wild edible plants and 26 wild fruits were identified during the survey. Also, 25 edible animal resources were recorded. It is suggested that the high diversity of wild edible bio-resources needs to be conserved for livelihood sustenance of the local communities.

Keywords: Bio-resource, edible, Ima Market, Imphal Valley, livelihood, Manipur.

Manipur forms a distinctive part of Indo-Burma inhabited by various ethnic groups and communities possessing varied cultures and traditions (Singh et al. 1996). It lies in the extreme east of India bordering Myanmar within 23°47'-25°41'N & 93°61'E-94°48'E (Singh et al. 1996). The terrain of the state is predominantly hilly (92%), except for a broad alluvial valley, called the

Imphal Valley, which extends north-south in the middle for over 1795km² (Singh et al. 1996). The Imphal Valley forms only 8.25% of the total area of Manipur while the remaining 91.75% is hills (Singh 2006). Although the valley constitutes only a small part of the geographical area, two-thirds of Manipur's 1.8 million people live in the Imphal Valley (Roy 1992).

The state falls in the Indo-Burma global biodiversity hotspot (Myers et al. 2000; Mittermeier et al. 2004). Its rich bio-resources have acted as the life source of different indigenous communities living in harmony within the area for centuries. The dominant indigenous communities of Manipur include the Meitei, Naga, Kuki and other small communities like Manipuri Muslim and Nepali people (Elangbam 2002). Most of these people depend directly or indirectly on wild bio-resources for their livelihood. The local people collect different edible wild bio-resources from the nearby hills and plains for their own food and also to sell them in the markets. One important feature of Manipur is that women play a very important role in the society both socially and economically. It is worth mentioning that most of the markets in the Imphal valley are run and controlled by women, these are popularly known as the Ima Market or Mother's Market. Ima means mother in the local language of Manipur. The main Ima Market is located at Khwairamban Bazaar in the heart of the city where more than 3000 women from different communities congregate everyday to sell local vegetables, fish, grain, handlooms, handicrafts and other household items. The uniqueness of Ima market is that it is exclusively for women and one will not find a single man doing business in the market or its vicinity. Ima (Mother), Ine (Aunt) and Iche (Sister) from various communities run the marketplace to support their families.

Through this study an attempt has been made to list the important edible bio-resources sold and consumed by the local people of the state so as to identify the rare and endemic bio-resources for their future conservation.

Study area: The present study was conducted at seven important Ima markets of Imphal valley run. The market places are Khwairamban Bazaar, Singjamei Bazaar, Kwakeithel Bazaar, Tera Bazaar situated at

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Imphal West District; Khurai Lamlong Bazaar, Kongba Bazaar and Chingmeirong Bazaar situated at Imphal East District. The market places are locally called "Bazaars" in Manipur. The Khwairamban Bazaar is the biggest market of Imphal situated in the heart of the city where more than 3000 women vendors sell vegetables, fruits, fishes and daily household items under rows of small markets built together. The Singjamei Bazaar is the second largest bazaar run by nearly 1000 women vendors. The other five bazaars are smaller in size, run by about 500 women each. There is no fixed size of the markets and the number of women vendors also fluctuates daily. Sometimes new women vendors do not get a permanent place inside the market place so they sell their items on the roadsides thus expanding the markets. At other times permanent vendors come out to the roadside as some people buy things in a hurry and do not want to bother roaming inside the markets. Women of different communities of the state run the markets everyday from early morning around 0500hr up to 1900hr under normal circumstances. The markets are run very systematically, all the items are sold separately and there is no mix of things reducing the confusion of the buyers and also reducing congestion. The frequent bandhs and general strikes called by different organizations in the state greatly affect the economy as well as the livelihood of these thousands of women from far flung areas of the state.

Methods: The methods employed in this study were so designed to collect information on the wild plants and animal bio-resources which are consumed daily by the local people of Manipur. Literatures were thoroughly searched for references on the subject and field data was collected for a period of two years from January 2007 to December 2008. Markets were surveyed and extensive interviews of women vendors were taken with regard to availability of wild bio-resources, following Jain (1989, 1990) and Martin (1995).

