EDIBLE BIO-RESOURCES & LIVELIHOODS

Dr. Puspa Komor
Dr. Oinam Sunanda Devi

Assam State Biodiversity Board

When the last Tree cut down,
The last Fish eaten,
And the last Stream poisoned,
you will realize that you cannot eat money.

–An old native American saying

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Published by:
Assam State Biodiversity Board
2nd Floor, Aranya Bhawan
Panjabari, Guwahati -781037

Photographs:
All photographs by authors except few which are duly credited in the photo plates

Design & Layout:

Printing & Binding:

Price: ₹ 450

ISBN: 978-81-932243-1-1

Smt. Pramila Rani Brahma,
Minister, Environment & Forests,
Soil Conservation,
Welfare of Plain Tribes and
Backward Class, Mines and Minerals-
Assam

सत्यमेव जयते

MESSAGE

I am indeed very happy that Assam State Biodiversity Board is making constant endeavours to document the richness of biological diversity and associated traditional uses in Assam.

The understanding of peoples' associations of with their local biological resources for livelihoods is the first step in planning for sustainable management of these resources. This book, therefore, is a welcome step for enhancing our understanding of biological resources on one hand and securing traditional knowledge of people on the other.

I congratulate the authors of this book 'Edible Bio-Resources and Livelihoods' and hope that the Board will continue with such works.

27/6/16

(Pramila Rani Brahma)

Shri V. K. Pipersenia, IAS
Chief Secretary
to the Government of Assam &
Chairman-
Assam State Biodiversity Board

सत्यमेव जयते

MESSAGE

In our country, there have been strong traditional knowledge systems for curing common ailments through locally available plants. Specially in villages the routine food used to be a prophylactic mix of locally available herbs and shrubs. Thus, people in rural areas had healthier lives than their urban counterparts. Assam which is a biodiversity hotspot with predominance of indigenous population presents an ideal canvas for understanding this innate relationship of local people with their surrounding floral and faunal diversity.

The present study throws light on some of the common edible species that are generally collected from wild and provide sustenance to local rural population in select districts of Assam. The Book also provides information on nutritive and medicinal values of some such edible species.

I hope the book will be useful to common people and encourage them to look towards these wild bio-resources with the much deserved respect.

(V. K. Pipersenia)

Sri A. K. Johari, IFS
Addl. PCCF
(Biodiversity & Climate Change)
Member Secretary- Assam State Biodiversity Board

FOREWORD

Sometimes I wonder what Mr. Tarzan or Master Mogli ate the whole day in jungles. I also wonder how an urban citizen would fend for herself or himself if left in the deep forests for a week with no packed food or chocolates. In such situations, a little knowledge of unconventional edible plants may come very handy.

Of the millions of plant species that exist on Earth, we depend on very few for our nutritional needs. In fact, 90% of food requirements are met by less than 10 species. What if these 10 species were taken away !!

People in the past had knowledge of their surrounding wealth, the plants and animals and knew how to live with them in a mutually beneficial way. With urbanization and changing food habits and ever increasing demands for a few select species the whole situation has changed. We are not only losing diversity of plants and animals but also the associated traditional knowledge. This, for me is the bigger threat then climate change scare.

The present study is a small endeavour to enhance our understanding of some non-conventional edible bio-resources used by the tribal and rural populations in select parts of Assam. The information on their occurrence, nutritional value, medicinal properties would help us appreciate the beauty of

Nature's Menu Card- providing not just the variety but also security against eventualities, such as species loss.

I hope the contents of this book will be useful for the readers.

(A. K. Johari)

ACKNOWLEDGEMENTS

At the outset, we would like to thank the former Chairman of the Assam Biodiversity Board, Sri Subhash Ch. Das, IAS, (*Retd.*) Addl. Chief Secretary-Assam and the present Chairman Sri V. K. Pipersenia, IAS, Chief Secretary, Assam for encouraging us to undertake this study.

We would like to extend our most sincere thanks to Sri A. K. Johari, IFS, Addl. Principal Chief Conservator of Forests and Member Secretary, Assam State Biodiversity Board for his continued support, encouragement and guidance throughout the course of this project.

Our gratitude to the Members of the Board for their technical inputs in this work. We extend our sincere thanks to the technical support team of the Assam State Biodiversity Board, specially Ms. Debolina Dey, Technical Assistant and Dr. Mazedul Islam, Technical Associate, for their help during editing and finalization of the book.

We would like to record our sincere thanks to Dr. Jayasree Borah, Associate Professor of the Department of Geography, Cotton College, whose guidance and support carried us through this study.

This work owes a lot to all the respondents with whom, we had the privilege to interact and whose vast knowledge and experiences have taught us many lessons, which no amount of reading could have ever taught. We thank them all. Our special thanks to Sri Pronabjyoti Baruah and Prasanta Kr. Bordoloi who has helped us in numerous ways during the conduct of field work of this research. We offer our gratitude to the officers and staffs of various institutions for providing us necessary data for this work.

On a personal note, we are deeply indebted to our parents and in-laws, family members for standing by us during this study. Lastly, and most profoundly, we wish to thank Mr. Smarajit Ojha, Assistant Professor, Department of Geography, Nagaon Girls College, for his continued support and encouragement throughout this venture

Dr. (Mrs.) Puspa Komor
Dr. Oinam Sunanda Devi

PREFACE

With the crack of the dawn, the rural landscape in the hills and plains of Assam bustles with life. With a soul of her own, the nature wakes up the farmer by providing the young stem of the bamboo as a means to brush his teeth, the wild yam in his backyard as his breakfast, ferns as a dish for the lunch and the lotus stems and fish secures for the dinner. In a rural landscape, bioresources forms an integral part of the day to day chores which may be directly or indirectly related to its natural environs. Irrespective of the social status, the wild edible bioresources forms an essential requirement in the rural society. And collecting, gathering and selling of these bioresources in the nearby market forms an important means of securing their livelihood. Dependency on such wild resources is a common phenomenon in the hills and plains of central Assam. These rural areas homes the knowledge base of traditional uses of the various edible bioresources found here.

The term 'Bioresources' refers to the total biological variation manifested as individual plants, animals or their genes, which could be taken by man for use as drugs, food, livestock feed, construction material for shelter, environmental protection, etc. Nature has provided man numerous possibilities and the degree of association of man with the same have evolved to the present complex relationship. This association of man with the bioresources reaffirms their importance in matters relating to the uses, practices, knowhow, beliefs and values within the cultural and natural landscape that evolves over time.

Different communities have their own culture, traditions and food habits. These food habits are again intrinsically linked with the changing seasons. Each season is marked by different festivals which calls for some specific traditional food preparation, viz, during celebration of Rongali Bihu festival in Assam, the Assamese community, prepares a dish made from 101 different green leafy wild or semi-wild edible plant species. Likewise, similar traditional use of food items are prevalent among the different communities of the region, for example, bamboos are used as a cooking vessel as well as storing water by the Karbi and Dimasa community while bamboo shoot is pickled and consumed by the Mishing, Assamese and the Bodo community. Today, these traditional food items though nutritious have been losing to the preferred modern instant food items which are quick and easy. However, the underlying nutritious values of these edible bioresources cannot be negated.

These non- conventional edible bioresources are not only a source of traditional delicacies but also an important aspect of cultural traits that has been passed through generations. It not only provides nutrition to the economically poor but is also an important facet in providing food security to the rural population. These edible bioresources be it in the form of roots, leaves, stems, flower, fruits or bark are commonly used for traditional medicinal purpose also. And along with it is the underlying inherent belief and faith associated with these wild bioresources.

With the changing man-environment relationship in the recent days, it becomes imperative to understand our immediate surroundings. The opportunities that the nature has provided us have its own built-in quality which not only nourishes us but also provides a means of earning a livelihood. It's time that we stop a while and think of the different social customs and beliefs, traditions and culture which reflects the imprints of these edible bioresources in our day to day life.

This publication is part of a project entitled "Documentation of the Commonly Traded Rare and Endemic Wild Edible Bio-

Resources from the Local Markets of Central Assam, India" which aims to document various local bio-resources that are commonly traded in the local markets of four central Assam districts namely Nagaon, Morigaon, Karbi Anglong and Dima Hasao. It further attempts to assess the current status and significance of these bio-resources and correlates their trade with the livelihood of local communities. The study also initiated awareness generation for promoting sustainability in harvest of the wild or semi-wild edible bio-resources of the select region. A humble attempt has been made in linking these edible bioresources as a means of securing livelihood. However, the present book is a representative of the fraction of these edible bioresources that are being sold in the market. It leaves ample scope for future research opportunities in the said subject, be it in matters relating to documentation, nutrition or livelihood.

We hope the readers will find this publication interesting and informative and we cordially welcome any suggestions for improvement of the book in its subsequent editions.

Authors

CONTENTS

INTRODUCTION

Bioresources are non-fossil biogenic resources which can be used by humans for multiple purposes: to produce food, substantial products, and/or energy carriers (Körner, 2015). They are natural sources like organic leftovers, naturally formed or formable raw materials (Maikhuri et al., 2000). Innovative mechanisms should be developed for sustainable use of these resources as an interface between traditional knowledge and the environment.

The study on the diversity and distribution of wild edible bio resources and their utilization is of great concern to mankind. Among the various kinds of plants, food plants received the earliest attention of mankind and reflect, man's search for knowing more and more about the nutrient qualities of food plants (Mohan & Janardhanan, 1994). In this regard, studies on the diversity and distribution of such wild edible plants, are relevant to codify exploitation of bio-resources.

India is extremely rich in its floristic wealth and native plant genetic resources. About 800 species of wild edible plants occur in different floristic regions and are consumed by the tribal communities (Singh & Arora, 1978). The unique richness of bio-resources makes the country a potential hub of economy growth to a competent level if utilized and tapped efficiently (Ramakrishnan, 1992). Various tribal sects of India are repositories of rich knowledge on various uses of plants genetic resources (Jain, 1981). In India, certain wild tubers, root types, green leaves, flowers, unripe as well as ripe fruits and grain legumes including tribal pulses are consumed by different tribal sects since generations (Gadgil, 1996).

North-East India comprises of the states of Arunachal Pradesh, Assam, Meghalaya, Manipur, Tripura, Mizoram, Nagaland and Sikkim. The unique ecological environment with high humid conditions have resulted larger speciation and genetic diversity of plant and animal species including domesticated ones, thus adding to high endemicity of the flora (Chatterjee, 1939). As a result the region finds place in part of two-biodiversity hotspot namely Himalayan (covering Sikkim, Assam, and Arunachal Pradesh) and Indo Burma (part of north-eastern India especially southern part of the Brahmaputra River) among the 34 biodiversity hotspots of the world (Mittermeier et al. 2003). About 10,000 plants species are estimated in the Himalaya hotspot where 3,160 species are endemic. On the other hand, about 7000 of 13,500 species from Indo-Burma hotspot is endemic to the region. The forests are home to one of the world's highest diversity of plants and animals. Within India, the NE region is the Biogeographical Gateway to India's richest biodiversity zones important for the genetic resources world over. Ironically this is also one of the world's most threatened area and recent estimates indicate it would not be long when all this will disappear in the next 15 years.

Tribal dominated tracts of Northeast India are the storehouse of knowledge about the multiple uses of plants (Arora R.K. 1981). Northeast India witnesses 130 major tribal communities of India's total of 427 tribal communities (Ramakrishnan, 1992; Dutta and Dutta, 2005; Prakash, 2005). Traditional communities living here for thousands of years have built a precious knowledge-base about the use of the rich bio-resources of the region. While people in most other parts of the country as well as in the world have already forgotten the use of wild plants for edible and medicinal purpose, it is still well preserved and practiced by the local communities of this geographical region. Studies undertaken by various researchers have documented 1350 species of plants which are used in ethno-medicinal preparations, 665 species of food plants and 899 species for

miscellaneous uses from the entire NE India (Dutta and Dutta, 2005).

The first ever research findings on evaluation of taxon distributional congruence in Indo-Burma and Himalayan biodiversity hotspot was reported by Pawar et al. (2007). Some of the unique endemic species of the region are *Coptis teeta* (Mishmi teeta) of Mishmi Hills of Arunachal Pradesh, *Napenthes khasiana* of Khasi Hills, Meghalaya, *Vanda coerulea* Meghalaya &Manipur and *Renanthera imschootiana* ,Manipur (Ramakrishnan, 1992).

Several works have been done on wild edible plants used by different communities in India such as Dietary uses of wild plant resources Sikkim, Himalaya (Sundriyal et. al., 2004); Karbi Anglong of Assam (Kar and Borthakur, 2007); Meghalaya, North East India (Kayang, 2007); Majuli Island and Darrang district, Assam (Baruah et. al., 2007); Traditional edible bio-resources Imphal, Manipur (Devi et. al., 2010); Nokrek Biosphere Reserve, Meghalaya (Bikarma et. al., 2011); Ethnobotany of western Mizoram (Lalfakzuala et. al., 2007), among others.

Some of the factors threatening the existence of biodiversity of the NE are habitat fragmentation and destruction due to deforestation, developmental activity, shifting cultivation, poaching, trade in wild flora and fauna, introduction of exotics and rapid wild spread of invasive species (Behera, 2001). The absence of modernized socio-economic and public healthcare systems along with lack of employment and good infrastructure facility has compelled the poor people of this region to depend on bio-resources for their livelihood generation. This in turn poses a great degree of threat to the original biota making it one of the most hot spot critical eco-region. Instead of conserving the rich forest resources, the current process of development in resource use practices has led to depletion of many biological resources at a non-renewable rate. Lack of organized marketing system for forest produce of medicinal herbal, and other industrial importance have aggravated the situation further. Emergence of

Intellectual Property Rights (IPR) as a major economic factor and widespread use of bio resources and traditional knowledge (TK) of developing countries by multinational pharmaceutical have instigated actions for conservation, protection and utilization of rich bio resources. It has been estimated that the total market value of medicinal plants/ herbs from NE alone that are traded out runs to 150 crores per year (source NEDFi, 2006)

In spite of the overall satisfactory level of awareness regarding the prevalent biological diversity, the Eastern Himalaya and Indo-Burma region still remains comparatively data-deficient regarding a wide variety of plant and animal taxa (Mittermeier et al. 2003). However the prevalent traditional knowledge base on plant and animal resource remains a positive aspect in the overall scenario. In this regard, the survey, identification and documentation of wild edible bio-resources are of great importance in assessing the natural resources of a region and understand their scope of sustainable utilization. Many communities depend directly or indirectly on wild bio-resources for their livelihood.

The present study was a survey of the tradable wild/semi-wild edible bio-resources used by these communities within the socio-cultural landscape of Central Assam. The study was conducted in the four districts of Nagaon, Morigaon, Karbi-Anglong and Dima Hasao. The region, comprising of the four study districts, is a storehouse of a valuable heritage of herbal remedies. Its rural and tribal people living in remote and forest areas of this central Assam landscape still depend to a great extent on the indigenous systems of medicine. These local communities have evolved their own unique Traditional Knowledge of different rare and wild edible bio-resources which they use in their day to day life. Such bio-resources form a major source of livelihood for the local communities of the region such as the Assamese, Karbis, Bodos, Nepalis, and the Dimasas, who sells these bio-resources in the local markets. Some wild edible plants are rich in nutrient content, and may even be superior to

cultivated ones in this respect. In fact, the unique richness of the edible bio-resources in Assam makes it a potential source of economic growth of the local communities of the region if utilized and tapped efficiently.

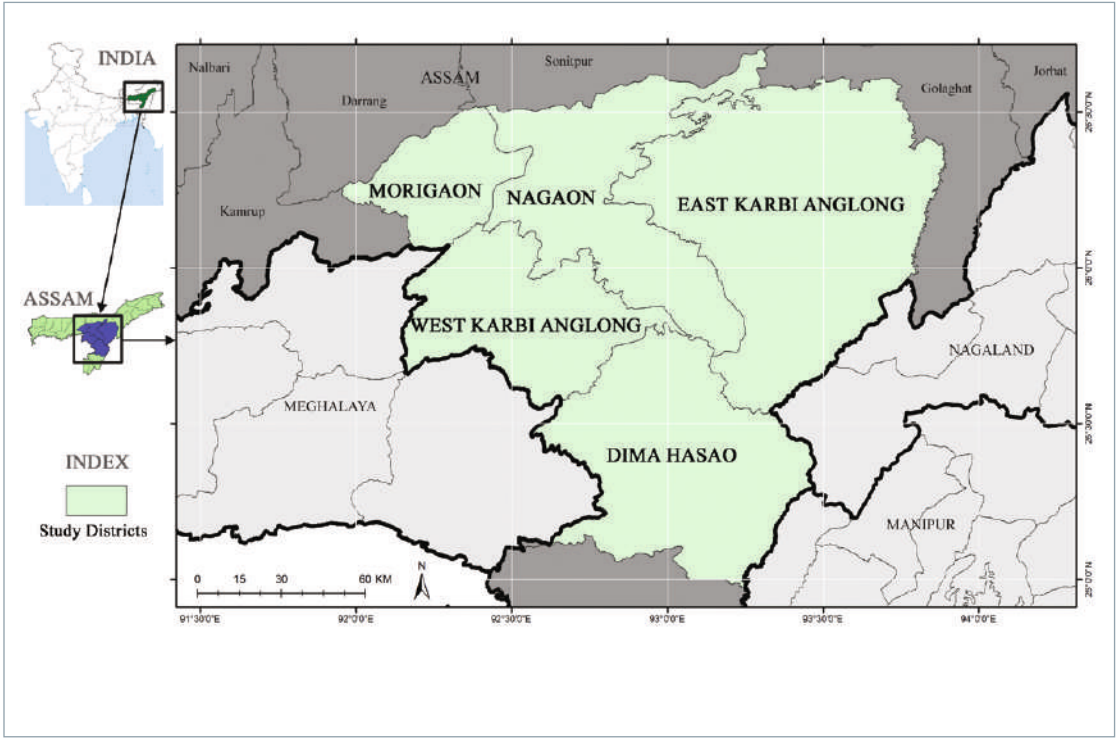
The goal of the study was to provide communities with the tools and information they need to preserve their self-sufficiency in an increasingly industrialized world, while retaining as much of their cultural framework as possible. This study is an attempt to document the important edible bio-resources sold and consumed by the local people of the state so as to identify the rare and endemic bio-resources for their future conservation and assess the level of livelihood dependency of the local communities on these bio-resources.

BRIEF DESCRIPTION OF THE STUDY SITES OF CENTRAL ASSAM

The study was conducted in the 4 central Assam districts of Nagaon, Morigaon, Karbi Anglong and Dima Hasao. While topographically, Nagaon and Morigaon belong to a relatively plain region, Karbi Anglong and Dima Hasao are characterised by hilly, undulating topography.