Regular surveys were conducted at the seven selected markets at least two times a month. Surveys were conducted at the peak marketing hours between 0700-1000 hr and 0300-1900 hr. At least 1-2 hours was spent in each market during the data collection. A total of 48 days and 144 hours were spent in each market place during the two years field surveys. A minimum of 100 women vendors in each market were interviewed regarding the local name of the bio-resource, their use, source, price and place from where they brought the items. All the edible wild plants, fruits and animal products were collected and identified with the help of specialists and relevant published papers and books such as Singh & Arora (1978), Sukla et al. (1982), Jhingran et al. (1991), Jain (1999), Elangbam (2002), Singh (2002), Khanna (2003), and Vishwanath & Geetakumari (2009). The bio-resources were categorized crudely as common or rare as per their availability and encounter rates in the market places.

Results: A total of 45 wild edible plants including two mushroom and two edible fungus varieties were identified during the surveys. The study also records 26 wild fruits and 25 edible animal bio-resources including two eel varieties, three gastropod varieties, one bivalve variety, one crustacean variety and 18 local fresh water fish varieties.

Out of the 45 edible plants, 37 are common species and eight are rare species. All the plants are seasonal i. e. 35.5% are summer species, 55.5% are winter species and 8.9% are found throughout the year. Some Rare plants are scarcely available and as a result their price is also high. For example *Pleurotus ostreatus*, a mushroom variety locally called "Uyen" costs Rs. 60-80/kg because of its high demand and high nutritive value. Some plant species are abundantly available so they are cheaper. For example *Oenunthe javanica*, a local herb variety found in open fields and wetlands called locally "Komprek", costs only Rs. 10-20/kg.

The study also records 26 local wild fruit varieties, of which 19 are Common and seven are rare varieties. 53.8% of these are summer varieties, 38.5% are winter varieties and 7.7% are year round varieties.

Of the total 25 edible animal bio-resources, 17 are common species and eight are rare species. These includes two freshwater eel species *Monopterus albus* and *Anguilla bengalensis*, three gastropod species *Pila globossa*, *Pila* spp. and *Turittella* spp., one fresh water mussel species *Anodonta anatina*, one freshwater crustacean species *Macrobrachium dayanum* and 18 fresh water fish species. Out of the total species 16% are found in summer, 52% are found in winter and 32% are found throughout the year.

Of the 100 women vendors interviewed in each market, 42.4% of the respondents said that they had collected the bio-resources themselves and 57.6% revealed that they had collected the resources from one or two local distributors.

The lists of all bio-resources are given below in the Tables 1, 2 and 3.

Discussion: From time immemorial, the indigenous local inhabitants of Manipur have had a wide knowledge about the uses of traditional bio-resources, either as food or medicine in their day-to-day life (Khumbongmayum et. al. 2004). In this study, a total of 45 wild edible plants, 26 wild fruit varieties and 25 edible animal bio-resources were recorded, all of which form an important part in the diet of the local Manipuri people. The local peoples mainly the women of different castes and communities went to far-flung areas and into the forests to collect these edible bio-resources for their own food and to sell them in the local markets as a source of income for themselves. Some wild edible plants are rich in nutrient content, and may even be superior to cultivated ones in this respect (Sundriyal & Sundriyal 2001a). A varied diet of wild edible plants may also increase one's sense of food palatability,

Table 1. Edible wild local plants found in the markets of Imphal Valley

	Family	Scientific name	Local name	Season	Status	Average price (Rs)	Source
1	Polygonaceae	<i>Polygonium barbatum</i> Linn.	Yelang	W	C	20-25/Kg	Open fields
2	Plumbaginaceae	<i>Phumbago zeylanica</i> Linn.	Kengoi	W	C	15-20/Kg	Open fields
3	Zingiberaceae	<i>Cucurma angustifolia</i> Roxb.	Yaipal	W	C	30-40/Kg	Hill forests
4	Zingiberaceae	<i>Hedychium coronarium</i> Koenig.	Loklei	S	C	20-25/Kg	Forests, open fields
5	Zingiberaceae	<i>Alpinia nigra</i> (Gaertn) Burt.	Pullei	S	C	40-50/Kg	Forests, open fields
6	Poaceae	<i>Zizania latifolia</i> (Turez.Ex. Stapf)	Eshing Kambong	S	C	20-25/Kg	Wetlands
7	Apiaceae	<i>Oenanthe javanica</i> (Blume) DC.	Komprek	W	C	10-15/Kg	Marshes, open fields, wetlands
8	Comolvulaceae	<i>Ipomea aquatica</i> Forsk.	Kollamni	W	C	15-20/Kg	Wetlands
9	Araceae	<i>Alocasia cucullata</i> (L) Schott.	Singjupal	YR	C	10-20/Kg	Marshes, wetlands, open fields
10	Cyperaceae	<i>Cyperus esculentus</i> , L.	Kaothum	W	C	10-20/Kg	Paddyfields and open fields
11	Euphorbiaceae	<i>Antiderma diandrum</i> (Roxb.) Roth.	Ching Yensin	W	C	10-15/kg	Hills
12	Apiaceae	<i>Ceutella asiatica</i> (L.)	Peruk	W	C	20-30/Kg	Open fields
13	Trapaceae	<i>Trapa natans</i> L.	Heikak yeli	W	C	10-15/Kg	Lakes & wetlands
14	Nymphaeaceae	<i>Eurgale ferox</i> , Salisb.	Thanging	S	C	30-50/Kg	Wetlands, ponds etc
15	Nymphaeaceae	<i>Nelumbo nucifera</i> (Gaertn)	Thambou	W	C	20-30/Kg	Wetlands, ponds, lakes
16	Nymphaeaceae	<i>Nymphaea nouchali</i> Burm.f.	Tharo Mari	W	C	25-30/Kg	Wetlands, ponds, lakes
17	Alismataceae	<i>Sagittaria sagittifolia</i> Linn.	Koukha	W	C	40-50/Kg	Open fields
18	Cycadaceae	<i>Cycas pectinata</i> Grift.	Yendang	W	C	20-25/kg	Marshes, hills