The Hill Districts of Karbi Anglong and Dima Hasao

The Karbi Anglong and Dima Hasao Raji districts are a part of part of the Meghalaya plateau. The Karbi Plateau is divided into two parts by the Kopili River. The height of the region varies from 1000 m to 1200 m above mean sea level. The western part of the plateau, comprising of the Hamren sub-division, is about half the size eastern part of the Karbi Plateau and runs contiguous to the Meghalaya plateau. It is comparatively rugged and undulating than the eastern part. The eastern part of the Karbi Plateau comprises of the Diphu and Bokajan sub-division. The Rengma hills are the key topographical feature of this section. The major portion of the area is covered by hills. The main range is Borail of which "Thumjang" is the highest peak (1866 meters). The region experiences heavy rainfall during the months from May to September, but it is not evenly distributed. The average annual in this hilly region varies from 2000 mm to 2700 mm. However, some of the regions such as the Langting - Manderdisa - Diyungmukh area receives much less rain. The average mean maximum temperature varies from 24°C to 30°C. The average mean minimum temperature varies from 10°C to 14°C. The average relative humidity varies from73% to 84%.



Locational Map of the Study Sites

Karbi Anglong -

Karbi Anglong is the largest amongst the 27 administrative districts of Assam state in North-eastern India. The district is located between 25°33' - 26°35' North Latitudes and 92°10' – 93°50' East Longitudes. The district is bounded by Golaghat district on the east, Meghalaya state and Morigaon district on the west, Nagaon and Golaghat districts on the north and Dima Hasao district and Nagaland state on the south. Karbi Anglong District occupies an area of 10,434 square kilometres. Diphu is the administrative headquarter of the district. As of 2011, the total population of the district stood at 965,280 persons and a density of 93 persons per square kilometre.

Apart from Karbi, other languages spoken here are Dimasa (Garo-dima), Kuki (Khawchung Thadou), Nepali, Assamese and Aiton. The district homes indigenous people like the Rengmas and the Karbis. Other indigenous communities in this district include the Dimasas, the Koch, the Nepali (Gorkha), the Adivasis, the Kuki-Chin People (Kukis, Hmars, Mizos), the Garos, the Tiwas, the Khasis and the Chakmas. More than 75% of the district is forested. The main vegetation is Tropical semi-evergreen with patches of Moist Deciduous and wet Evergreen forests in certain areas. The district boasts the largest population of hoolock gibbons in Assam.

Dima Hasao -

Dima Hasao is the third largest district of Assam with 4888 square kilometres after Karbi Anglong and Sonitpur district. The district lies between 25°3' - 25°47' North Latitudes and 92°37' E and 93°17' East Longitudes. Dima Hasao District is surrounded by East Karbi Anglong District and Nagaland on North east, Manipur on East, Nagaon Dist. on North, West Karbi Anglong District on the North-west, Meghalaya on West and Cachar district on South. As of 2011 it is the least populous district of Assam with a total population of 213,529 persons and a density of 43.7 persons per square kilometre.

The major tribes inhabiting the district are Dimasas, Zeme Nagas, Biate, Hmars, Kukis, Hrangkhawls, Vaipheis, Karbis, Khasi-pnars and Khelmas. Major languages spoken in the district are the Dimasa, Bengali, Assamese, Hmar, Zeme, Hrangkhol, Karbi, Kuki, Biate [Biate language], Khelma, and Nepali. Haflong Hindi is the lingua franca in the Dima Hasao.

The Plain Districts of Karbi Anglong and Dima Hasao

The districts of Nagaon and Morigaon fall in the central Assam Brahmaputra plains. The region is an endowment of the mighty Brahmaputra River which flows with a gentle slope from northeast to southwest with an average gradient of 13 cm for every kilometre. The Brahmaputra is a paleo-river, which means it is older than the Himalayas forms the Brahmaputra flood plain. Extensive floodplains and char lands have been formed by the dynamic, braided fluvial regime of the Brahmaputra River in the region. A belt of tall grasslands exist all along the south bank floodplains of the Brahmaputra River in the two districts which are home to some of the most diverse flora and fauna The Brahmaputra and its tributaries have formed numerous wetlands, swamps and marshes all along the region, comprising of new alluvium deposits, which occur all along the river course. The beels, marshy lands and swamps are in reality the old abandoned channels of the Kalong and the Kopili rivers. Morigaon has the highest number of wetlands among all the districts of Assam. The otherwise plain undulating topography of the region is marked by isolated hillocks of Archaean origin such as the Mayong region in Morigaon and Silghat and Burapahar in Nagaon. Its highlands include the Hatimura parbat with an elevation of 186.5 m, the Barkandali with an altitude of 853 m and the Kamakhya parbat with an altitude of 244 m. The average altitude of the district is 60.6 meters from the m.s.l.

Nagaon -

The Nagaon district extends between 25°45' - 26°45' North Latitudes and 92°33' to 93°20' East Longitudes. On the north, Nagaon is bounded by Sonitpur District and the Brahmaputra, towards its south lies West Karbi Anglong District and Dima Hasao District, towards its east lies the districts of East Karbi Anglong and Golaghat. As of 2011, Nagaon is the most populous district of Assam. The total population of Nagaon stood at 2,826,006 persons with a density of 711 persons per square kilometre. The district headquarter is located at Nagaon. Nagaon district occupies an area of 3,831 square kilometers.

The district presents a mix of cultures of Hinduism, Islam, Sikhism, Jainism, and Buddhism. It has different language speakers including Assamese, Bengali, Hindi, Bodo, Karbi, Dimasa, Manipuri. Major Communities in the district are Bengali Muslims, Assamese Muslims, Assamese Brahmins, Kalita, Bengali Hindus, Tea tribes (Adivasi) and Koch Rajbongshis. Assamese is the lingua franca and the communicating language in the district.

Morigaon -

The Morigaon district covers an area of 1,450.02 square kilometres. The district is bounded by the Brahmaputra River on the North, Karbi Anglong district on the South, Nagaon District on the East and Kamrup District on the West. The district covers an area of 1551 square kilometres. As per the 2011 census, the total population of Morigaon stood at 9,57,853 persons with a density of 618 persons per square kilometre. The district headquarter is located at Morigaon.

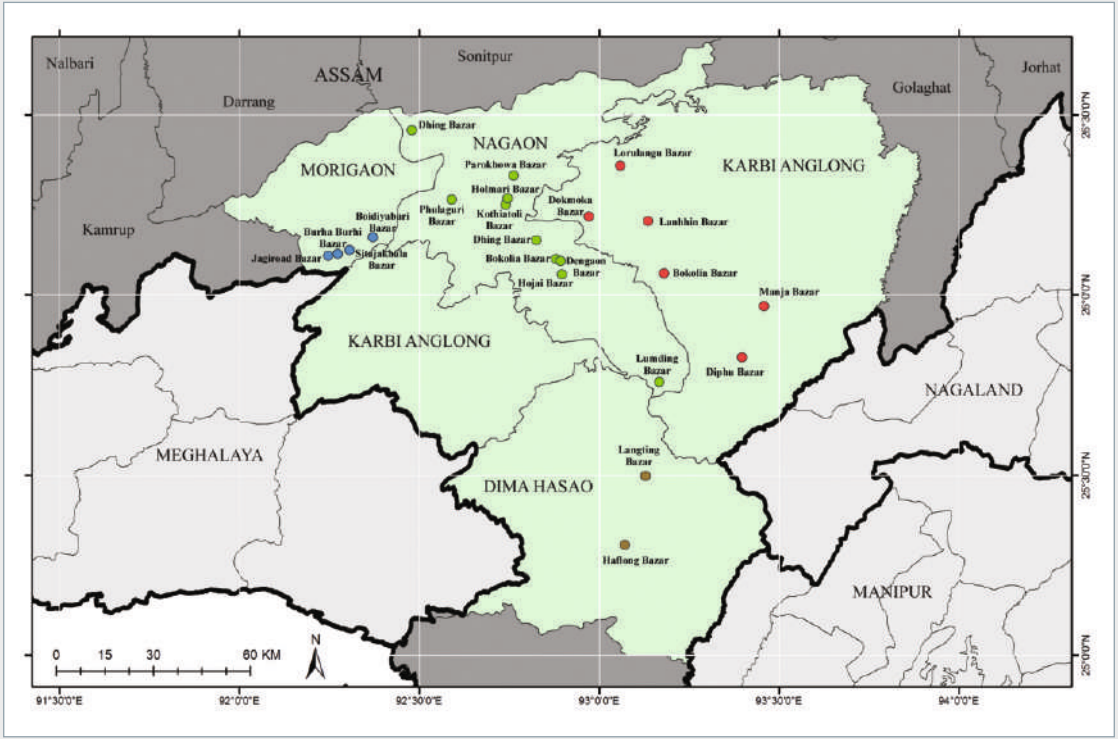
The ancient place of occult Mayang is located in this district as well as Pobitora Wildlife Sanctuary. The greater part of the district is an alluvial plain, criss-crossed with numerous rivers and water ways and dotted with many beels and marshes. The mighty Brahmaputra flows along with the northern boundary of the district. Killing, Kolong and Kopili rivers flow through the

southern part of the district. The Killing meets the Kopili at the Matiparbat where from Kopili moves westward. The Kolong joins Kopili at the Jagi Dui Khuti Mukh and from here they jointly fall into the Brahmaputra. Owing to the presence of these rivers, the district has luxuriant tropical forest cover.

Table-1

List of markets surveyed in Nagaon, Morigaon, Karbi Anglong and Dima Hasao districts of Assam

Sl. No.	Name of the Market	Type of Market	Market Day	District	No of Visits
1	Holmari Bozaar	Weekly	Sunday	Nagaon	3
2	Lumding Market	Daily	All Days	Nagaon	2
3	Kothiatoli Bozaar	Weekly	Saturday	Nagaon	3
4	Hojai Bozaar	Weekly	Sunday	Nagaon	3
5	Parokhowa Bozaar	Weekly	Saturday	Nagaon	1
6	Bokolia Bozaar	Weekly	Tuesday	Nagaon	1
7	Dengaon Bozaar	Weekly	Tuesday	Nagaon	1
8	Dhing Bozaar	Weekly	Monday	Nagaon	2
9	Phuloguri Bozaar	Weekly	Saturday	Nagaon	2
10	Langhin Bozaar	Weekly	Sunday	Karbi Anglong	3
11	Diphu Market	Daily	All Days	Karbi Anglong	2
12	Lorulangu Market	Weekly	Sunday	Karbi Anglong	1
13	Dakmoka Bozaar	Weekly	Wednesday	Karbi Anglong	1
14	Manja Bozaar	Weekly	Friday	Karbi Anglong	1
15	Sitajakhala Bozaar	Weekly	Thursday	Morigaon	4
16	Boidyabari Bozaar	Weekly	Sunday	Morigaon	1
17	Burha-Buri/ Bhuragaon Bozaar	Bi-Weekly	Monday & Friday	Morigaon	1
18	Jagiroad Bozaar	Weekly	Sunday	Morigaon	2
19	Haflong Bozaar	Daily/Weekly	Sunday	Dima Hasao	2
20	Langting Bozaar	Daily	All Days	Dima Hasao	2



Map showing Locations of Markets Surveyed

CHECKLIST OF EDIBLE BIO RESOURCES AVAILABLE IN LOCAL MARKETS OF CENTRAL ASSAM

The study area is rich and has a large number of useful wild/semi-wild edible bio-resources. These wild edible bio-resources have been classified accordingly into three parts. They are:

I. Tradable wild/semi-wild edible fruits available in the markets of central Assam.

ii. Tradable wild/semi-wild edible plant resources available in the markets of central Assam.

iii. Tradable other edible resources available in the markets of central Assam.

The preference for wild/semi-wild leafy plant and fruit resources over underground plant parts seems to be common among diverse ethnic groups in the study area. The study revealed that for young leaves and stems the winter season was preferred while for the fruits each season had their own unique produce. Table 2 provides the list of the tradable wild/semi-wild edible fruits available in the markets of study sites; Table 3 provides the list of the tradable wild/semi-wild edible plant resources available in the markets and Table 4 provides the list of the tradable wild/semi-wild edible other resources. Each edible bio-resource had their own uses and the way of eating them depended on the food habits of the community who consumed it. But in general ripe fruits are often eaten fresh, green leafy vegetative parts (e.g., young leaves and stems) are usually boiled or stir-fried; less commonly they are eaten fresh as salad or added to soups.

Of the total 143 species documented, they belonged to 73 different families. Of the total 58 wild/semi-wild edible fruits documented, they belonged to 24 different families. Similarly of the total 81 wild/semi-wild edible plant resources documented, they belonged to 45 different families and of the 4 wild/semi-wild edible other resources documented, they belonged to 4 different families.

The detailed description of the same is presented in a tabular form in Table 2, 3 and 4 respectively.

Table-2:

List of tradable wild/semi-wild edible fruits available in the markets of study sites. The name of the plants are arranged alphabetically under families which are further arranged according to A. L. Takhtajan's (1980) classification system of flowering plants.

Abbreviations used: C/R/A/O
*Common (C) and Rare (R) status as per frequency of occurrence in the market places
*Abundant (A) and Occasional (O) status as per frequency of occurrence in the market places

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Dicotyledons								
1	Moraceae	*Artocarpus chama* Roxb.	Sham Kothal	Ripe Fruit eaten raw and ripe seed taken roasted	Jun-Aug	₹ 20-25/ fruit	R, O	Considered to have medicinal properties in healing wounds.
2	Moraceae	*Artocarpus heterophyllus* Lam.	Kothal	Ripe Fruit eaten raw and ripe seed taken roasted/ eaten as vegetable also	Jun-Aug	₹ 30-50/ fruit	C, A	Considered to have anti- bacterial, anti-inflammatory and anti-diabetes properties. It is also an antioxidant, used for treatment of fever, stomach ulcers and constipation.

3	Moraceae	*Artocarpus lakoocha* Roxb.	Bohot/ Deba Tenga	Ripe Fruit eaten raw	Jun-Aug	₹ 20-25/ fruit	R, O	The root is an astringent and is used as a purgative; when macerated it can be used as a poultice for skin ailments
4	Moraceae	*Ficus hispida* L. f.	Dimoru	Ripe Fruit eaten raw	Year Round	₹ 20-25/ kg	R, O	Considered to have anti- inflammatory and anti- dysenteric properties. Also Considered good for liver.
5	Moraceae	*Ficus racemosa* L.	Mou Dimoru	Ripe Fruit eaten raw	Year Round	₹ 20-25/ kg	R, O	
6	Moraceae	*Morus alba* L.	Nuni gosh	Ripe fruits are eaten fresh	Jun-Aug	₹ 30-40/ kg	R, O	The root bark of the plant is used in traditional medicine for curing dental caries. It is also considered to have some anti-venom properties Useful for treatment of dysentery, gastritis, etc. and is said to have anti inflammatory properties.

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Dicotyledons								
7	Arecaceae	*Calamus erectus* Roxb.	Bet fruit	Ripe Fruit eaten raw	Apr-Jul	₹ 50-60/ kg	R, O	Considered an essential item for offering to the Gods during traditional New Year celebration rituals (*Rongali Bihu* celebration day in Assam) of Manipuri communities locally called as *"Cheiraoba".*
8	Clusiaceae	*Garcinia morella* (Gaertn.) Desr.	Kuji Thekera	Ripe Fruits are eaten raw	Jul-Aug	₹ 10-15/ fruit	R, O	Useful for treatment of dysentery, gastritis, etc. and is said to have anti inflammatory properties.
9	Clusiaceae	*Garcinia pedunculata* Roxb. ex. Buch-Ham.	Bor Thekera	Ripe Fruits are eaten raw	Jul-Aug	₹ 10-15/ fruit	R, A	Dried fruit slices are used as medicine for dysentery.
10	Clusiaceae	*Garcinia xanthochymus* Hook. f. ex. T. Anderson	Tepor Tenga	Ripe Fruits are eaten raw	Jun-Jul	₹ 20-25/ kg	R, O	Considered to possess antibacterial and anti-malarial properties

11	Flacourtiaceae	*Flacourtia jangomas* Lour.) Raeusch	Paniol	Ripe fruits are eaten raw	Aug-Oct	₹ 50-60/ kg	R, O	Considered to have antibacterial properties. The bark are also used in traditional medicines for curing stomach ailments
12	Passifloraceae	*Passiflora endulis* Sims. var. *endulis*	Lata bael (Passion fruit)	Ripe Fruit is Eaten, sweet and aromatic in taste	Jul-Aug	₹ 40-50/ kg	R, O	Considered to be a stimulant and tonic.
13	Cucurbitaceae	*Cucumis melo* L. var. *momordica* Duthie	Chiral/ Bangee	Ripe Fruit eaten raw	Jun-Aug	₹ 20-30/ fruit	C, A	The fruit is used as a cooling light cleanser or moisturizer for the skin. Also used as a first aid treatment for burns and abrasions. The seed is anti-tussive, digestive, febrifuge and vermifuge.
14	Sapotaceae	*Mimusops elengi* (L.)	Bokul	Ripe Fruit is Eaten	Oct-Feb	₹ 30-40/ kg	R, O	Considered rich in Calcium and Have been used as medicine for toothache
15	Elaeocarpaceae	*Elaeocarpus floribundus* Blume.	Jolphai	The mature fruit is eaten raw, cooked or pickled.	Nov-Dec	₹ 30-40/ kg	C, A	Considered to have medicinal properties. The local people used the leaves in rheumatism. Fruits are prescribed in dysentery and diarrhea.

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Dicotyledons								
16	Euphorbiaceae	*Baccaurea ramiflora* Lour.	Leteku	Ripe fruits are eaten raw	May -Jul	₹ 30-40/ kg	C, A	Considered to medicinal properties and are used in the treatment of skin diseases.
17	Euphorbiaceae	*Bridelia stipularis (L.) Bl.*	Mou Hilikha	Salty sour tested fruits eaten raw/ as pickles also	Jul- Aug	₹ 40-50/ kg	R, O	Plant is used in pleurisy and exudation. Bark decoction is given to children for cough, fever and asthma and is also used as gargle for sores in mouth.
18	Euphorbiaceae	*Phyllanthus acidus* (L.) Skeels	Pam Lakhi	Fruits eaten raw, pickled	Feb-Jul	₹ 40-50/ kg	R, O	Considered to have medicinal properties and are consumed as blood-enhancer for liver.
19	Euphorbiaceae	*Phyllanthus emblica* L.	Amalakhi	Fruits eaten raw, pickled	Feb-Jul	₹ 40-50/ kg	C, A	Considered highly medicinal by local people.
20	Euphorbiaceae	*Antidesma ghaesembilla* Gaertn.	Heloch	Fruits eaten raw, pickled	Jun-Jul	₹ 30-40/ kg	C, A	The fruit is laxative and purgative

21	Euphorbiaceae	*Manihot esculenta* Crantz.	Himolu aalu	Tubers eaten cooked	Oct-Feb	₹ 30-40/ bundle	C, A	
22	Annonaceae	*Annona squamosa* L.	Atlas	Ripe fruits eaten raw	Jun-Jul	₹ 50-60/ kg	R, O	Considered to be a vermifuge
23	Rosaceae	*Prunus domestica* L.	Ahom Bogori (Plum)	The mature fruit is eaten raw, cooked or pickled.	Jul-Sep	₹ 30-40/ kg	C, A	Considered highly medicinal. Effective laxative and is also good for stomach ailments. It also has antioxidant properties.
24	Rosaceae	*Pyrus communis* L.	Nachpati	Fruit taken Raw	Jul- Aug	₹ 40-50/ kg	C, A	Considered to have diuretic properties and stimulates the urine elimination
25	Rosaceae	*Rubus ellipticus* Smith	Jutuli poka (Asian Wild Raspeberry)	Ripen berry eaten raw	May- Jun	₹ 30-40/ kg	R, O	Considered to have astringent and anti-diuretic properties
26	Fabaceae	*Tamarindus indica* L.	Teteli	Fruits are sour, eaten fresh or dried, chutneys etc.	Oct-Feb	₹ 60-70/ kg	C, A	Local people believed planting tamarind tree in front of house brings bad omen. Local people used the fruit as a poultice applied to foreheads for treating fevers.

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Dicotyledons								
27	Myrtaceae	*Elaeagnus caudata* Schl.ex Momiy.	Mirika Tenga	Ripe fruit is eaten, very Sour when not ripe.	Apr- May	₹ 30-40/ kg	R, O	Considered an essential item for offering to the Gods during marriage ceremony rituals of Manipuri communities
28	Myrtaceae	*Syzygium cumini* (L.) *Skeels*	Kola Jamu	Ripe fruits eaten fresh	Jun- Jul	₹ 30-40/ kg	C, A	Considered to have anti microbial properties, also used to treat digestive ailments.
29	Myrtaceae	*Syzygium kurzii (*Duthie) N.P. Balakr	Bogi Jamu	Ripe fruits eaten fresh	Jun- Jul	₹ 30-40/ kg	R, O	
30	Combretaceae	*Terminalia citrina* Roxb.ex Flem	Hilikha	Fruits and eaten raw or dried	Jun-Dec	₹ 30-40/ kg	C, A	Considered to have great medicinal properties by local people. Usually chewed after meals as digestive by local people.

31	Trapaceae	*Trapa natans* L. var. *bispinosa* (Roxb.) Makina	Bor Singori	The seeds are eaten either raw or roasted	Oct-Mar	₹ 25-40/ kg	C, A	Considered to have aphrodisiac, astringent, anti-pyretic, anti-diarrheal and appetizing properties.
32	Trapaceae	*Trapa bicornis* L. var. *quadrispinosa* (Roxb.)	Horu Singori	The seeds are eaten either raw or roasted	Oct-Mar	₹ 20-30/ kg	R, O	
33	Rutaceae	*Aegle marmelos* (L.) Correa	Bael	Pulp of Ripe fruit are consumed as juices	Sep-Dec	₹ 10-20/ fruit	C, A	It is a sacred plant for Hindus. The leaves are offered during religious ceremonies and pujas. Considered medicinal for indigestion and constipation.
34	Rutaceae	*Citrus aurantifolia* (Chirstm.) Swig	Gol Nemu	Fruit taken Raw	Jun-Aug	₹ 5-10/ fruit	C, A	Considered to have anti-oxidant and antibacterial properties and are used in treatment of skin diseases.
35	Rutaceae	*Citrus maxima* Merr.	Bor Tenga	Ripe fruit taken raw	Sep- Dec	₹ 10-20/ fruit	C, A	
36	Rutaceae	*Citrus limon* (L.) Burm. f.	Nemu Tenga	Fruit taken Raw	Jul-Dec	₹ 3-5/ fruit	C, A	It is considered to be highly antibacterial and is consumed for improving digestion.

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Dicotyledons								
37	Rutaceae	*Citrus* sp.	Sokora Tenga	Fruit taken Raw	Jun -Aug	₹ 25-30/ fruit	C, O	The peel oil is used in skin care products due to its high antioxidant and anti inflammatory properties.
38	Rutaceae	*Citrus medica* L.	Jara Tenga	Fruit taken Raw	Jul-Dec	₹ 3-5/ fruit	R, O	It is considered to be highly medicinal and is used for improving digestion, a remedy for motion sickness and pulmonary troubles etc.
39	Rutaceae	*Citrus reticulata* Blanco	Komla Tenga	Ripe Fruit Taken Raw	Nov-Apr	₹ 50-60/ kg	C, A	Considered to have analgesic, anti asthmatic, anti cholesterolemic, anti inflammatory, antiseptic and laxative properties
40	Rutaceae	*Citurs sinensis* (L.) Osbeck	Moushumbi	Fruit taken Raw	Jun- Aug	₹ 50-60/ kg	C, A	
41	Rutaceae	*Citrus aurantifolia* sp.	Nemu	Fruit taken Raw	Jul- Dec	₹ 3-5/ fruit	C, O	

42	Meliaceae	*Aglaia spectabilis* (Miq.)	Amari	Ripe fruit taken raw, picked also	Jun- Aug	₹ 30-40/ kg	R, O	
43	Anacardiaceae	*Mangifera sylvatica* Roxb.	Bon Aam	Unripe fruit used for pickles, jelly and chutney	Feb-Apr	₹ 50-60/ kg	C, A	
44	Anacardiaceae	*Myrica esculenta* Buch-Ham exD.Don	Nagatenga	Ripe fruit eaten raw	Feb-Apr	₹ 30-40/ kg	R, O	The acidic fruit is considered medicinal for remedy of colic pain.
45	Anacardiaceae	*Spondias pinnata* (L.f.) Kurz.	Amora	Ripe fruit eaten raw	Jun -Aug	₹ 30-40/ kg	C, A	Considered to have anti-tubercular properties.
46	Sapindaceae	*Litchi chinensis* Sonner	Lichu	Ripe Fruit eaten raw	Apr- Jun	₹ 30-40/ bundle	C, A	Considered to have anti-cancer properties.
47	Oxaliodaceae	*Averrhoa carambola* L.	Kordoi tenga	Fruits are acidic, eaten raw or cooked with sugar	Oct- Jan	₹ 30-40/ kg	C, A	Considered to have antioxidant and anti microbial properties. It is used as medicine for jaundice and kidney stone.
48	Oxaliodaceae	*Averrhoa bilimbi* L.	Bilimbi tenga	Fruits are acidic, eaten raw, as jams and jellies	May-Oct	₹ 40-50/ kg	C, A	Considered useful for treatment of skin infections etc.

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Dicotyledons								
49	Rubiaceae	*Meyna laxiflora* Robyns	Meyna/Heibi	Ripe Fruits are eaten	Mar-Apr	₹ 50-60/ kg	C, A	
50	Apocynaceae	*Carissa corandas* L.	Korja tenga	Ripe Fruits are eaten raw or pickled	May-Oct	₹ 60-70/ kg	R, O	Considered useful for treatment of skin infections etc.
Monocotyledons								
51	Bromeliaceae	*Ananas cosmosus* (L.) Merr	Mati Kothal/ Anaras	Ripe Fruit eaten raw	Jun- Jul	₹ 20-25/ fruit	C, A	Considered to have digestive, diuretic, laxative, diaphoretic and anti-microbial properties.
52	Musaceae	*Ensete glaucum* (Roxb.) Cheesman	Bhim Kol	Ripe fruit taken raw	Sep- Dec	₹ 40-50/ dozen	C, A	This is endemic to Assam and has medicinal properties. The dried leaf and outer cover of the fruit are burnt and prepare an alkaline substance called '*Kala Khar*' used to make a local delicacy called '*Khar*'.

53	Musaceae	*Musa accuminata* Colla	Jahaji Kol	Ripe fruit taken raw	Year Round	₹ 40-60/ dozen	C, A
54	Musaceae	*Musa balbisiana* Colla.	Athia Kol	Ripe fruit taken raw	Sep-Dec	₹ 40-50/ dozen	R, A
55	Musaceae	*Musa paradisica* L.	Cheni Champa Kol	Ripe fruit taken raw	Year Round	₹ 20-30/ dozen	C, A
56	Musaceae	*Musa sanguinia* rook. f.	Malbhog Kol	Ripe fruit taken raw	Year Round	₹ 50-70/ dozen	C, A
57	Musaceae	*Musa velutina* H. Wendl. & Drude	Senduri Kol	Ripe fruit taken raw	Sep-Dec	₹ 40-50/ dozen	R, O
58	Musaceae	*Musa sapientum* L.	Manohar Kol	Ripe fruit taken raw	Sep-Dec	₹ 40-60/ dozen	C, A

Table-3:

List of tradable wild/semi-wild edible plant resources available in the markets of study sites
The name of the plants are arranged alphabetically under families which are further arranged according to A. L. Takhtajan's (1980) classification system of flowering plants.

Abbreviations used: C/R/A/O
*Common (C) and Rare (R) status as per frequency of occurrence in the market places
*Abundant (A) and Occasional (O) status as per frequency of occurrence in the market places

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Dicotyledons								
1	Lauraceae	*Cinnamomum zeylanicum* Bl.	Dhalcheni	Bark is used for aromatic flavour	Oct- Mar	₹ 50-60/ kg	C, A	
2	Lauraceae	*Cinnamomum tamala* (Buch-Ham) Nees. & Eberm.	Tezpata	Use as aromatic spices for flavour	Year Round	₹ 15- 20/ bundle	C, A	
3	Saururaceae	*Houttuynia cordata* Thunb.	Mashundari	Aromatic Herb mainly used in curries	Oct- Dec	₹ 5-10/ bundle	C, A	Traditionally it is used in folk medicine for dieresis and detoxification and herbal medicine for its antiviral, antibacterial and antileaukemic properties.

4	Nymphaeaceae	*Euryale ferox* Salisb.	Makhana/ Thanging	The seeds are eaten either raw or roasted	Jul-Aug	₹ 10-15/ Fruit	R, O	The seeds are considered good for babies and invalids
5	Nymphaeaceae	*Nymphaea rubra* Roxb.ex. Andrews	Ronga Bhet	Leaf Petiole, fruits and roots eaten as vegetables	Aug-Oct	₹ 10-15/ bundle	R, O	
6	Nymphaeaceae	*Nymphaea nouchali* Burm. P.	Nila Bhet	Leaf Petiole, fruits and roots eaten	Jun-Jul	₹ 20-30/ bundle	C, A	
7	Nelumbonaceae	*Nelumbo nucifera* Gaertn.	Podum guti/ stem	Seeds are eaten either raw or cooked, roots eaten raw	Nov-Dec	₹ 40-50/ kg	R, O	
8	Moraceae	*Ficus geniculata* Kurz	Tenga Bor	Young shoots, leaves and green fruits eaten	Year Round	₹ 20-30/ bundle	R, O	
9	Moraceae	*Ficus hispida* L.f.	Dimoru	Leaf scales are acidic which is consumed cooked	Year Round	₹ 20-30/ bundle	R, O	
10	Basellaceae	*Basella alba* L.	Puroi xak	Eaten as vegetable	Oct-Dec	₹ 10-20/ bundle	R, O	Considered to be useful for treatment of osteoporosis.

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Dicotyledons								
11	Amaranthaceae	*Amaranthus viridis* L.	Khutura xak	Tender shoots and leaves are eaten as vegetable	Oct-Jan	₹ 15- 20/ bundle	C, A	It is considered medicinal, mostly prescribed for urinary problem
12	Amaranthaceae	*Amaranthus tricolor* L.	Ronga Moricha	Leaves and shoots eaten as vegetables	Oct-Jan	₹ 15- 20/ bundle	C, A	Considered to have medicinal properties and are used against external inflammation and bladder distress.
13	Cheno-podiaceae	*Chenopodium album* L.	Jilmil xak/ Bathua	The leaves are eaten as pot herb	Oct-Dec	₹ 15- 20/ bundle	C, A	The plant is generally consumed by local people for its rich contents of Vitamin A, Calcium, and Potassium and phosphorous. In Ayurveda, it is said that pregnant women should not eat *bathua* as it may result in miscarriages.
14	Polygonaceae	*Polygonum barbata* (L.) H. Hara	Bon Ghehu/ Yelang	Young Leaves eaten as vegetable	Oct-Feb	₹ 20-30/ bundle	R, O	Considered to have colic pain relieving properties.

15		*Polygonum posumbu* Buch. Ham. ex. D. Don	Singju/ Phak Pai/ Knotweed	Young shoots as vegetable, spice & also as chutney	Oct-Feb	₹ 10-15/ bundle	R, O	Considered to have antipyretic and dyspepsiac properties.
16	Dilleniaceae	*Dillenia indica* L.	Outenga	Fleshy calyx eaten raw as well as cooked	Dec-Apr	₹ 10-15/ piece	C, A	Mucilage found in the fruit is used to wash hair as shampoo and considered good for hair growth
17	Cucurbitaceae	*Mukia maderaspatana* (L.) Roem	Bon Tita Karela	Eaten as Vegetable	Oct-Dec	₹ 20-30/ kg	R, O	
18	Sterculiaceae	*Byttneria aspera* Collebr. ex wall.	Tikoni Barual Xak	Eaten as vegetable	Feb-Apr	₹ 10-20/ bundle	R, A	Considered medicinal and are used by tribal people at the time of delivery
19	Malvaceae	*Corchorus capsularis* L.	Morapat	Young leaves are cooked as vegetable	Jul-Aug	₹ 20-30/ bundle	C, A	Considered to have antioxidant properties.
20	Malvaceae	*Hibiscus sabdariffa* L.	Ronga Tenga Mora	Leaves and fruits are acidic, eaten cooked.	Oct-Mar	₹ 20-30/ bundle	C, A	Considered to have medicinal properties useful for dysentery. It also has anti-hypertensive, diuretic properties, mildly laxative.

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Dicotyledons								
21	Malvaceae	*Malva verticillata* L.	Lofa Xak	Eaten as Vegetable	Oct-Feb	₹ 20-30/ bundle	C, A	
22	Fabaceae	*Canavalia gladiata* (Jacq.) DC.Tebi	Tebi	Eaten as Vegetable	Oct-Mar	₹ 20-30/ bundle	R, O	
23	Fabaceae	*Parkia timoriana* (DC.) Merr.	Manipuri Urahi (Yonchak)	The tender pods are eaten as vegetable espicially with Fish	Oct-Mar	₹ 10-20/ piece	C, A	Considered to have laxative and anti-helmintic properties.
24	Fabaceae	*Psophocarpus tetragonolobus* (L.) DC.	Tengnoum-anbi/Chari Siria Urohi	Eaten as Vegetable	Oct-Mar	₹ 20-30/ kg	C, A	
25	Fabaceae	*Trigonella foenum graccum* L.	Methi Hak	Eaten as Vegetable	Oct-Mar	₹ 10-20/ bundle	C, A	Considered medicinal for diabetes
26	Rutaceae	*Murraya koenigii* (L.) Spreng	Narasingha	The aromatic leaves are used in curries	Sept-Dec	₹ 10-15/ bundle	C, A	Considered to have anti-diabetic, antioxidant and hepatoprotective properties.

27	Rutaceae	*Zanthoxylum oxyphyllum* Edgew	Mejenga	The aromatic leaves are used in curries	Apr-Jul	₹ 10-15/ bundle	R, O	The fruits are said to be astringent, digestive and stimulant. Also useful in treatment of tooth ache. The bark, especially the root bark, is tonic and aromatic.
28	Rutaceae	*Zanthoxylum rhetsa* (Roxb.)DC	Mukthrubi/ Brajmani gosh	The aromatic leaves are used in curries	Mar-Apr	₹ 10-20/ bundle	R, O	
29	Oxalidaceae	*Oxalis corniculata* L.	Horu Tengeshi Xak	Young shoots & leaves are eaten as vegetable	Jun-Aug	₹ 20-25/ bundle	R, O	The plant is highly considered medicinal in dysentery and blood pressure.
30	Apiaceae	*Centella asiatica* (L.) Urban	Bor Manimuni	Leaves, young shoots are eaten as vegetables	Mar-May	₹ 10-30/ bundle	C, A	It is considered medicinal in stomach complains and usually used locally as liver tonic

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Dicotyledons								
31	Apiaceae	*Eryngium foetidum* L.	Mann Dhania	Aromatic Herb used in curries	Oct-Dec	₹ 5-10/ bundle	C, A	It is used in traditional medicine for burns, earache, fevers, hypertension, constipation, fits, asthma, stomachache, worms, infertility complications, snake bites and also in malaria
32	Apiaceae	*Hydrocotyle sibthorpioides* Lam.	Horu Manimuni	Leaves, young shoots are eaten as vegetables	Mar-May	₹ 10-30/ bundle	C, A	
33	Rubiaceae	*Paederia foetida* L.	Bhedai lata	Leaves, tender twigs are used as vegetable	Oct-Jan	₹ 10-15/ bundle	R, O	It is considered medicinal for stomach ache and gastric problems
34	Rubiaceae	*Paederia scandens* (Lour.) Merrill	Ronga Bhedai lata	Young leaves are cooked as vegetable	Oct-Jan	₹ 10-15/ bundle	R, O	It is believed to have Medicinal properties for indigestion

35	Convolvulaceae	*Ipomoea aquatica* Forssk.	Kolmou xax/ Kollamni	The leaves and undershoots are taken as vegetables	Jun-Aug	₹ 15- 20/ bundle	C, A	
36	Convolvulaceae	*Ipomoea batatas* (L.) Lam.	Mitha Aalu	Tuberous roots are eaten raw, boiled or fried	Oct-Feb	₹ 20-30/ kg	C, A	
37	Verbenaceae	*Clerodendrum glandulosum* Coleb.	Nephaphu	Tender leaves are eaten as vegetable	Oct-Feb	₹ 20-30/ bundle	R, O	It is highly recommended among local people for curing high blood pressure. Mishing tribe used it in making local wine.
38	Lamiaceae	*Leucas aspera* (Willd.) Link.	Durun xak	Leaves & Flower buds are used as vegetables	Oct-Dec	₹ 10-20/ bundle	C, A	Considered medicinal for liver ailments, snake bites, headache etc.
39	Lamiaceae	*Mentha arvensis* L.	Pudina	Leaves are eaten raw as chutney	Oct-Feb	₹ 5-10/ bundle	C, A	Considered medicinal for digestive system
40	Lamiaceae	*Ocimum americanum* L.	Bon Tulshi (Mayang ton)	Leaves are eaten as aromatic flovour	Oct-Apr	₹ 5-10/ bundle	C, A	
41	Solanaceae	*Capsicum annuum* L. *var nagahari*	Bhot Jolokia	Eaten as Spices	Oct-Dec	₹ 2-5/ piece	C, A	

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Dicotyledons								
42	Solanaceae	*Solanum anguivi* Lamk.	Deori Tita/ Bhekuri Guti	Eaten Raw	Oct-Apr	₹ 40-50/ kg	R, O	The fruits are eaten with honey for sore throat, rashes in tongue etc.
43	Solanaceae	*Solanum ferox* L.	Bhot Bengena/ Tita bhekuri	Eaten Raw	Oct-Apr	₹ 20-30/ kg	R, O	Considered medicinal for worm infection and skin diseases.
44	Scrophul-ariaceae	*Bacopa monnieri* (L.) Pennell	Brahmi xax	Eaten as vegetable	Oct-Dec	₹ 20-30/ bundle	C, A	It is considered as tonic for brain, believed to increase memory power if taken with milk.
45	Bignoniaceae	*Oroxylum indicum* (L.) Kurz.	Bhatghila/ Napakban	Tender leaves and shoots eaten as vegetable	Jun-Aug	₹ 15- 20/ bundle	R, O	
46	Pedaliaceae	*Sesamum indicum* L.	Teal Pat	Leaves eaten as vegetable, seed as special chutney, making ladoo etc.	Apr-Jun	₹ 10-20/ bundle	R, O	Used widely in traditional medicine. The leaves and seed are astringent. Also used in religious ceremonies

47	Acanthaceae	*Andrographis paniculata* (Burm. f.) Wall.ex.Nees	Sirata Tita	Whole Plant Eaten as vegetable	Oct-Dec	₹ 20-30/ bundle	R, O	Considered to have great medicinal properties, used for stomach problems
48	Acanthaceae	*Phlogacanthus thyrsiflorus* Nees	Nongmagkha/ Ronga Tita Phul	Leaf and flower eaten as vegetable	Oct-Apr	₹ 10-30/ bundle	R, O	Leaf boiled with water for intake during Cold/Cough.
49	Asteraceae	*Xanthium strumarium* L.	Ogora	Young shoots & leaves are eaten as vegetable	Oct-Dec	₹ 20-30/ bundle	R, O	
50	Passifloraceae	*Mukia maderaspatana* (L.) Roem	Bon Tita Karela	Eaten as vegetables	Oct-Feb	₹ 50-60/ kg	R, O	
51	Piperaceae	*Piper nigram* L.	Jhaluk	Eaten as spices	Oct-Dec	₹ 30-50/ kg	C, A	
52	Oleaceae	*Nyctanthes arbor-tristis* L..	Hewali phul	Flower eaten as vegetable	Aug-Jan	₹ 20-30/ kg	C, A	Considered to have anti-bacterial, anti-helmintic and anti-inflammatory properties.