19	Mimosaceae	<i>Neptunia oleraceae</i> Lous.	Ekai thibi	W	C	20-30/kg	Ponds, wetlands
20	Chenopodiaceae	<i>Chenopodium album</i> Linn.	Monsaobi	W	C	15-20/Kg	Marshes, openfields
21	Lamiaceae	<i>Meriandra bengalensis</i> Benth.	Kanghuman	S	C	10-15/Kg	Openfields
22	Paliionaceae	<i>Sesbania sesban</i> (Jacq.) W. Wight	Chuchurangmei	S	C	20-30/Kg	Open fields, hills
23	Vitaceae	<i>Cessins javana</i> Linn.	Kongouyen	S	C	20-25/Kg	Open fields
24	Moraceae	<i>Ficus palmate</i> Linn	Heiban	W	C	20-25/kg	Hills
25	Rubiaceae	<i>Vanguirea speniosa</i> Linn	Heibi mana	W	C	15-20/Kg	Hills, open fields
26	Caryophyllaceae	<i>Stelaria media</i> Linn.	Yerum keirum	W	C	20-25/Kg	Open fields
27	Amaranthaceae	<i>Amaranthus viridis</i> L.	Chengkruk	W	R	25-30/Kg	Hills
28	Graminaceae	<i>Ustilago consimilis</i> Sydow	Kambong	W	C	25-40/Kg	Wetlands
29	Polyporaceae	<i>Pleurotus ostreatus</i> (Jacquin ex. Fr) Kummer.	Uyen	S	R	60-80/Kg	Hills
30	Schizophyllaceae	<i>Schizophyllum commune</i> , Fr.	Kanglayan	S	R	25-50/Kg	Hills
31	Auriculariaceae	<i>Auricularia delicata</i> (Fr.) P.Henn.	Uchina	S	C	20-30/Kg	Hills
32	Agaricaceae	<i>Agaricus campestris</i> L.ex. Fr.	Chengum	W	C	50-60/Kg	Hills, river embankments.
33	Alismataceae	<i>Alisma plantago-aquatica</i> Linn.	Ishing Yempat	S	C	10- 15/Kg	Wetlands
34	Araceae	<i>Colocasia antiquorum</i> (L) Scott	Lam Pal	YR	C	!5-20/Kg	Marshes and open fields
35	Malvaceae	<i>Hibiscus cannabinus</i> Linn.	Shougree	YR	C	10- 20/Kg	Open fields
36	Malvaceae	<i>Hibiscus sabdariffa</i> Linn.	Shilhot Shougree	YR	C	10-25/Kg	Open fields
37	Saururaceae	<i>Houttuynia cordata</i> Thunb.	Tokning- khok	W	C	10-15/kg	Open fields
38	Lamiaceae	<i>Meriandra benghalensis</i> Benth.	Kanghoo- man	W	C	10- 20/Kg	Open fields
39	Compositae	<i>Enhydra flactuans</i> Lour.	Komprek Tujombi	W	R	20- 30/kg	Wetlands