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Monocotyledons								
53	Alliaceae	*Allium sativum* L.	Naharu	Eaten as Spices	Oct-Dec	₹ 5-10/ bundle	C, A	
54	Amaryllidaceae	*Allium hookeri* Thwaites	Tlang purun/ Maroi Napakpi	Whole plant, roots used as spice	Oct-Apr	₹ 10-20/ bundle	C, A	
55	Asperagaceae	*Asparagus racemosus* Willd	Satmul	Tuberous roots has medicinal properties	Apr-Jun	₹ 50-100/ bundle	R, O	Considered the most important herb in Ayurvedic medicine for women. Used internally for infertility, loss of libido, threatened miscarriage, menopausal problems etc.
56	Dioscoreaceae	*Dioscorea alata* L.	Kath Aalu	Tuberous roots are eaten raw, boiled or fried	Nov-Dec	₹ 30-40/ kg	C, O	
57	Dioscoreaceae	*Dioscorea esculenta* (Lour.) Burk.	Mowa Aalu	Tuberous roots are eaten raw, boiled or fried	Nov-Dec	₹ 25-40/ kg	C, A	

58	Dioscoreaceae	*Dioscorea hamiltonni* Hook.f	Bon Aalu	Tuberous roots are eaten raw, boiled or fried	Nov-Dec	₹ 25-40/ kg	C, A	
59	Poaceae	*Bambusa tulda* Roxb.	Jati Bah gaaj	Young Rhizomes as vegetable	Jun-Aug	₹ 10-20/ shoot	C, A	
60	Poaceae	*Bambusa balooca* Roxb.	Bhaluka Bah gaaj	Young Rhizomes as vegetable	Jun-Aug	₹ 10-20/ shoot	C, A	
61	Poaceae	*Dendrocalamus hamiltonii* Gamble.	Kako Bah gaaj	Shoots as Vegetable/Pickle	Jun-Aug	₹ 10-20/ shoot	C, A	The shoots are fermented to make a local Assamese dish called *Kharisa*
62	Poaceae	*Melocanna baccifera* (Roxb.) Kurz	Muli Bah gaaj	Shoots as Vegetable/Pickle	Jun-Aug	₹ 10-20/ shoot	C, A	
63	Musaceae	*Musa paradisiaca* L.	Kach Kol	Whole green fruit is eaten as vegetable	Oct-Feb	₹ 5-10/ piece	C, A	It is considered rich source of iron by local people
64	Musaceae	*Musa assamica* G. Mann	Malbhog Kol Dil	Whole flower part is eaten as vegetable	Oct-Feb	₹ 20-30/ piece	C, A	It is considered rich source of iron by local people

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Monocotyledons								
65	Zingiberaceae	*Alpinia nigra* (Gaertn.) Burtt.	Tora (Pullei)	Tender shoots, Pith & Inflorence eaten as vegetable	Feb-Apr	₹ 10-20/ bundle	C, A	Considered to have medicinal properties. The rhizome is used as an aphrodisiac, tonic, diuretic, expectorant, appetizer and analgesic.
66	Zingiberaceae	*Hedychium spicatum* Sm.	Kor Phul Spiked Ginger Lily)	Tender shoots & Bulb easten as vegetable	Feb-Apr	₹ 10-20/ bundle	R, O	
67	Zingiberaceae	*Curcuma aromatic*	Bon Halodhi	Aromatic bulb eaten as spices	Oct-Feb	₹ 60-70/ kg	C, A	Considered to have medicinal properties of healing wounds and joint pains.
68	Zingiberaceae	*Zingiber officinale* Roscoe	Aada	Aromatic bulb eaten as spices	Oct-Feb	₹ 60-80/ kg	C, A	It is useful for treatment of nausea and arthritis pain
69	Arecaceae	*Calamus erectus* Roxb.	Raidang Bet	Ripe fruit & fleshy inner of young shoots are eaten	Apr-Jun	₹ 30-50/ bundle	R, O	

70	Araceae	*Alocasia cucullata* (Lour.) Schott.	Mukhi/Panch Mukhi Kochu	Tubers are eaten as vegetable	Nov-Mar	₹ 40-50/ kg	C, A	
71	Araceae	*Alocasia odora* (Roxb.) Koch	Dahi Kochu	Petioles are eaten cooked	Mar-Apr	₹ 20-30/ bundle	C, A	
72	Araceae	*Alocasia indica* (Lour.) Schott	Nal Kochu	Tubers, rhizomes and shoots are eaten cooked	Oct-Mar	₹ 30-40/ kg	C, A	
73	Araceae	*Amorphophallus bulbiferra* (Roxb.) Bl.	Ol Kochu	The whole plant is used as vegetable	Oct-Mar	₹ 20-25/ plant	C, A	
74	Araceae	*Alocasia* sp.	Koni/Horu Kochu	Tubers are eaten as vegetable	Nov-Mar	₹ 30-40/ kg	C, A	
75	Araceae	*Colocasia esculenta* (L.) Schott	Kola Kochu	Fresh, dried leaf sheath, tubers eaten as vegetable	Nov-Mar	₹ 30-40/ kg	R, A	
Pteridophyta								
76	Athyriaceae	*Diplazium esculentum* (Retz.) Sw.	Dhekia xak	Tender fronds are eaten as vegetable	Jun-Aug	₹ 10-20/ bundle	C, A	Considered a rich source of vitamins and minerals.

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Fungi								
77	Agaricaceae	*Agaricus bisporus* (J. E. Lange) Imbash	Button Mushroom	Whole part is consumed cooked	Oct-Feb	₹ 40-50/ kg	R, O	Considered good source of dietary fiber, Proteins, Vitamin C and other important minerals.
78	Pleurotaceae	*Pleurotus squarrosulus* (Mont) Singer	Mushroom	Whole part is consumed cooked	Feb-Apr	₹ 60-80/ kg	R, O	Considered good source of dietary fiber, Proteins, Vitamin C and other important minerals.
79	Pleurotaceae	*Pleurotus ostreatus* (Jacq.ex Fr.) Kummer	Mushroom (Uyen)	Whole part is consumed cooked	Feb-Apr	₹ 70-80/ kg	R, A	Considered good source of dietary fiber, Proteins, Vitamin C and other important minerals.
80	Auriculariaceae	*Auracularia delicata* (Mont).Henn	Uchina (Fungus)	Whole part is consumed cooked	Feb-Apr	₹ 60-80/ kg	R, A	Considered good source of dietary fiber, Proteins, Vitamin C and other important minerals.
81	Schizophy-llaceae	*Schizophyllum commune* Fries.	Kanglayen (Fungus)	Whole part is consumed cooked	Feb-Apr	₹ 60-80/ kg	R, A	Considered good source of dietary fiber, Proteins, Vitamin C and other important minerals.

Table-4:

List of tradable wild/semi-wild edible other resources available in the markets of study sites.

Sl. No.	Family	Scientific Name	Local Name	Common Uses	Seasonal Availability	Local Price (₹)	Status*	Associated Traditional Knowledge
Magnoliopsida (Dicotyledons)								
1	Saturniidae	*Samia cynthia ricini*	Eri Polu	Larvae and pupae eaten as food	Oct-Dec	₹ 60-80/ kg	C, A	Considered rich source of animal protein by local tribes
2	Crustacea	*Barytelphusa guerini*	Kekura	Eaten cooked as a delicacy	Oct-Dec	₹ 5/piece	R, O	Considered rich source of Calcium by local tribes
3	Turritellidae	*Turitella spp.*	Fresh Water Snail	Eaten cooked as a delicacy	Dec-April	₹ 40-50/kg	R, O	Considered rich source of Calcium by local tribes
4	Formicidae	*Oecophylla smaragdina*	Amloi Porua	Eaten cooked as a delicacy	Mar-May	₹ 60-70/ kg	R, O	Considered rich source of protein by local people

*Common (C) and Rare (R) status as per frequency of occurrence in the market places
*Abundant (A) and Occasional (O) status as per frequency of occurrence in the market places

WILD/SEMI-WILD EDIBLE FRUITS

Family: Moraceae

Round Jack fruit

Artocarpus chama Roxb.

Assamese Name: Sham Kathal

Nutritional Value:

Energy 95 kcal; carbohydrate 23.5gm; protein 1.72 gm; total fat 0.49gm; dietary fibres 1.5 gm; niacin 0.92 gm; vitamin C 13.7gm; vitamin E 0.34 gm; sodium 3mg; potassium 303mg; calcium 34 mg; phosphorus 36 mg; magnesium 37 mg; zinc 0.42 mg & small amount of beta-carotene, per 100gm.

Round Jack fruit

Artocarpus chama Roxb.

Characteristics: A large deciduous tree about 30-40 m in height with a girth of 3-5 m. Young shoots are dotted with long stiff hairs. Leaves are large and of variable sizes about 12-30 cm by 6-16 cm, elliptic-ovate or sub-round, entire or minutely dentate, obtuse and coriaceous. Little hairs are present both on dorsal and ventral surfaces, stipules large and amplexical. Flowering receptacle axillary, globose with long peduncle. Fruit is globose about 3-4 inches in diameter. The edible fleshy arils covered the seeds.

Flowering: March to April.

Fruiting: June to August (Summer Season).

Uses: The ripe fruits are sweet and eaten raw. The seeds are also eaten roasted or boiled. It is a good timber tree and used in making a variety of furniture etc.

Associated Traditional Knowledge: Considered to have medicinal properties of healing wounds. It is also reported to have anti-diabetic, anti-inflammatory and antioxidant properties. It is also useful in the treatment of stomach ulcers and constipation.

Family: Moraceae

Jack fruit

Artocarpus heterophyllus Lamk.

Assamese Name: Kathal

Nutritional Value:

Energy 95 kcal; total fat 0.6gm; carbohydrate 23 gm; protein 1.5 gm; dietary fibres 1.5 gm; sugar 19 gm; vitamin A 0.03 gm; vitamin C 13.7 gm; vitamin B6 0.15gm; sodium 2mg; potassium 448mg; calcium 36 mg; iron 0.01 mg & magnesium 37 mg, per 100gm.

Jack fruit

Artocarpus heterophyllus Lamk.

Characteristics: A large deciduous tree about 8-25 m in height with greyish-brown bark. The leaves are about 4-25 x 2-12 cm, coriaceous, glossy and usually glabrous with dark green on the top and pale green underside. Individual flower borne on an elongated axis forming a racemoid inflorescence. The tree bears multiple fruit consisting of several achenes (syncarp), each of which is indehiscent and one-seeded, cauliflorus, 20-100 x 15-50 cm in size. The entire fruit weighs around 4.5-50 kg; oval, oblong or ellipsoid, dark green when young, yellow or brownish when mature. They are the largest tree-borne fruits in the world. Inside are the fruitlets about 4-11 x 2-4 cm in size, composed of fleshy aril and the seed. Fruits contain more than 500 firm or waxy seeds.

Flowering: March to April.

Fruiting: June to August (Summer Season).

Uses: The ripe fruits are sweet and eaten raw. The seeds are also eaten roasted or boiled and as vegetables.

Associated Traditional Knowledge: Considered to have anti-bacterial, anti-inflammatory and anti-diabetes properties. It is also reported to be an antioxidant, used for treatment of fever, stomach ulcers and constipation. Local people used jackfruit leaves poultices for healing bruises and wounds. It is also believed to be a remedy for snake bites.

Family: Moraceae

Monkey fruit or Monkey Jack

Artocarpus lakoocha Roxb.

Assamese Name: Dewa Chali or Bohot

Source: Internet

Nutritional Value:

Energy 90 kcal; total fat 0.4 gm; carbohydrate 21.2 gm; protein 1.2 gm; dietary fibres 1.5 gm; sugar 19 gm; vitamin A 0.03 gm; vitamin C 15.7 gm; sodium 4mg; potassium 425mg; calcium 32 mg; iron 0.01 mg & magnesium 35 mg, per 100gm.

Monkey fruit or Monkey Jack

Artocarpus lakoocha Roxb.

Characteristics: A large deciduous tree with spreading crown about 20 m in height. Leaves are about 4-12 inch long, broadly oblong, coriaceous, rough above and soft pubescent beneath. The flowers are unisexual. Male and female flowers in separate spherical heads but on the same tree. Male flowers are yellow-orange while the female are reddish. Fruits are irregularly lobed, velvety, yellow or orange red when ripe.

Flowering: February to May.

Fruiting: July to August (Summer Season).

Uses: The ripe fruit and male flower are eaten raw, boiled, steamed or roasted. The wood is hard and termite resistant and are used in heavy construction, poles, furniture, boats and plywood etc.

Associated Traditional Knowledge: Apart from a good timber, the tree is also reported to have some medicinal properties. The root is an astringent and is used as a purgative; when macerated it can be used as a poultice for skin ailments. The bark are also used to treat headache.

Family: Moraceae

Mulberry

Morus alba L.

Assamese Name: Nuni/ Kiskuri

Source: Internet

Nutritional Value:

Per 100 gms, the fruit contain water 87.5 gm; total fat 0.49gm; carbohydrate 8.3 gm; protein 1.5 gm; dietary fibres 1.4 gm; sugar 19 gm; sodium 2mg; potassium 448mg; calcium 80 mg; phosphorus 40 mg; iron 1.9 mg; vitamin A 174 mg; thiamine 9mg; riboflavin 184 mg; nicotinic acid 0.8 mg & ascorbic acid 13 mg.

Mulberry

Morus alba L.

Characteristics: A moderate sized deciduous tree which can reach up to a height of about 20m. Sometimes grows as a shrub. The leaves are ovate, caudate-acuminate, lobed, membranous and pubescent when young. Flowers appear with young leaves. The flowers are single-sex catkins; male catkins are 2–3.5 cm long and female catkins are 1–2 cm long. Male and female flowers are usually on separate trees although they may occur on the same tree. The fruits are about 2–3 cm long, ovoid or sub-globose, greenish-yellow when young, red at maturity and ultimately black when ripe.

Flowering: March to April.

Fruiting: June to August (Summer Season).

Uses: The ripe fruits are eaten fresh. One of the primary uses of the plant is for rearing silkworms.

Associated Traditional Knowledge: The root bark of the plant is used in traditional medicine for curing dental caries. It is also considered to have some anti-venom properties. It is also reported to have anti-oxidant and anti-helmintic properties.

Family: Arecaceae

Cane fruit

Callamus erectus Roxb.

Assamese Name: Bet Guti

Nutritional Value:

This fruit is rich in Vitamins and minerals such as vitamin C, vitamin A, vitamin E, Calcium, magnesium and phosphorous.

Cane fruit

Callamus erectus Roxb.

Characteristics: A small tree with hairy young shoots. The leaves are large and of variable sizes, thinly coriaceous, glossy green above, pubescent beneath. Receptacle is in pair or cluster on old stem even at the base of the tree. Fruits are about 2cm long, roundish, with a thin scaly pattern cover which turn reddish brown when ripe. The fleshy aril covered the seed.

Flowering: December to February (or Year Round).

Fruiting: April to May (or Year Round).

Uses: The ripe fruit which is very acidic and can be eaten raw. Young leaves and shoots are eaten as cooked vegetable.

Associated Traditional Knowledge: Considered to have anti-diabetic and anti-oxidant properties The fruit is considered an essential item for offering to the Gods during traditional New Year celebration rituals of Assamese Manipuri communities locally called as "*Cheiraoba*".

Family: Clusiaceae

Garcinia

Garcinia pedunculata Roxb.

Assamese Name: Bor Thekera

Nutritional Value:

Energy 63 kcal; carbohydrate 15.6gm; protein 0.5 gm; total fat 0.4gm; dietary fibres 5.1 gm; niacin 0.28 gm; riboflavin 0.05 mg; vitamin C 7.2 mg; sodium 7mg; potassium 48mg; calcium 5.49 mg; phosphorus 9.21 mg; magnesium 13.9 mg; zinc 0.12 mg & small amount of alpha & beta-carotene per 100gm.

Garcinia

Garcinia pedunculata Roxb.

Characteristics: A large evergreen tree with fluted trunk and short spreading branches. The leaves are lanceolate with prominent midribs. Male flowers are light green in sparsely flowered panicles. The female flowers are solitary. The fruit is roundish or globose with a diameter ranging between 8 to 12 cm. It has a juicy interior with edible fleshy arils.

Flowering: March to April.

Fruiting: July to August.

Uses: The ripe fruit is eaten cooked or raw. Usually the ripe or raw fruits are sliced, sun-dried and preserved. Local people used the slices for preparing delicacies like "*tenga diya masor jol*" meaning Assamese sour fish curry. It can also be prepared with other vegetables, especially fritters made with lentils. Pickles are also prepared.

Associated Traditional Knowledge: Considered to have medicinal properties for gastro intestinal ailments such as dysentery. The fruit is sliced into small pieces, and then dried under the direct sunlight about 10-15 days for preservation. The seeds are separated and discarded. The processed product is known as "*Suthi*" in Assamese. Healing value of the dried form of the fruit increases on the length of its preservation. The more it is old, the more it is effective.

Family: Flacourtiaceae (or Salicaciae)
Indian Plum/Coffee Plum
Flacourtia jangomas (Lour.) Raeusch
Assamese Name: Ponial

Nutritional Value:
Energy 94 kcal; carbohydrate 24.2 gm; protein 0.5 gm; total fat 0.6gm; dietary fibres 1.2 gm; vitamin C 5mg; niacin 0.4 mg; thiamine 0.01 mg; riboflavin 0.02 mg; potassium 171mg; calcium 33mg; phosphorus 17mg & iron 0.7mg, per 100gm.

Indian Plum/Coffee Plum

Flacourtia jangomas (Lour.) Raeusch

Characteristics: A small evergreen tree or shrub bearing compound spines on the trunk up to about middle edges. It produces small white to green fragrant flowers which occurs on lateral shoots. Fruits are globose in shape and it turns dark purple when ripe. It is covered by persistent stigmas

Flowering: March to April.

Fruiting: August to October.

Uses: The fruits are acidic and are eaten raw or cooked as jam.

Associated Traditional Knowledge: Considered to have antibacterial properties. The barks are also used in traditional medicines for curing stomach ailments (bowel movements). The fruit and leaves are used in the treatment of diarrhoea and roots are also used for treatment of tootache by local people.

Family: Passifloraceae

Passion fruit

Passiflora endulis Sims.

Assamese Name: Lata Bael

Nutritional Value:

Energy 97 kcal; carbohydrate 23.38gm; protein 2.70 gm; total fat 0.70gm; dietary fibres 10.40 gm; niacin 1.5 gm; riboflavin 0.13mg; vitamin C 30 mg; vitamin K 0.7 mg; potassium 348mg; calcium 12 mg; phosphorus 68 mg; magnesium 29 mg & small amount of beta-carotene, per100gm.

Passion fruit

Passiflora endulis Sims.

Characteristics: A vine with densely hispid branchlets. The leaves are usually 3-5 lobed to halfway, sub-orbicular-ovate and appressed glandular-pubescent. The base of the leaves are cordate, margin sub-entire to ciliate, apex acute; stipules sub-reniform, deeply cleft into glandular processes. Flowers are about 4 cm across, axillary, often solitary and hermaphrodite. Bract and bracteoles about 2-3 cm, deeply pinnateisect, glandular-pubescent. Calyx tube short and saucer shaped, lobes ovate-lanceolate. Petals are slightly shorter than the calyx lobes. The fruit is berry, sub-globose, approximately 4 cm across.

Flowering: July to September.

Fruiting: October- November.

Uses: The aromatic pulp of the ripe fruit is consumed raw, juiced, made into syrup or used as sauces. An edible oil is also obtained from the seed.

Associated Traditional Knowledge: Considered to be a stimulant and tonic and also reported to have antioxidant properties. The flowers are also used to treat nervous disorders, bronchial conditions, arthritis, asthma, insomnia, gastrointestinal disorders and menopausal symptoms.

Family: Cucurbitaceae

Snap Melon

Cucumis melo L.

Assamese Name: Chiral/Bangee

Nutritional Value:

Energy 34 kcal; carbohydrate 8.6gm; protein 0.84gm; total fat 0.19 gm; dietary fibres 0.9 gm; vitamin C 36.7 mg; vitamin K 2.5 mg; sodium 1mg; potassium 269mg; calcium 9 mg; magnesium 12 mg; Zinc 0.18 mg & small amount of alpha-carotene, per100gm.

Snap Melon

Cucumis melo L.

Characteristics: The plant is an annual climber, able to climb with the help of tendrils, but more commonly sprawling along the ground. Leaves are simple, broad and ovate. Flowers are unisexual and axillary. Male flowers in clusters of 2-3 individuals while female flowers are solitary and yellow in colour. The fruit is smooth either cylindrical or oval in shape about 12-15 cm long and 5-8 cm wide with a mealy, somewhat insipid or slightly sour flesh.

Flowering & Fruiting: August to September.

Uses: The fruit is consumed raw or cooked. The seed is rich in oil with a nutty flavor.

Associated Traditional Knowledge: The fruit is used as a cooling light cleanser or moisturizer for the skin. Also used as a first aid treatment for burns and abrasions. The seed is anti-tussive, digestive, febrifuge and vermin-fuge. The root is also diuretic and emetic.

Family: Sapotaceae

Bullet wood/ Spanish Cherry

Mimusops elengi Roxb.

Assamese Name: Bokul

Nutritional Value:

Protein 0.48gm; vitamin C 15.67 mg; vitamin A 0.05 mg; calcium 83 mg; phosphorus 17 mg & iron 0.92 mg, per100 gm.

Bullet wood/ Spanish Cherry

Mimusops elengi Roxb.

Characteristics: A small to large evergreen tree of about 15m with almost round crown. Generally characterized by a short, dark and very rough trunk. The ark is dark grey. Leaves dark-green, elliptic-acuminate, shining and glabrous. Flowers 8-merous, creamy white with pleasant fragrant and star like, solitary. Fruit is generally globose about 1 inch long, yellow-orange when ripe.

Flowering: March to July.

Fruiting: October to December (Cold season).

Uses: Ripe fruits are eaten, very astringent and consumed by local people for its rich calcium content. Flowers are generally used for garlands. The whole plant is used as ornamental and shade provider.

Associated Traditional Knowledge: The whole plant have been used in various traditional medicines for treatment of toothache and bleeding gum. The bark is used for cooling, a cardio tonic, alexipharmic, stomachic, anthelmintic and astringent which cures biliousness. The root is aphrodisiac, diuretic, astringent to the bowel, good for gonorrhea and used as a gargle which cures relaxation of the gums.

Family: Elaeocarpaceae

Indian Olive

Elaeocarpus floribundus Blume.

Assamese Name: Jolphai

Nutritional Value:

Energy 115 kcal; carbohydrate 6.26 gm; protein 0.84gm; total fat 10.68 gm; dietary fibres 3.2 gm; vitamin C 0.9mg; vitamin E 1.65mg sodium 735mg; potassium 8mg; calcium 88 mg; magnesium 4 mg; phosphorus 3mg; iron 3.31mg; zinc 0.22 mg & small amount of beta-carotene, per100gm.

Indian Olive

Elaeocarpus floribundus Blume.

Characteristics: An evergreen tree with a spreading crown and an average height of up to 20 to 40 m, though often smaller. Generally found in wild as well as in the household garden for its edible popular fruit. The leaves are ovate, elliptic, often rounded at the base, 5 to 12 cm long, glabrous, blistered on both surfaces when dry, acute or shortly acuminate, irregularly crenate. It turns bright red before falling. Flowers are small and white, in drooping racemes, in the axils of fallen leaves. The greenish fruit is drupe, about 3 to 4 cm long, oblong, narrowed at the base, bluntly pointed at the apex.

Flowering: May to August.

Fruiting: November to December.

Uses: The mature fruit is eaten fresh or cooked and also as pickles.

Associated Traditional Knowledge: Considered to have medicinal properties. The local people used the leaves in rheumatism. Fruits are prescribed in dysentery and diarrhea. Infusion of the bark and leaves are used as mouth wash for inflamed gum.

Family: Euphorbiaceae

Burmese Grape

Baccaurea sapida (Roxb.) Muell

Assamese Name: Leteku

Nutritional Value:

Energy 56 kcal; water 3.56 gm; carbohydrate 5.19 gm; protein 0.58gm; total fat 0.07 gm; ash 0.38 gm; vitamin C 273 mg; sodium 35 mg; potassium 730mg; calcium 75 mg; magnesium 504 mg & phosphorus 132mg, per100gm.

Burmese Grape

Baccaurea sapida (Roxb.) Muell

Characteristics: A middle size tree species of about 5-10 m height and dioecious in nature. The leaves are moderate size, membranous and elliptic-oblong in shape. Flowers come out from old trunk as raceme inflorescences. The capsular fruit is roundish to oval in shape and is greenish while immature which turns into yellow when ripe. Seeds are orbicular inside the capsule and normally 3-4 seeds are embedded in rose coloured pulp (or aril).

Flowering: April to May.

Fruiting: June to August.

Uses: The fruits are consumed raw.

Associated Traditional Knowledge: The acidic fruits are considered to have medicinal properties and are used in the treatment of skin diseases.

In West Bengal, the local people used the fruits in ritual purposes during "Holy Chariot Procession of Lord Jagannath" where people pay their homage to the God by throwing the fruit along with other rituals.

Family: Euphorbiaceae

Indian Gooseberry

Phyllanthus emblica L.

Assamese Name: Amlokhi

Nutritional Value:

Energy 44 kcal; carbohydrate 10.18 gm; protein 0.88gm; total fat 0.58 gm; dietary fibres 4.3 gm; niacin 0.30 gm; thiamine 0.04 gm; vitamin C 27.7 mg; sodium 1mg; potassium 198mg; calcium 25 mg; magnesium 10 mg; phosphorus 27mg & iron 0.31mg, per100gm.

Indian Gooseberry

Phyllanthus emblica L.

Characteristics: A small to medium size deciduous tree, reaching about 8 to 18 m in height, with a crooked trunk and spreading branches. Leaves are pinnate with small leaflets and light green in colour. The flowers are monoecious and greenish yellow. The fruit is nearly spherical, light greenish yellow, quite smooth and hard on appearance, with six vertical stripes or furrows.

Flowering: March to May.

Fruiting: June to September.

Uses: The fruits are consumed raw or dried. The fruits are also used in culinary dishes. Pickles are also prepared. Popularly known as *Amla* they are also used in Shampoos and hair oils

Associated Traditional Knowledge: Considered highly medicinal in Ayurveda and Unani system of traditional Indian medicine. All parts of the plant are used in various herbal preparations, including the fruit, seed, leaves, root, bark and flowers. It is also believed to nourish the hair and scalp and prevent premature graying of hair.

Family: Euphorbiaceae

Malay Gooseberry or Star Gooseberry

Phyllanthus acidus (L.) Skeels

Assamese Name: Pomlokhi or Pora Amlokhi

Nutritional Value:

Energy 44 kcal; carbohydrate 9.18 gm; protein 0.85gm; total fat 0.48 gm; dietary fibres 4.3 gm; vitamin C 35.6 mg; sodium 1mg; potassium 190mg; calcium 25 mg; magnesium 10 mg; phosphorus 27mg & iron 0.31mg, per100gm.

Malay Gooseberry or Star Gooseberry

Phyllanthus acidus (L.) Skeels

Characteristics: A small deciduous tree or shrub, reaching 2 to 9 m in height. The leaves are ovate or lanceolate in form, with short petioles and pointed ends about 2 to 7.5 cm long. They are green and smooth on the upper-side and blue-green on the underside. The flowers are small and pinkish and appear in clusters in 5 to 12.5 cm long panicles at leafless parts of the main branches, at the upper part of the tree. The fruits are numerous, oblate, with 6 to 8 ribs, and are densely clustered. They are pale yellow or white, waxy, crisp, juicy and very sour. About 4 to 6 seeds are contained in a stone at the center of each fruit.

Flowering: April to May.

Fruiting: June to August.

Uses: The acidic fruits are eaten raw or as pickles.

Associated Traditional Knowledge: The acidic fruits are considered to have medicinal properties and are consumed as blood-enhancer for liver. The syrup is also used in the treatment of stomach ailments. The peppered leaves are used to make a poultice for treatment of rheumatism.

Family: Rosaceae

Plum

Prunus domestica L.

Assamese Name: Plum

Nutritional Value:

Energy 46 kcal; carbohydrate 11.42 gm; protein 0.70gm; total fat 0.28 gm; dietary fibres 1.4 gm; vitamin C 9.5 mg; vitamin E 0.26mg; sodium 1mg; potassium 157mg; calcium 6 mg; magnesium 7 mg; phosphorus 16mg; iron 0.17 mg & small amount of beta-carotene, per100gm.

Plum

Prunus domestica L.

Characteristics: A small deciduous tree with rounded crown which grows to a height of about 6 to 15 m. It is usually thorn less and has a scaly dark brown bark. The leaves are simple and elliptic about 4 to 10 cm in length and are a matt dark green above and a lighter green below, turning yellow, orange or red in the autumn. The flowers are white or greenish white that are about 1 to 2.5 cm in diameter, that usually grows solitary or in pairs. The fruits are globose or ovoid drupes with blossom, measuring between 4 to 8 cm and are red or dark purple in colour.

Flowering: March to April.

Fruiting: June to August.

Uses: The ripe fruit is eaten raw or dried and as Jams and jellies. Wines are also made from the fruit.

Associated Traditional Knowledge: Considered highly medicinal. The dried fruit, known as prunes, is a safe and effective laxative and is also good for stomach ailments. It also has antioxidant properties.

Family: Rosaceae

Pear

Pyrus communis L.

Assamese Name: Nachpati

Nutritional Value:

Energy 58 kcal; carbohydrate 13.81 gm; protein 0.38 gm; total fat 0.12 gm; dietary fibres 3.1 gm; vitamin C 4.2mg; vitamin E 0.12mg; riboflavin 0.025mg; sodium 1mg; potassium 119mg; calcium 9 mg; magnesium 7 mg; phosphorus 11mg; zinc 0.10 mg & small amount of beta-carotene, per100gm.

Pear

Pyrus communis L.

Characteristics: A medium sized deciduous tree, reaching 7-10 m tall often with a tall, narrow crown. The leaves are alternately arranged, simple, 2-12 cm long, glossy green on some species or dense silvery-hairy in some others, shape varies from broad oval to narrow lanceolate. The flowers are white, rarely tinted yellow or pink, 2-4 cm in diameter and have five petals. The fruit is globose and is composed of the receptacle or upper end of the flower-stalk greatly dilated. Enclosed within its cellular flesh is the true fruit.

Flowering: April to June.

Fruiting: July to August.

Uses: The fruit is consumed raw, canned as juice and dried. Jams and jellies are also prepared.

Associated Traditional Knowledge: Considered to have diuretic properties and stimulates the urine elimination. Also have analgesic properties. In external use, the bark is used in decoctions and believed to mitigate the pains produced by blows, twists, sprains and bruises etc.

Family: Fabaceae

Tamarind

Tamarindus indica L.

Assamese Name: Teteli

Nutritional Value:

Energy 239 calories; total fat 0.6gm; sodium 28mg; potassium 628mg; carbohydrate 62 gm; dietry fibres 5 gm; sugar 57 gm; protein 2.8 gm; vitamin C 5%; vitamin B6 5%; calcium 7 %; iron 15% & magnesium 23% per 100 gms of the fruit plup.

Tamarind

Tamarindus indica L.

Characteristics: A large evergreen tree about 10 to 15 m tall. The crown has an irregular, vase shape outline of dense foliage. It has rough bark and its branchlets are warty tormentose. Leaves are evergreen, bright green in colour, elliptical ovular; arrangement is alternate and are even pinnate; leaflets are 15 to 17 pairs, small, narrowly oblong, base and apex obtuse, margin entire. Racemes are terminal on short peduncle. Flowers are 2cm across, red or pale yellow. The fruit is an indehiscent legume, sometimes called as a pod, 12 to 15 cm in length with a hard brown shell, flat usually curved. Seeds are dark brown and smooth when ripe.

Flowering: April to June.

Fruiting: October to December (Cold season).

Uses: The fruit is eaten raw or dried. Jams and jellies are also prepared along with pickles or eaten as chutneys or curries. Tender leaves are eaten as vegetables to make special tangy curries. The wood is used to make furniture.

Associated Traditional Knowledge: Local people believed planting tamarind tree in front of house brings bad omen. People used the fruit as a poultice applied to foreheads for treating fevers. It is also reported to have laxative, anti-microbial, anti-parasitic, anti-fungal, anti-viral and anti-nematodal properties. They are also used for treatment of stomach ailments such as abdominal pain, diarrhea and constipation.

Family: Myrtaceae

Silver Berry

Elaeagnus caudata Schl.ex Momiyana

Assamese Name: Mirika Tenga

Nutritional Value:

The fruit contains about 8.3% sugars;
4.5 % protein/ 1% ash and about 12 mg vitamin C per 100 gm.
Rich source of vitamins and minerals especially, vitamin A, C & E, flavanoids and other bio-active compounds.

Silver Berry

Elaeagnus caudata Schl.ex Momiyana

Characteristics: A large woody evergreen scandent shrub with spine. Leaves are variable, alternate, ovate-oblong, glabrous and clothed beneath with silvery or ferruginous scales. Flowers are peduncled, small and scented; periath are covered with ferruginous scales. Fruit is about an inch long, ovoid, ribbed, red when ripe, succulent and silky inside.

Flowering: November to February.

Fruiting: April to May.

Uses: The ripe fruit which is very acidic can be eaten raw or as pickles.

Associated Traditional Knowledge: Considered to have medicinal properties useful in constipation and as a health tonic. The root extract of the fruit is consumed during pregnancy to prevent miscarriage by local people. The fruit is considered an essential item for offering to the Gods during marriage ceremony rituals of Assamese Manipuri communities. As a result, the prices of the fruit goes up in off season.

Family: Myrtaceae

Jamun

Syzygium cumini (L.) Skeels

Assamese Name: Kola Jamu

Nutritional Value:

Energy 251 kcal; water 84.75 gm; fat 0.23gm; sodium 28mg; potassium 55 mg; carbohydrate 14 gm; dietry fibres 0.6 gm; sugar 57 gm; protein 0.995 gm; thiamine 0.01 mg; vitamin C 11.85 mg; vitamin B6 0.03 mg; calcium 11.65 mg; iron 1.41mg; magnesium 35 mg;
phosphorus 15.6 mg & sodium 26.2 mg per 100 gms of the fruit plup.

Jamun

Syzygium cumini (L.) Skeels

Characteristics: An evergreen tree reaching up to about 30 m and can live more than 100 years. The Leaves are smooth, glossy, elliptic to oblong or ovate. Flowers are greenish white in colour. The fruits are berry, oblong, black, juicy shining when thoroughly ripe.

Flowering: April to May.

Fruiting: June to July.

Uses: The ripe fruits are eaten raw. Jams and jellies are also prepared. The wood is water resistant, because of which it is used in railway sleepers and used to install motors in wells. The leaves are used as food for livestock due to its high nutritive value.