	Family	Scientific name	Local name	Season	Status	Average price (Rs)	Source
40	Chenopodiaceae	<i>Chenopodium album</i> Linn	Monsaobi	S	C	20- 30/kg	Open fields
41	Saururaceae	<i>Houttuynia cordata</i> Thunb.	Tokningkok	S	C	10-20/kg	Open fields
42	Oxalidaceae	<i>Oxalis corniculata</i> Linn.	Yensil	S	R	20- 30/ kg	Open fields & hills.
43	Polygonaceae	<i>Rumex maritimus</i> Linn.	Torong Khongchak	W	R	30-40/kg	Hills
44	Polygonaceae	<i>Polygonum chinense</i> Linn	Angom Yensil	S	R	20- 30/kg	Hills
45	Polygonaceae	<i>Polygonum molle</i> D. Don.	Tharam	S	R	20-30/kg	hills

S - Summer; W - Winter; YR - Year round; C - Common; R - Rare.

Table 2. Edible wild local fruits found in the markets of Imphal Valley

	Family	Scientific name	Local name	Season	Status	Average price (Rs)	Source
1	Anacardiaceae	<i>Rhus hookerii</i> Sahni & Bahadur.	Heimang	W	R	40-50/kg	Hills, plains
2	Nymphaeaceae	<i>Nymphaea rubra</i> Roxb.	Lemphu	W	C	10-20/kg	Wetlands
3	Clusiaceae	<i>Garcinia pedunculata</i> Roxb.	Heibum	W	R	80-100/kg	Hills, plains
4	Rosaceae	<i>Prunus armeniaca</i> L.	Malhei	W	C	30-40/kg	Hills, plains
5	Moraceae	<i>Ficus cunia</i> , Buch. Ham. Ex. Roxb.	Heirit	S	C	50-70/kg	Hills
6	Myrtaceae	<i>Elaeagnus umbellate</i> Thunb.	Heiyai	S	C	30-50/kg	Hills, plains
7	Moraceae	<i>Morus nigra</i> Linn.	Heijampet	S	R	40-50/kg	Hills, plains
8	Myrtaceae	<i>Syzygium cumini</i> (L.) Skeels	Jam	S	C	10-20/kg	Hills, plains
9	Tiliaceae	<i>Microcos paniculata</i> Linn.	Heitup	W	C	30-50/kg	Hills
10	Rubiaceae	<i>Vanguirea spinosa</i> Hook.f.	Heibi	W	C	20-30/kg	Hills, plains
11	Moraceae	<i>Ficus glomerata</i> Roxb.	Heibung	YR	C	20-25/kg	Hills, plains
12	Elaeocarpaceae	<i>Elaeocarpus floribundus</i>	Chorphon	S	C	20-30/kg	Hills, plains
13	Rhamnaceae	<i>Ziziphus mauritiana</i> Lam.	Boroi	W	C	20-30/kg	Hills, plains
14	Moraceae	<i>Artocarpus heterophyllus</i> Lamk.	Theibong	W	C	15-30/pc	Hills, plains
15	Euphorbiaceae	<i>Phyllanthus emblica</i> (L.)	Heikru	S	C	10-30/kg	Hills, plains
16	Averrhoaceae	<i>Averrhoa carambola</i> Linn.	Heinjom	W	C	10-20/kg	Hills, plains
17	Caesalpiniaceae	<i>Tamarindus indica</i> L.	Mange	YR	C	10-20/kg	Hills, plains
18	Anacardiaceae	<i>Mangifera indica</i> Linn.	Heinou	S	C	40-60/kg	Open fields and hills
19	Rosaceae	<i>Prunus crasoides</i> D. Don.	Chumbrei	S	C	20-30/kg	Open fields & hills
20	Anacardiaceae	<i>Spondias mangifera</i> Willd.	Heining	S	C	20-25/kg	Open field & hills
21	Myristicaceae	<i>Horsfieldia amygdalnia</i> (Wall) Warb.	Nonganghei	S	R	20- 30/kg	Hills
22	Dilleniaceae	<i>Dillenia indica</i> Linn	Heigree	S	C	10- 20/kg	Foothills
23	Euphorbiaceae	<i>Baccaurea sapida</i> (Roxb) Muell.	Motok- hei	S	C	20-30/kg	Hills
24	Meliaceae	<i>Aphanomixis polystachya</i> (Wall) Parker.	Heirangkhoi	S	R	30-45/kg	Hills
25	Moraceae	<i>Artocarpus chaplasi</i> Roxb.	Heirukothong	S	R	20-40/kg	Hills
26	Flacourtiaceae	<i>Flacourtia jangomas</i> (Lour.) Raeusch.	Heitroi	S	R	30-40/kg	Hills

S - Summer; W - Winter; YR - Year round; C - Common; R - Rare.