Associated Traditional Knowledge: Widely used in Ayurveda, Unani and Chinese medicine system. Considered to have anti microbial properties, also used to treat digestive ailments. The barks and seeds are used as medicine for diabetics.

** Specially consumed by local people for its high sources of vitamin A and vitamin C.

Family: Combretaceae

Chebulic Myrobalan

Terminalia citrina Roxb. ex Flem.

Assamese Name: Hilikha

Nutritional Value:
Energy 143 kcal; water 58 gm; carbohydrate 9 gm; protein 4gm;
potassium 64mg; calcium 128 mg; magnesium 67 mg & zinc 0.20 mg, per100gm.

Chebulic Myrobalan

Terminalia citrina Roxb. ex Flem.

Characteristics: A large deciduous tree with alternate opposite leaves reaching about 10m in height. Flowers are yellowish white with offensive smell arranged in axillary spikes. The drupaceous fruit is ovoid in shape with more or less five ridges.

Flowering: April to May.

Fruiting: March to February.

Uses: The unripe & ripe fruits are consumed raw or boiled. The fruits are also dried and preserved for medicinal properties. Usually chewed after meals as digestive by local people.

Associated Traditional Knowledge: It is considered one of the best medicinal plants or tanning material. Believed to be a remedy for all illness or diseases hypothetically, it is used widely in Ayurvedic medicines. It is reported to improve digestion power and help in cleaning bowels and useful in dysentery. They are also useful topically as mouthwash and gargle for treatment of sore throat and cough.

Family: Trapaceae

Water Chestnut

Trapa natans L. var. *bispinosa* (Roxb.) Makino

Assamese Name: Bor Singori/ Paniphal

Nutritional Value:

Energy 5 calories; total fat 0.06gm; carbohydrate 12.3 gm; dietry fibres 2.5 gm; sugar 2.46 gm; protein 0.88 gm; sodium 8mg; potassium 118mg per 100 gms of the fruit plup

Water Chestnut

Trapa natans L. var. *bispinosa* (Roxb.) Makino

Characteristics: An aquatic floating herb with dimorphic leaves. The submerged leaves are modified into thread like segments and floating leaves are in rosettes like segments, green and rhomboid. Flowers are white, close to surface of water. Fruits are single seeded, hard obovoid with two short beak and lateral sharp spines. Dark brown or black when ripe. It is most common in all ponds and *beels* of the state.

Flowering: October to November.

Fruiting: October to March.

Uses: The fruit is eaten raw, roasted or cooked.

Associated Traditional Knowledge: Considered to have aphrodisiac, astringent, anti-pyretic, anti-diarrheal and appetizing properties. Also consumed as tonic. Widely used in Unani medicine in cases of sexual debility, fatigue, tuberculosis, intermittent fevers, dysentery, dry cough, bleeding disorders, anal fissure and sore throat etc.

Family: Rutaceae
Wood Apple
Aegle marmelos Correa
Assamese Name: Bael

Nutritional Value:
Energy 140 kcal; carbohydrate 31 gm; dietry fibres 1.6 gm; protein 2 gm; vitamin C 0.85 mg; vitamin B6 0.03 mg; thiamine 0.01 mg; riboflavin 0.13mg & sodium 1 mg per 100 gms of the fruit plup.

Wood Apple

Aegle marmelos Correa

Characteristics: A tree with spinous branches about 6-10 m in height. Leaves are trifoliate. The flowers are greenish white in colour. Fruits are almost round and are about 2 - 7 inch in size. Outer shell is hard with a soft aromatic pulp.

Flowering: March to May.

Fruiting: March to June in the next year.

Uses: Ripe fruit pulps are consumed raw or by making juices. The pulp is laxative and it is also considered medicinal for indigestion and constipation.

Associated Traditional Knowledge: Considered highly medicinal by local people. It is useful for treatment of diarrhoea and dysentery. It is also a good laxative and useful in constipation. The leaves are reported to have anti-diabetic properties and are also useful for treatment of jaundice. *Bael* is a sacred plant for the Hindus. The fruit and the trifoliate leafs are an essential item/ingredient for Lord Shiva and Goddess Durga Puja. It is believed that praying Lord Shiva without *Bael* leafs/fruits will not fulfill the wishes of the person concerned.

Family: Rutaceae

Citron

Citrus medica L.

Assamese Name: Jara Tenga

Photo: N. Lakra

Nutritional Value:

Energy 29kcal; carbohydrate 9.32 gm; protein 1.1 gm; fat 0.3gm;
dietry fibres 2.8 gm; riboflavin 0.02mg; thiamine 0.01 mg; vitamin C 53 mg;
sodium 2.5mg; potassium 138mg; calcium 26 mg;
iron 0.6 mg & magnesium 8 mg per 100 gms of the fruit plup.

Citron

Citrus medica L.

Characteristics: A small tree or shrub that reaches a height of 3-6 m. It has irregular straggling branches and stiff twigs and long spines at the leaf axils. The evergreen leaves are green and lemon scented with slightly serrate edges, ovate lanceolate, about 3 -7 inches long. Flowers are white, usually tinged with red. Fruit is usually oblong and obovoid narrowing towards the stylar end, yellow when ripe and highly aromatic. The rind is leathery, furrowed and adherent. The inner portion is thick, white and hard. The pulp is acidic, but also can be sweet. It is a large fruit which can reach to about 4 - 5 kg if not picked before fully mature.

Flowering: Year Round.

Fruiting: Year Round (more during Spring).

Uses: The fleshy mesocarp of the fruit is sweet, eaten fresh and also the acid juice of the fruit is taken. The candied peel is sun dried or pickled. It is widely used in food industry as an aromatic ingredient.

Associated Traditional Knowledge: A common fruit associated with paddy harvesting in Assam. Local people especially women folks prefer to eat the acid fruit with salt and chilli during harvesting season. It is considered to be highly medicinal and is used for improving digestion, a remedy for motion sickness and pulmonary troubles etc. The peel is also used as a remedy for dysentery.

Family: Rutaceae

Acid Lemon (Assam lemon)

Citrus limon L.

Assamese Name: Nemu Tenga

Nutritional Value:

Energy 29 kcal; total fat 0.3gm; sodium 2mg; potassium 128mg; carbohydrate 9 gm; dietry fibres 2.8 gm; sugar 2.5 gm; protein 1.1 gm; vitamin C 88%; vitamin B6 5%; calcium 2 %; iron 3% & magnesium 2% per 100 gms.

Acid Lemon (Assam lemon)

Citrus limon L.

Characteristics: A small tree or shrub that reaches a height of 2 -5 m with spiny shoots and alternately arranged evergreen leaves. It has irregular straggling branches and stiff twigs and long spines at the leaf axils. The leaves are green and lemon scented with slightly serrate edges, ovate lanceolate, about 3 - 5 inches long. Flowers are solitary or in small corymbs, about 2 - 4 cm in diameter, with five white petals and numerous stamens and are often very strongly scented. Fruit is usually globose to elongated about 10 cm long and 57 cm in diameter, with a leathery rind or peel.

Flowering: Year Round.

Fruiting: Year Round (more during Spring).

Uses: The fruit eaten fresh and also the acid juice, rind and zest are used in a wide variety of foods and drinks. Lemon juice is used to make lemonade, soft drinks and cocktails. It is also used in marinades for fish.

Associated Traditional Knowledge: The most common fruit associated with Assamese Kitchen. A major source of Vitamin C, local people eat the acid fruit with rice, *dal* and other spicy curry. It is considered to be highly antibacterial and is consumed for improving digestion. The peel is also eaten as a remedy for worms. It is widely used in Ayurveda.

** India is the second largest producers of lemon in the world after China.

Family: Rutaceae

Pomelo or Shaddock

Citrus maxima Merr.

Assamese Name: Robab Tenga

Nutritional Value:

Energy 57 kcal; carbohydrate 10 gm; protein 0.94gm; total fat 0.12gm; dietry fibres 1 gm; vitamin C 53.2 mg; vitamin E 0.18 mg; sodium 1mg; potassium 216 mg; calcium 40 mg; iron 0.1mg; magnesium 10 mg; zinc 0.08mg & small amount of alpha & beta-carotene, per 100 gm.

Pomelo or Shaddock

Citrus maxima Merr.

Characteristics: A moderate size tree that reaches a height of 5 - 12 m with somewhat crooked trunk and low irregular branches. The young branchlets are angular and often densely hairy. Spines are present on the branchlets, old limbs and trunk. The leaves are alternate, ovate, 5 - 20 cm long and 2 - 12 cm wide, leathery, dull green, glossy above, dull and minutely hairy beneath. The flowers are fragrant, borne singly or in clusters of 2 - 10 in leaf axils and yellowish white in colour. The fruit ranges from nearly round to oblate or pear shaped, 10 - 30 cm wide. The peel, clinging or more or less easily removable, greenish yellow or pale yellow colour. The pulp varies from greenish yellow or pale yellow to pink or red and is divided into 10 to 10 segments, very juicy to fairly dry.

Flowering: March to May.

Fruiting: July to September.

Uses: The ripe fruit is eaten raw and made into preserves and fruit drinks. The white inner part of the peel can be candied. The aromatic flower is used to make perfumes also.

Associated Traditional Knowledge: Consumed as major sources of Vitamin C. Fruits and flowers are considered to have medicinal properties. The peel oil is used in skin care products due to its high antioxidant and anti inflammatory properties.

Family: Rutaceae

Key Lime

Citrus aurantifolia (Chirstm) Swing

Assamese Name: Gol Nemu

Nutritional Value:

Energy 47 kcal; carbohydrate 11.75 gm; protein 0.94gm; total fat 0.12gm; dietry fibres 2.4 gm; niacin 0.28mg; thiamine 0.01 mg; vitamin C 53.2 mg; vitamin E 0.18 mg; potassium 169 mg; calcium 40 mg; iron 0.1mg; magnesium 10 mg; zinc 0.08mg & small amount of alpha & beta-carotene, per 100 gm.

Key Lime

Citrus aurantifolia (Chirstm) Swing

Characteristics: A small tree that reaches a height of 3 - 6 m with irregular short, stiff twigs, small leaves and many small sharp thorns. The leaves are pale green about 3 - 5 cm long. The small white flowers are usually borne in clusters. The fruit is dark green in colour about 3 - 6 cm in diameter, oval or nearly globular in shape, often with small apical nipple. The peel is thin and greenish yellow when fruit is ripe. The pulp is tender, juicy, yellowish green in colour and highly acidic.

Flowering: Year Round.

Fruiting: Year Round (or June to August).

Uses: The acidic fruit is eaten fresh as a major source of Vitamin C. Pickles is also made. Squash, Juices and lemonades are also prepared from the pulp. The dried peel or rind is also use as flavoring agent.

Associated Traditional Knowledge: Considered to have antioxidant and antibacterial properties and are used in treatment of skin diseases. Local people preserved the fruit in mustard oil and stored it for treating stomach ailments. The older the better. It is also used to treat cough.

Family: Rutaceae

Orange

Citrus reticulata Blanco.

Assamese Name: Komla Tenga

Nutritional Value:

Energy 47 kcal; carbohydrate 11.75 gm; protein 0.94gm; total fat 0.12gm; dietry fibres 2.4 gm; niacin 0.28mg; thiamine 0.01 mg; vitamin C 53.2 mg; vitamin E 0.18 mg; potassium 169 mg; calcium 40 mg; iron 0.1mg; magnesium 10 mg; zinc 0.08mg & small amount of alpha & beta-carotene, per 100 gm.

Orange

Citrus reticulata Blanco.

Characteristics: A small tree that reaches a height of 5 - 7 m with slender branches and lance shaped shiny evergreen leaves. The leaves are not trifoliate but the petioles (leaf stems) are slightly winged. The flowers are white and highly fragrant. The orange colour round fruit is juicy and sweet with loose skin which is very easy to peel. They are about 5 - 10 cm in diameter and have easily divided sections. They are similar to oranges but usually smaller and looser skinned.

Flowering: March to May.

Fruiting: November to February.

Uses: The ripe fruit is eaten fresh. Squash, Jams and Jellies are also prepared from the pulp. The dried peel or rind is also use as flavoring agent. Local people burned the dried peel to repel insects.

Associated Traditional Knowledge: Considered to have analgesic, anti asthmatic, anti cholesterolemic, anti inflammatory, antiseptic and laxative properties and are widely used in the field of medicine.

Family: Anacardiaceae

Hog Plum

Spondias pinnata (L. f.) Kurz.

Assamese Name: Amora

Nutritional Value:

Fruit contains moisture 90.3%; fat 3%; fibre 1%; carbohydrate 4.5%; protein 0.7%; minerals 0.5%; calcium 36 mg; iron 3.9 mg; thiamine 0.02mg; riboflavin 0.02mg; vitamin C 1 mg per 100 gms.

Hog Plum

Spondias pinnata (L. f.) Kurz.

Characteristics: A middle sized deciduous tree with a pleasant aromatic acidic smell, reaching about 9 - 18 m in height. It remains leafless during winter season (December- March). Leaves are Compound with 3 pairs of opposite leaflets. The flowers are greyish-white or pale-yellow. Fruit is drupe about an inch long, acidic and aromatic. It becomes greenish yellow when ripe.

Flowering: April to May.

Fruiting: June to August.

Uses: The fruits are eaten raw when riped or as pickles or chutneys. The tender leaves and flower buds are also used in preparing a local fish delicacy.

Associated Traditional Knowledge: Considered to have anti-tubercular properties. The bark is used medicinally in treatment of diarrhea, dysentery and to prevent vomiting. The roots are also believed to be useful in regulating menstruation.

Family: Anacardiaceae

Bayberry

Myrica esculenta Buch-Ham.

Assamese Name: Naga tenga

Source: internet

Nutritional Value:

Water 7.54 mg; sugar 12.65 mg; vitamin C 41.2mg;
protein 0.097mg; phosphorus 0.019mg;
potassium 0.003mg' calcium 0.013mg & magnesium 0.004mg, per 100gm.

Bayberry

Myrica esculenta Buch-Ham.

Characteristics: A small medium height evergreen tree, about 6 - 8 m in height. The bark is soft and brittle. Leaves are conjoint, 1 - 2 ft long that has leaflets in pairs of about 6 to 9. Branchlets are spine-tipped. Flowers are small, white colour and found in bunches. Fruits are globose, succulent drupe, with a bard endocarp, pale green in colour turns deep red when ripe and are about 1 - 2 cm in diameter. Seeds are triangular in shape and are astringent in taste.

Flowering: May to September.

Fruiting: February to April.

Uses: The ripe fruit is very sour and are eaten raw or dried. Pickles are also prepared. Sometimes juices of the fruit are also consumed during hot weather.

Associated Traditional Knowledge: The acidic fruit is considered medicinal for remedy of colic pain. It is also reported to be useful in treatment of fever, cold, haemorrhage, asthma and bronchitis. The bark of the tree are used in the treatment of teeth disorders and in healing wounds and ulcers.

Family: Sapindaceae

Litchi

Litchi chinensis Sonner

Assamese Name: Lichu

Nutritional Value:

Energy 66 Kcal; total fat 0.4gm; potassium 171 mg; carbohydrate 17 gm; dietry fibres 1.3 gm; sugar 15 gm; protein 0.8 gm; vitamin C 11.9mg; vitamin B6 0.05mg; & magnesium0. 2mg per 100 gms of the fruit plup.

Litchi

Litchi chinensis Sonner

Characteristics: A large evergreen tree reaching about 6-12 m tall. The bark is grey-black, the branches a brownish-red. Leaves are 10-25 cm or longer, with leaflets in 2-4 pairs. Flowers grow on a terminal inflorescence with many panicles. The panicles grow in clusters of ten or more reaching 10-40 cm or longer, holding hundreds of small white, yellow or green flowers that are distinctively fragrant. The fruit varies in shape from round to ovoid to heart-shaped. The thin, tough inedible skin is green when immature, ripening to red or pink-red. The fleshy , edible portion of the fruit is an aril, surrounding one dark brown inedible seed that is about 1 - 3 cm long and about 0.6-1.5 cm wide.

Flowering: April to May.

Fruiting: June to August (Summer Season).

Uses: The fruit is eaten raw, canned or juiced.

Associated Traditional Knowledge: It has anti-cancer properties. The fruit has flavonoids in the pulp which helps fight fatal and lethal diseases like cancer. Also helps normalizing blood pressure thus preventing from strokes and coronary heart diseases. It also improves digestion and maintains healthy bones. Favorite fruit of local people for its high source of Vitamin B and Vitamin C and all other medicinal properties.

Family: Oxalidaceae

Star Fruit

Averrhoa carambola L.

Assamese Name: Kordoi

Nutritional Value:

Energy 31 kcal; carbohydrate 6.73 gm; protein 1.04gm; total fat 0.33gm; dietry fibres 2.8 gm; niacin 0.36mg; thiamine 0.01 mg; vitamin C 34.4mg; vitamin E 0.15 mg; sodium 2mg; potassium 133 mg; calcium 3 mg; magnesium 10 mg; phosphorus 12 mg & zinc 0.12mg.

Star Fruit

Averrhoa carambola L.

Characteristics: A small evergreen tree or shrub that grows up to an average height of 5 - 12 m, with pink to red purple flowers. The compound leaves are soft, medium green, spirally arranged around the branches in an alternated fashion. The pinnate leaves have a single terminal leaflet and 5 - 11 nearly opposite leaflets, each leaf is about 15 - 20 cm long. The leaflets are ovate or ovate oblong in shape. The top side is smooth and undersides are finely hairy and whitish. The flowers are small and bell shaped, with five petals that have whitish edges. The fruits are oblong, star shaped with five prominent ridges about 7 - 15 cm long and 9 cm wide. The fruits have a thin, waxy skin that is orange yellow colour. The juicy fruit is yellow inside when ripe with about 12 seeds which are flat, thin and brown.

Flowering: July to August.

Fruiting: October to January.

Uses: The mature ripe fruits are eaten fresh or cooked with sugar. Pickles, jelly and squash are also prepared. The acidic fruits have also been used to clean rusty or tarnished metal especially brass as well as bleach rust stains from cloth.

Associated Traditional Knowledge: Considered to have antioxidant and anti microbial properties. It is used as medicine for jaundice and kidney stone.

Family: Oxalidaceae

Bilimbi/Cucumber Tree

Averrhoa bilimbi L.

Assamese Name: Bilimbi Tenga

Nutritional Value:

Energy 46 kcal; carbohydrate 12.2gm; protein 0.4 gm; total fat 0.13 gm; dietary fibres 4.6 gm; vitamin C 13.3 mg; vitamin E 1.2 mg; sodium 2 mg; potassium 85 mg; calcium 8 mg; Magnesium 6 mg; phosphorus 13 mg; zinc 0.1mg and small amounts of beta-carotene per 100 gm of fruit pulp.

Bilimbi/Cucumber Tree

Averrhoa bilimbi L.

Characteristics: Bilimbi tree is attractive and at the same time is a long-lived tree which reaches up to a height of 5-10 m. Its trunk is short and quickly divides up into ramifications. The leaves are bunch up at the branch tips and are 12-20 m in length. The leaves comprise of 11-37 alternate leaflets with pointed tips. Small, fragrant, 5-petalled flowers, yellowish-green or purplish marked with dark-purple, are borne in small, hairy panicles. The fruit is ellipsoid, obovoid or nearly cylindrical, faintly 5-sided, 4-10 cm long; capped by a thin, star-shaped calyx at the stem-end and tipped with 5 hair-like floral remnants at the apex. They are crisp when unripe, turn from bright-green to yellowish-green, ivory or nearly white when ripe and falls to the ground. The outer skin is glossy, very thin, soft and tender, and the flesh green, jelly-like, juicy and extremely acid. There may be a few about 6 or 7 flattened, disc-like seeds about 6 mm wide, smooth and brown.

Flowering: February to April.

Fruiting: May to October.

Uses: Ripe fruits are taken raw or dried. It is also useful for making jelly, jam and syrup. They are used as souring agents in curries and soups.

Associated Traditional Knowledge: Bilimbi has been used in traditional medicinal practices for centuries. It is reported that Bilimbi drinks cools down fevers and when drank as a syrup, the vitamin C combats bowel hemorrhages, stomach problems and internal hemorrhoids. The fruits when applied topically as a mashed paste, it get rid of acne and rheumatism. The leaves are also reported to reduce rectal inflammation. Traditional healers used a paste from the fruit to help new mothers heal from childbirth.

Family: Bromeliaceae

Pineapple

Ananas cosmosus (L.) Merr

Assamese Name: Mati Kothal/ Anaras

Nutritional Value:

Energy 50 kcal; carbohydrate 13.52 gm; protein 0.54gm; total fat 0.12gm; dietry fibres 1.4 gm; niacin 0.50mg; vitamin C 47.8 mg; sodium 1mg; potassium 109 mg; calcium 13 mg; iron 0.29mg; magnesium 12 mg; zinc 0.08mg & small amount of beta-carotene, per 100 gm.

Pineapple

Ananas cosmosus (L.) Merr

Characteristics: The pineapple is a herbaceous perennial, which grows to 1 to 2 tall. The plant has a short, stocky stem with tough, waxy leaves. It has 30 or more long, narrow, fleshy, trough-shaped leaves with sharp spines along the margins that are 30 cm long, surrounding a thick stem. The stem grows into a spike-like inflorescence up to 15 cm long with over 100 spirally arranged, trimerous flowers, each subtended by a bract. Flower colour varies, depending on variety, from lavender, through light purple to red. The ovaries develop into berries, which coalesce into a large, compact, multiple accessory fruit. The fruit of a pineapple is arranged in two interlocking helices, eight in one direction and thirteen in the other. Each of the eyes on the surface is the dried base of a small flower.

Flowering: April to May.

Fruiting: June to July (available till November).

Uses: The fruit is eaten fresh, cooked, canned or as juices. Jams and jellies are also prepared along with pickles or eaten as chutneys or curries.

Associated Traditional Knowledge: Considered to have digestive, diuretic, laxative, diaphoretic and anti-microbial properties. In traditional medicine both the fruit and root may be eaten or applied topically as an anti-inflammatory or as a proteolytic agent. In some practices, it may be used to induce abortion or menstruation or as an anti-helminthic agent. Also used to treat gastric irritability and jaundice.

Family: Annonaceae

Custard Apple

Annona squamosa L.

Assamese Name: Atlas/Ata Kathal/Ataphal

Nutritional Value:

Energy 101 kcal; carbohydrate 25.2gm; protein 2.47 gm; total fat 0.6 gm; dietary fibres 6.6 gm; niacin 1.19 mg; vitamin C 44.4 mg; nicotinic acid 0.5mg; sodium 3mg; potassium 382 mg; calcium 27 mg; Magnesium 18mg; phosphorus 32.1 mg; iron 1.14mg; ash 1.11 gm and moisture 80.1 gm, per 100 gm of fruit pulp.

Custard Apple

Annona squamosa L.

Characteristics: A moderate sized erect deciduous tree with a rounded or spreading crown and trunk 10 to 14 inch thick. Height ranges from 4.5-10 m. The ill-smelling leaves are deciduous, alternate, oblong or narrow-lanceolate, 10-20 cm long and 2-5 cm wide, with conspicuous veins. Flowers, in drooping clusters, are fragrant, slender, with 3 outer fleshy, narrow petals about 2-3 cm long; light-green externally and pale-yellow with a dark-red or purple spot on the inside at the base. The compound fruit is about 8-16 cm in diameter, may be symmetrically heart-shaped, lopsided, or irregular; or nearly round, or oblate, with a deep or shallow depression at the base. The skin, thin but tough, may be yellow or brownish when ripe. There is a thick, cream-white layer of custard like, somewhat granular, flesh beneath the skin surrounding the concolorous moderately juicy segments, in many of which there is a single, hard, dark-brown or black seed about 1-2 cm long.

Flowering: April to May.

Fruiting: August to November.

Uses: The ripe fruits are eaten fresh. The leaves have also been employed in tanning and they yield a blue or black dye.

Associated Traditional Knowledge:

Considered highly medicinal by local people. The leaf decoction is given as a vermifuge. Crushed leaves or a paste of the flesh may be poulticed on boils, abscesses and ulcers. The fruits are used for treatment of anaemia, diarrhoea and dysentery. The bark is reported to be very astringent and the decoction is taken as a tonic. Root barks are also useful for relieving toothache. Additionally, local traditional healers use the fruit to treat burning conditions, vomiting and coughs.

Family: Euphorbiaceae

Black Current Tree

Antidesma ghaesembilla Gaertn.

Assamese Name: Heloch

Nutritional Value:

Energy 64.6 kcal; carbohydrate 10.9 gm; protein 1.81 gm; total fat 0.02 gm; dietary fibres 1.5 gm; vitamin C 111.2 mg; sodium 9.26mg; potassium 304 mg; iron 0.76 mg and moisture 82.8 gm per 100 gm.

Black Current Tree

Antidesma ghaesembilla Gaertn.

Characteristics: A moderate sized tree up to 20 m in height with pubescent young twigs. The leaves are stalked, alternately arranged and are papery to thinly leathery, covered with fine hairs, oblong in shape (sometimes ovate or drop shaped), 3-7 cm long by 3-5 cm wide. The leaf base is rounded to heart-shaped while the leaf tip is usually rounded. Flowers are tiny yellow-green to yellow-red which are borne on branched axillary or terminal inflorescences axillary and terminal. The plant is dioecious, bearing female and male flowers on different trees. The male inflorescenes are longer, about 4-8 cm long, while the female inflorescenes are shorter, about 2-3 cm long but become longer when developing fruits. The male flowers are stalkless while the female flowers are stalked. Its small fruits are fleshy ellipsoid drupes that are somewhat flattened, 3-4 mm long by 2.5-3 mm wide, ripening red.

Flowering: March to September.

Fruiting: June to December.

Uses: The fully ripe fruit can be eaten raw, cooked or made into jams and jellies.

Associated Traditional Knowledge: Considered highly medicinal by local people. The fruit is reported to be laxative and purgative. The leaves are used as a poultice to treat headaches, scurf, abdominal swellings and fevers. The stem is also reportedly used as a medicine to stimulate the menstrual flow.

Family: Apocynaceae

Crane Berry/ Bengal Current

Carissa corandas L.

Assamese Name: Korja Tenga

Nutritional Value:

Energy 46 kcal; carbohydrate 12.2gm; protein 0.4 gm; total fat 0.13 gm; dietary fibres 4.6 gm; vitamin C 13.3 mg; vitamin E 1.2 mg; sodium 2 mg; potassium 85 mg; calcium 8 mg; Magnesium 6 mg; phosphorus 13 mg; zinc 0.1mg and small amounts of beta-carotene per 100 gm of fruit pulp.

Crane Berry/ Bengal Current

Carissa corandas L.

Characteristics: The plant is a sprawling semi-vine shrub about 1.5 to 2 m in height. Leaves are 1-3 inches long, very dark green, shiny and opposite and they have large spines. If the leaves or stems are injured, the white milky sap is seen, which is characteristic of this group of plants. The flowers are small, fragrant, white in colour and about 3.5 inches long, with rose colour stalk. The fruits are small and purplish to black in colour. The fruit size is variable, but most fruits are about 3.5 inch in diameter with a few seeds. Fruits usually occur in clusters somewhat resembling large purple grapes.

Flowering: March to April.

Fruiting: May to October.

Uses: Ripe fruits are taken raw or dried. The mature fruits are harvested for pickles. It contains pectin and accordingly is a useful ingredient in jelly, jam, syrup and chutney.

Associated Traditional Knowledge: The fruits are used in the treatment of skin infections and leaves are remedy for fevers, ear-ache and syphilitic pain. It is also reported to have gut-stimulatory effect and thus is useful in the treatment of constipation and diarrhoea. Traditionally, it has also been reportedly used as stomachic and anti-helmintic; the stems are also used to strengthen tendons. It also possesses analgesic and anti-inflammatory effect.

Family: Musaceae

Banana

Ensete glaucum (Roxb.) Cheesman

Assamese Name: Bhim Kol

Nutritional Value:

Energy 90kcal; carbohydrate 22.84gm; protein 1.09gm; total fat 0.33gm; dietry fibres 2.6 gm; vitamin C 8.7 mg; vitamin E 0.10 mg; sodium 1mg; potassium 358 mg; calcium 5 mg; magnesium 27 mg; phosphorus 22mg; zinc 0.15mg & small amount of alpha & beta-carotene, per 100gm.

Banana

*En*sete *glaucum* (Roxb.) Cheesman

Characteristics: A very large and tall banana usually cultivated in home stead or generally grows uncared in marginal areas about 4 - 7m tall. Spadix drooping with an ovate spathe. The fruits have seeds in them.

This Banana is endemic to North East India only.

Flowering: October to February.

Fruiting: March to July.

Uses: The pulp of the ripe fruit is eaten, considered highly medicinal to feed infant and patients. Young Shoots (Pseudo stem) and flowering part called '*Koldil*' are also eaten as vegetable. Considered a high source of iron.

Associated Traditional Knowledge: Considered highly medicinal by local people. It is useful for treatment of intestinal disorders and coronary diseases. It is also reported to be useful in treatment of uric arthritis and gout. Consumption of Banana helps in keeping healthy eye sight and is very useful in the treatment of anemia. The dried leaf and outer cover of the fruit are burnt and prepare an alkaline substance called '*Kala Khar*' used to make a local delicacy called '*Khar*'. The whole plant or parts are also used in different religious as well as domestic celebrations.

WILD/SEMI-WILD EDIBLE PLANT RESOURCES

Family: Saururaceae

Fish mint/ Fishwort/ Heartleaf

Houttuynia cordata Thunb.

Assamese Name: Masundari/ Mosondoi

Nutritional Value:

Ash 6.03%; Moisture 56.21% ; carbohydrate 23.45 gm; protein 12.22gm; dietry fibres 2.40gm; sodium 1.30mg; potassium 49.65 mg; calcium 8.25 mg; magnesium 0.08 mg & iron 0.98mg, per 100gm.

Fish mint/ Fishwort/ Heartleaf

Houttuynia cordata Thunb.

Characteristics: A perennial herb with creeping root stock about 30-60 cm high and with thin spreading rhizomes. The stems are green or sometimes purplish red and either smooth or pubescent on the nodes. The lower part of the leaf stalk forms a sheath round the stem. It gives out a very unpleasant smell when bruishes its leaf. The leaves are usually heart-shaped, 4-10 cm long and about 2.5 - 6 cm wide and purple underneath. The flowers are small, crowded into a short spike around 2 cm long, with four white, petal like bracts at the base. The stamens usually degenerate and the fruits are apomictic i.e they developed seeds without being fertilized. Fruits are sub-globose.

Flowering: April to June.

Fruiting: July to August.

Uses: Leaves are eaten raw or cooked as vegetables. Roots are also edible, eaten as chutney.

Associated Traditional Knowledge: Traditionally it is used in folk medicine for dieresis and detoxification and in herbal medicine for its anti-viral, anti-bacterial and anti-leaukemic properties.

Family: Amaranthaceae

Slender Amaranth/ Green Amaranth

Amaranthus viridis L.

Assamese Name: Khutura xax

Nutritional Value:

Energy 46kcal; water 91.69 gm; carbohydrate 4.02 gm; protein 2.46gm; total fat 0.33gm; vitamin C 43.3 mg; vitamin B6 0.19 mg; riboflavin 0.15mg; thiamine 0.02mg; niacin 0.65mg; sodium 20mg; potassium 611 mg; calcium 215 mg; magnesium 27 mg & phosphorus 50mg, per 100gm.

Slender Amaranth/ Green Amaranth

Amaranthus viridis L.

Characteristics: An annual herb with stems erect or occasionally ascending, about 10-80 cm long. The stems are sparingly or densely branched and channeled. Leaves are triangular-ovate to narrowly rhombic, about 2-7 cm long and 1 to 6 am wide and hairless; tip usually narrow and with a small narrow notch, stalks are about 1-10 cm long. Flowers are pale white to green depending upon sexes, slender, paniculate spikes in leaf axils or at the end of the branches. The fruits are small, nearly round, about 1.3-1.5 mm in size slightly exceeding the sepals.

Flowering: Throughout the year.

Uses: Tender shoots and leaves are eaten cooked.

Associated Traditional Knowledge: It is considered medicinal for treating urinary problems. A decoction of the entire plant is used to stop dysentery and inflammation. The plant is emollient and vermifuge. The root juice is used to treat inflammation during urination. It is also taken to treat constipation.

Family: Amaranthaceae

Chinese spinach/ Red spinach

Amaranthus tricolor L.

Assamese Name: Ronga Moricha

Nutritional Value:

Energy 23kcal; carbohydrate 3.63 gm; protein 2.86gm; total fat 0.39gm; dietary fibre 2.2 gm; vitamin C 28.1 mg; vitamin E 2.03 mg; niacin 0.72mg; sodium 79mg; potassium 558 mg; calcium 99 mg; copper 0.13mg; magnesium 79 mg; zinc 0.53 mg & small amount of beta-carotene, per 100gm.

Chinese spinach/ Red spinach

Amaranthus tricolor L.

Characteristics: An erect, often stout herb up to 2.5m in height with long stalked leaves. It is generally red or bright pink in colour. The leaves are up to 6 inch long, ovate, oblong and are notched or rounded at the tips and decurrent at the base into petioles. The flowers are small clusters, whitish-green or red while the seeds are very small, black or red-brown.

Flowering & Fruiting: Throughout the year.

Uses: Tender shoots and leaves are eaten cooked.

Associated Traditional Knowledge: Considered to have medicinal properties and are used against external inflammation and bladder distress. It is also reported to improve the kidney function and aid digestion. The roots of red spinach are used as a remedy for dysentery. It is highly recommended for consumption by patients with colon cancer, diabetes mellitus, high blood cholesterol.

Family: Chenopodiaceae

Lamb's quarters/ Goosefoot/ Pigweed

Chenopodium album L.

Assamese Name Jilmil xax/ Bathua

Nutritional Value:

Energy 32kcal; carbohydrate 5 gm; protein 3.2gm; total fat 0.70gm; dietary fibre 2.1 gm; omega-3 fatty acid 32mg; omega-6 fatty acid 274gm; vitamin C 37 mg; niacin 0.20mg; riboflavin 0.3mg; thiamine 0.1mg; sodium 265mg; potassium 288 mg; calcium 258 mg; copper 0.2mg; magnesium 23 mg & zinc 0.3mg, per 100gm.

Lamb's quarters/Goosefoot/ Pigweed

Chenopodium album L.

Characteristics: An erect herb usually coated with meaty substance, stems and inflorescence sometime tinged with purple or red. The leaves are variable, smaller upwards and lower one attaining to about 8 - 10 cm in length, pale green, oblong-lanceolate or rhomboid lanceolate, more or less toothed or lobulate. They are waxy-coated, un-wettable and mealy in appearance, with a whitish coat on the underside. The tiny flowers are radially symmetrical, bisexual, green in spikes and grow in small cymes on a dense branched inflorescence about 10-40 cm long.

Flowering & Fruiting: February to March.

Uses: Leaves are consumed as vegetable due to its rich contents of minerals and nitrogenous compounds.

Associated Traditional Knowledge: The plant is generally consumed by local people for its rich contents of Vitamin A, Calcium, and Potassium and phosphorous. In Ayurveda, it is said that pregnant women should not eat *bathua* as it may result in miscarriages. Very useful in treating kidney stone and also reduces formation of stone. It is also used for inner and external swellings, jaundice, irregular period, curing infections after delivery, anemia and for blood purification.

Family: Basellaceae

Malabar Spinach/Vine Spinach

Basella alba L.

Assamese Name: Puroi xax

Nutritional Value:

Energy 19 kcal; carbohydrate 3.4 gm; protein 1.8 gm; total fat 0.3 gm; vitamin C 102 mg; Riboflavin 0.15mg; sodium 24mg; potassium 510 mg; calcium 109 mg; Magnesium 65mg; iron 1.2mg, zinc 0.43mg and small amount of beta-carotene per 100 gm.

Malabar Spinach/Vine Spinach

Basella alba L.

Characteristics: The plant is a perennial vine and grown as annual or biennial pot-herb. A glabrous climber with fleshy twining stems often red or pale green in colour growing to about 9 m in length. *Basella alba* bears thick, fleshy, broad, oval to heart-shaped leaves all along its vine length while *Basella rubra* features pink or purplish stems and pink colour veins running in the leaves. Flowers are bisexual, red or white in lax peduncled spikes. Utricle has the size of a small pea included within flesh perianth which is black with red or purplish juice. The fruits are round and soft, and can be red, white, or black in colour. The seeds are round and black.

Flowering: December to January.

Fruiting: February to March.

Uses: Leaves stem and fruits are largely used as vegetables.

Associated Traditional Knowledge: Considered highly medicinal by local people and thus consumed regularly in their diet as it is reported to help in preventing osteoporosis (weakness of bones) and iron-deficiency (anaemia). Besides, it is also believed to protect the body from cardiovascular diseases and cancers of colon. It is also effective against diarrhoea. Local people used paste of leaves for treatment of boils and sores. It is also a demulcent, diuretic, and febrifuge.

Family: Polygonaceae

Joint weed/ Knot grass

Polygonum barbata (L.) Hara

Assamese Name: Bon Ghehu/Yelang

Nutritional Values:
This leafy vegetable is rich in B Complex Vitamins specially vitamin B2, B3 & B12, vitamin E, vitamin D and minerals such as Calcium, magnesium and potassium.