Table 3. Edible animal resource found in the markets of Imphal Valley

	Family	Scientific name	Local name	Season	Status	Average price (Rs)	Source
I. Eel Varieties							
1	Synbranchidae	<i>Monopterus albus</i> (Zuiew)	Ngapurum	W	C	150-180/kg	Pond, river, wetlands
2	Anguillidae	<i>Anguilla bengalensis</i> (Gray)	Ngaril	W	R	150-250/Kg	River
II. Fresh Water Fish Varieties							
1	Cyprinidae	<i>Osteobrama belangeri</i> (Valenciennes)	Pengba	W	R	300- 500/kg	River, wetland
2	Cyprinidae	<i>Puntius sophore</i> (Hamilton)	Phabounga	YR	C	40-80/kg	Wetland, lake, river
3	Cobitidae	<i>Lepidocephalus guntea</i> (Hamilton-Buchanan)	Ngakijou	W	C	50-70/kg	River
4	Bagridae	<i>Mystus bleekeri</i> (Day)	Ngarep	W	R	40-60/kg	River
5	Siluridae	<i>Ompok bimaculatus</i> (Bloch)	Ngaten	W	R	80-100/kg	River
6	Schilbeidae	<i>Eutropiichthys vacha</i> (Hamilton)	Ngahei	S	R	250- 350/kg	Wetland, river
7	Clariidae	<i>Clarias batrachus</i> (Linnaeus)	Ngakra	W	C	100-150/kg	Wetland, lakes
8	Heteropneustidae	<i>Heteropneustes fossilis</i> (Bloch)	Ngachik	YR	C	60-100/kg	Wetland, lakes
9	Belonidae	<i>Xenentodon cancila</i> (Hamilton)	Nga Cheklaobi	S	R	50-80/kg	Wetland
10	Ambassidae	<i>Chanda nama</i> (Hamilton)	Nagmhai	YR	C	30-40/kg	River, wetland
11	Channidae	<i>Channa orientalis</i> (Bloch & Schneider)	Meitei Ngamu	W	C	90-120/kg	River, wetland
12	Osphronemidae	<i>Colisa labiosus</i> (Day)	Pheteen	S	C	50-100/kg	Wetland, river, streams
13	Cyprinidae	<i>Colisa fasciatus</i> (Bloch & Schneider)	Ngapema	YR	C	40-80/kg	Wetland, river
14	Anabantidae	<i>Anabas testudineus</i> (Bloch)	Ukabi	YR	C	80-100/kg	Wetland, river
15	Bagridae	<i>Mystus</i> spp.	Ngachep	S	C	40-50/kg	River
16	Channidae	<i>Channa punctatus</i> (Bloch)	Ngamu	YR	C	50-80/kg	River, ponds, wetlands
17	Channidae	<i>Channa striatus</i> (Bloch)	Porom	YR	C	150-200/kg	Wetlands
18	Siluridae	<i>Wallago attu</i> (Bloch & Schneider)	Sareng	W	R	200-300/kg	River
III. Fresh Water Prawn Variety							
1	Palaemonidae	<i>Macrobrachium dayanum</i> . (Henderson)	Khajing	YR	C	50-100/kg	River, lakes
IV. Fresh Water Mussel Variety							
1	Unionidae	<i>Anodonta anatina</i> (Linnaeus)	Kongreng	W	C	40-50/kg	River
V. Fresh Water Gastropod Varieties							
1	Pilidae	<i>Pila globosa</i> (Swainson)	Labuk tharoi	W	C	10-15/kg	Pond, river, paddy fields
2	Pilidae	<i>Pila</i> spp.	Tharoi ningrabi	W	C	5-10/kg	River, wetlands
3	Turritellidae	<i>Turittella</i> spp.	Laitharoi	W	R	20-30/kg	River

S - Summer; W - Winter; YR - Year round; C - Common; R - Rare.

which in turn may lead to an increase in food intake (Sharpe 1987; Ogle 1990). Due to its high nutritive value, people throng to the markets everyday to buy these bio-resources for their consumption.

Some of the wild plants and fish varieties are not only used as food items but they are also related to traditional ceremonies. Some wild plant species such as *Mangifera*

indica Linn., *Ficus glomerata* Roxb., *Tamarindus indica* Linn., *Baccaurea sapida* Roxb., and *Artocarpus heterophyllus* Lamk are connected with traditional bio-folklore and ceremonies and thus regarded as sacred species (Singh et al. 1996; Khumbongmayum et. al. 2004). Not only plants, some fish varieties also have traditional values and thus are in high demand and very

costly. For example *Eutropiichthys vacha* locally called “Ngahei” is associated with the “Chaumba” ceremony, which is the first rice eating ceremony of a child. It is believed that feeding “Ngahei Curry” to the child will increase his or her knowledge and wisdom. It costs around Rs. 250-350 /kg but it can go up to Rs. 500-700 / kg in off-season. Similarly, *Osteobrama belanger* locally called “Pengba” is associated with the “Ningol Chakouba” Festival, celebrated to strengthen the bonds of love between brothers and sisters. Due to its high nutritive value and high demand it costs around Rs. 300-500 /kg. But these fish species have become so scarce that they are hardly available in the market nowadays.

Due to rapid destruction of forests and the filling up of wetlands for expansion of land area and developmental activities, most of these wild bio-resources are becoming rare and threatened. It is expected that an ever growing population will eventually lead to a greater demand for food and other necessities. As a result the existing biotic pressures may be increased several times in the near future (Sundriyal et al. 2004).

Therefore, it is important to identify the rare edible bio-resources which are the livelihood of many indigenous Manipuri people so that proper conservative measures may be taken to preserve these local gene pools for our future generations.

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