Joint weed/ Knot grass

Polygonum barbata (L.) Hara

Characteristics: A rhizomatous perennial herb with erect stems about 40-90 cm tall, robust and pubescent, simple or branched above. Petiole is about 5-8mm, densely hispidulous. Leaf blade are lanceolate or elliptic-cuneate, margin ciliate and apex acuminate. Inflorescence are terminal, spicate, erect and about 4-8cm in length; several spikes aggregated and panicle-like. They are rarely solitary. Bracts are funnel-shaped, glabrous with ciliate margin each about 3-5 flowered. Pedicle is short. The perianth is 5-parted and is white or greenish in colour.

Flowering: August to September.

Fruiting: September to October.

Uses: Tender leaves with shoots are consumed as vegetable.

Associated Traditional Knowledge: Considered to have colic pain relieving properties. The roots are astringent and cooling and are used externally in the treatment of scabies. Also consumed as a tonic and useful against headache.

Family: Polygonaceae

Knotweed/ Oriental Lady's Thumb

Polygonum posumbu (Buch-Ham. ex D. Don) H. Gross

Assamese Name: Behu/ Singju/Phak pai

Nutritional Values:
This leafy vegetable is rich in vitamin C, vitamin D, vitamin A, vitamin B complexes and minerals specially magnesium and potassium.

Knotweed/ Oriental Lady's Thumb

Polygonum posumbu (Buch-Ham. ex D. Don) H. Gross

Characteristics: This adventives annual plant has stems up to 2 inch long that tend to lie along the ground, although their tips are more erect. As a robust plant, it often branches near the base, sending decumbent stems in all directions. The stems are light green to reddish brown, round in circumference and glabrous. The alternate leaves occur at interval along these stems; they are up to 3 cm long and 1 cm across, tapering to a petiole-like base. These leaves are elliptic, broadly lanceolate or ovate in shape, smooth along the margins and hairless. At the base of each leaf, there is a membranous sheath with long bristles along its upper rim; sometimes these bristles are as long as the sheath. The outer tips of the stems terminate in spike-like racemes of flowers up to 2 cm long. Each flower consists of about 5 pink to rosy pink sepals and no petals. Each flower is replaced by a 3-angled seed that is black and shiny, tapering to blunt points at the upper and lower ends. The root system consists of a taperoot that is shallow and branching.

Flowering: June to September.

Fruiting: July to October.

Uses: The aromatic leaves are added to other vegetables for flavor; also the leaves are consumed as chutney.

Associated Traditional Knowledge: Considered to have antipyretic and dyspepsiac properties.

Family: Dilleniaceae

Elephant Apple

Dillenia indica L.

Assamese Name: Outenga

Nutritional Values:

Energy 59 kcal; Protein 0.08gm; total fat 0.02 gm; dietary fibre 0.021 gm; ash 0.35 mg; calcium 16 mg; phosphorus 26 mg & vitamin C 4 mg, per 100gm.

Elephant Apple

Dillenia indica L.

Characteristics: It is an evergreen large shrub or small to medium-sized tree growing up to 15 m tall. The leaves are about 15–36 cm long, with a conspicuously corrugated surface with impressed veins. The flowers are large, about 15–20 cm in diameter, with five white petals and numerous yellow stamens. Its characteristic round fruits are large, greenish yellow, have many seeds. The fruit is a 5–12 cm diameter aggregate of 15 carpels, each carpel containing five seeds embedded in a fibrous pulp.

Flowering: June to August.

Fruiting: December to April.

Uses: Fruits (Fleshy calyx) are eaten raw as well as cooked. It is cooked with fish called '*Mashor tenga*" a famous local delicacy enjoyed by every household in Assam. Also prepared with *Dal* or pulses during hot season. Pickles, Jam etc. are also prepared from it. Mucilage found in the fruit is used to wash hair as shampoo and considered good for hair growth.

Associated Traditional Knowledge: Considered to have anti-dandruff and anti-hair fall properties. Local tribes used the plant (Fruit, leafs, roots & mucilage) in number of ways such as combating weakness, fever, dysentery, wounds of burns etc. In Ayurveda, it is believed to have aphrodisiac properties promoting virility.

Family: Byttneriaceae/ Sterculiaceae

Bitter Climber

Byttneria grandifolia DC

Assamese Name: Tikoni Barual Xak/Kukurdaini

Nutritional Values:

This leafy vegetable is rich in vitamin C, vitamin E,
Folic acid and minerals specially magnesium, sulphur, sodium and potassium.

Bitter Climber

Byttneria grandifolia DC

Characteristics: It is a woody big liana. The branchlets are sparsely puberulent when young. Petioles are about 2-8 cm long and hairy. Leaf blade are broadly ovate, cordate or nearly orbicular; apex obtuse or acute. Petals are yellowish white and purple red adaxially, apex 2-lobed, with long ligulate appendix, nearly as long as sepals. Spiny capsule are globose or ovoid-globose, 3-4 cm in diameter. Seeds are oblong, black when mature.

Flowering: April to June.

Uses: Tender leaves and shoots are eaten cooked as vegetables.

Associated Traditional Knowledge: Considered medicinal and are used by tribal people at the time of delivery as it is believed to ease pain during child birth.

Family: Malvaceae

White Jute

Corchorus capsularis L.

Assamese Name: Mora Pat

Nutritional Values:

Energy 10kcal; water 24.6gm; carbohydrates 2gm; protein 1.3 gm; total fat 0.1gm; vitamin A 0.31mg; vitamin C 10.4mg; niacin 0.4mg; riboflavin 0.2mg; sodium 2.2mg; potassium 157 mg; calcium 58.2 mg; iron 0.07mg, magnesium 17.9 mg & phosphorus 23.2mg, per 100gm.

White Jute

Corchorus capsularis L.

Characteristics: A tall annual herb reaching a height of 2-4 m, unbranched or with only a few side branches. The leaves are alternate, simple, lanceolate, about 5-15cm long, with an acuminate tip and a finely serrated or lobbed margin. The flowers are small about 2-3 cm diameter and yellow, with five petals. The fruit is a many seeded capsule.

Flowering: October to December.

Fruiting: February to March.

Uses: Fresh leaves and tender shoots are consumed as vegetable. The dried leaves can be used as a thickener in soups. Immature fruits are added to salads or used as a potherb. It is widely cultivated for the fibers (Jute) which are used for making varieties of twine, rope, mats, cloths, bags etc.

Associated Traditional Knowledge: Considered to have anti-oxidant properties. In Ayurveda, it is used for treatment of ascites, pain, piles and tumors. Local people consumed it for its appetizing and laxative properties. However, it is widely cultivated for its vegetable fibers, second to cotton.

Family: Malvaceae

Roselle

Hisbiscus sabdariffa L.

Assamese Name: Ronga Tenga Mora/ Mesta Tenga

Nutritional Values:

Energy 279kcal; water 49.3gm; carbohydrates 6.4 gm; protein 0.5 gm; total fat 0.4gm; vitamin C 6.8 mg; niacin 0.2mg; sodium 3.4mg; potassium 157 mg; calcium 123 mg; iron 0.8mg, magnesium 29.1 mg & phosphorus 21.1mg, per 100gm.

Roselle

Hisbiscus sabdariffa L.

Characteristics: An annual or perennial herbaceous plant growing up to 2.5m in height. The leaves are deeply 3-5 lobed, 8-15cm long arranged alternately on the stems. Stems and leaves are reddish in colour. The Flowers are about 8-10 cm in diameter, white to pale yellow with a dark red spot at the base of each petal and have a stout fleshy calyx at the base, 1-2 cm wide enlarging to 3-3.5 cm fleshy and bright red as the fruit matures. The fruits are red and hairy. Fleshy sepals persists in fruits.

Flowering: April to July.

Fruiting: August to November.

Uses: Leaves and fruits are acidic, eaten cooked. Local people consumed it as a local delicacy with fish and pork. Jelly and juices are also prepared with the ripe fruits.

Associated Traditional Knowledge: Considered to have medicinal properties useful for dysentery. It also has antihypertensive, diuretic properties, mildly laxative.

Family: Rutacea

Curry Leaf Plant

Murraya koenigii (L.) Spreng.

Assamese Name: Narasingha/ Bishahari

Nutritional Values:

Energy 108kcal; moisture 63.8gm; carbohydrates 18.7gm; protein 6.1 gm; dietary fibre 6.4 gm; total fat 1gm; vitamin C 4mg; niacin 2.3 mg; riboflavin 0.21mg; calcium 830 mg; iron 0.93mg; copper 0.1mg; magnesium 44mg & phosphorus 57mg, per 100gm.

Curry Leaf Plant

Murraya koenigii (L.) Spreng.

Characteristics: A deciduous aromatic shrub with strong smell growing up to 3-5 m tall with a trunk up to 40 cm in diameter. The aromatic leaves are pinnate with 15-25 leaflets, each leaflet 2-4cm long and 1-2 cm broad. The flowers are small, white and fragrant which produce small shiny-black berries containing a single, large viable seed. It turns purplish black when ripe.

Flowering: April to May.

Fruiting: July to August.

Uses: The aromatic leaves are used to flavor curries. It is also eaten with other vegetables. Often used as digestive.

Associated Traditional Knowledge: Considered to have anti-diabetic, antioxidant and hepato-protective properties. They also help in quick digestion. They are also useful for the treatment of nausea, vomiting, digestive problems, diarrhea and bloated stomach etc. They are also used in the treatment of boils and other similar skin eruptions. It is also known to be effective in treating premature graying of hairs and strengthening hair roots.

Family: Rutacea

Prickly Ash

Zanthoxylum oxphyllum Edgew

Assamese Name: Mejenga

Nutritional Values:
This leafy vegetable is rich in vitamin C, vitamin D, vitamin E, Folates and minerals specially magnesium and potassium.

Prickly Ash

Zanthoxylum oxphyllum Edgew

Characteristics: A slender scrambling shrub which is highly aromatic. Prickles are usually hooked. Leaves are about 6-14 inch long, rachis armed with prickles beneath. Leaflet blades are alternate or opposite, lanceolate or rarely ovate. Inflorescences are terminal, cymose-corymbose and are about 30-flowered. Perianth are arranged in 2 series with 4 sepals and is purplish green in colour.

Flowering: April to May.

Fruiting: August to September.

Uses: Tender shoots are eaten as vegetable.

Associated Traditional Knowledge: The fruits are said to be astringent, digestive and stimulant. It is also reported to be useful in treatment of tooth ache. The bark, especially the root bark, is tonic and aromatic.

Family: Oxalidaceae

Indian Sorrel/Creeping wood Sorrel/Sleeping beauty

Oxalis corniculata L.

Assamese Name: Horu Tengeshi Xax

Nutritional Values:
The leaves contains about 86% water; carbohydrates 0.82mg; protein 0.23gm; total fat 0.08mg; vitamin C 78mg; niacin 0.6mg; calcium 150mg; iron 8mg, phosphorus 78mg & beta-carotene, per 100gm.

Indian Sorrel/ Creeping wood Sorrel Sleeping beauty

Oxalis corniculata L.

Characteristics: A prostrate herb, branchlets creeping, rooting in nodes. The trifoliate leaves are subdivided into three rounded leaflets and resemble a clover in shape. The leaves are greenish purple in colour and have inconspicuous stipules at the base of each petiole. They are arranged alternately along the stems. A single long stalk arises from the axils of the leaf from which extend three flower stalks, each with a single flower. The flowers are about 7-11mm wide and have 5 yellow petals. The fruit is a capsule, 1-2 cm long, cylindric, pointed apically and 5-ridged in cross section.

Flowering: June to August.

Fruiting: September to October.

Uses: Young shoots and leaves are consumed as vegetables.

Associated Traditional Knowledge: The plant is highly considered medicinal in dysentery and blood pressure. Local people enjoyed this herb with small fish as delicacy. Consumed for its rich content of Vitamin C. The whole plant is antihelmintic, antiphlogistic and diuretic properties. It is also used in the treatment of influenza, fever, urinary tract infections, diarrhoea, traumatic injuries etc.

Family: Apiaceae

Indian Pennywort/ Asiatic Pennywort

Centella asiatica L.

Assamese Name: Bor Manimuni

Nutritional Values:

The herb is rich in antioxidants, including beta-carotene & B-complex vitamins; Energy 32 kcal; dietary fibre 2.0gm; protein 1.6 gm & small quantities of niacin, riboflavin, thiamine and ascorbic acid.

Indian Pennywort/ Asiatic Pennywort

Centella asiatica L.

Characteristics: A prostrate herb. The stems are slender with creeping stolons, green to reddish-green in colour, connecting plants to each other. It has long-stalked, green, rounded apices which have smooth texture with palmately netted veins. Leaves are sub-orbicular, borne on pericladial petioles, reniform, 1-4 cm in diameter with petioles about 1-10 cm long. The rootstock consists of rhizomes, growing vertically down. They are creamish in colour and covered with root hairs. Inflorences are 3-5 flowered umbels. The flowers are sub-sessile, petals obtuse, white or pinkish to red in colour, born in small, rounded bunches (umbels) near the surface of the soil.

Flowering: April- May.

Uses: Leaves and young shoots are consumed as vegetable.

Associated Traditional Knowledge: It is considered medicinal in stomach complains and usually used locally as liver tonic making curry with small fishes etc. pounded leaves are used to treat wounds, cuts etc.

Family: Apiaceae

Culantro/ Long coriander/ Mexican coriander

Eryngium foetidum L.

Assamese Name: Maan Dhania

Nutritional Values:

Energy 23kcal; carbohydrates 3.67gm; protein 2.13 gm; total fat 0.52gm; dietary fibre 2.80gm; vitamin E 2.5mg; vitamin C 27mg; sodium 46mg; potassium 521 mg; calcium 67 mg; iron 1.77mg, magnesium 26mg; phosphorus 48 mg & small amounts of alpha-carotene and beta-carotene, per 100gm.

Culantro/ Long coriander

Eryngium foetidum L.

Characteristics: A very aromatic, glabrous, erect perennial herb. Basal leaves spathulate, spinous and toothed. Leaves in the flowering branches are small, lanceolate and pointed rosette. Flowers are white and in sub-sessile umbels. The Fruit are ellipsoid.

Flowering: May.

Fruiting: Cold Season.

Uses: The aromatic leaves consumed as flavoring herb for curries. Also consumed as chutneys.

Associated Traditional Knowledge: It is reportedly used in traditional medicine for burns, earache, fevers, hypertension, constipation, fits, asthma, stomachache, worms, infertility complications, snake bites and also in malaria.

Family: Rubiaceae

Skunk Vine/ Stink Vine

Paederia foetida L.

Assamese Name: Bhedai Lota/ Paduri lota

Nutritional Values:

This leafy vegetable is rich in vitamin C, vitamin D, vitamin E vitamin B complexes, vitamin A, Protein and minerals such as calcium, magnesium and zinc.

Skunk Vine/ Stink Vine

Paederia foetida L.

Characteristics: A fast growing, slender, perennial climbing plant producing stems about 1.5 to 7 m long that twine into other plants for support. Leaves are opposite and elliptic-ovate. Flowers are greyish-purple. The fruits are ellipsoids and reddish in colour. It has got unpleasant smell when any part is smeared.

Flowering: July to October.

Fruiting: November to February.

Uses: Young leaves and tender twigs of the plants are consumed as vegetable.

Associated Traditional Knowledge: Considered to have medicinal properties for treating stomach ache and gastric problems. Thus people consumed the plant as local delicacy. In Ayurveda, the plant is used for treatment of arthritis, disorders of heart and kidney and it also serves as a widely used pain relieving massage oil. Therapeutically, it is considered an aphrodisiac, it improves strength and immunity, also useful in wound and bone healing and it also relieves inflammation and stiffness.

Family: Lamiaceae

Thumbe

Leucas aspera (Willd.) Link.

Assamese Name: Duron Hak

Nutritional Values:
This leafy vegetable is rich in Calcium, magnesium, potassium, iron and vitamins such as vitamin C, vitamin D and vitamin E.

Thumbe

Leucas aspera (Willd.) Link.

Characteristics: A silky dark green aromatic herb covered with densely matted woolly hairs (tomentose) and woody root stock. The Stem is quadrangular and hairy. Leaves are small, opposite-alternate, narow elliptic and distantly serrated. It emits scent, when bruised. The flowers are bi-labiate, white with nectaries.

Flowering: Cold Season.

Fruiting: Hot Season.

Uses: Leaves and flower buds are consumed as vegetable.

Associated Traditional Knowledge: It is considered medicinal for liver ailments, snake bite, scorpion sting sinusitis, etc. It is used as a stimulant, anti-helmintic, laxative and diaphoretic. Also being reported for used orally in the treatment of headache, asthma and bronchitis etc.

Family: Solanaceae

Nightshade/ Hairy fruited egg plant

Solanum ferox L.

Assamese Name: Bhot Bengena/Tita bhekuri

Nutritional Values:

Energy 24kcal; carbohydrates 5.7gm; protein 1gm; total fat 0.19gm; dietary fibre 3.4gm; vitamin C 2.2 mg; sodium 2 mg; potassium 230 mg; calcium 9mg; iron 0.24mg & magnesium 14 mg, per 100gm.

Nightshade/ Hairy fruited egg plant

Solanum ferox L.

Characteristics: A small shrub up to 10 3.5 m in height with herbaceous branches. Stems and branches are covered with curved prickles. Leaves are ovate or oblong, serrate or obtusely lobed about 15 to 20 cm long. The flower is bluish-purple in extra-axillary cyme. Calyx is shortly funnel-shaped, with ovate-triangular lobes. Fruits are berry, globose, smooth about an inch in diameter, yellow when ripe.

Flowering: June to October.

Fruiting: November to December.

Uses: Fruits are eaten raw as vegetables.

Associated Traditional Knowledge: Considered medicinal for worm infection and skin diseases. Local people consumed the fruits with honey for sore throat and rashes in tongue etc. It is also used for treatment of asthma, fever, vomiting and loss of appetite in Ayurveda.

Family: Scroplulariaceae

Brahmi/ Waterhyssop

Bacopa monnieri (L.) Pennel

Assamese Name: Brahmi Hak

Nutritional Values:
This leafy vegetable is rich in vitamin B complexes specially vitamin B12, vitamin B9, vitamin C, vitamin E and minerals such as magnesium and zinc.

Brahmi/ Waterhyssop

Bacopa monnieri (L.) Pennel

Characteristics: A common perennial creeping herb rooting at nodes. Leaves are small and succulent, oblong and about 4-6 mm thick. They are arranged oppositely on the stem. The flowers are small and white in racemose inflorence, with four or five petals. Fruits are small capsule. Generally grows on damp soil, often cultivated.

Flowering & Fruiting: July to September.

Uses: Leaves and tender shoots are eaten cooked as vegetable.

Associated Traditional Knowledge: It is considered as tonic for brain, believed to increase memory power if taken with milk. Mostly used in Ayurveda and has an age-old reputation for being an effective and powerful herb helpful for memory and combating stress. It acts as an adaptogen, helping the body to adapt in new or stressful situation. It also promotes liver health and encourages normal blood pressure. It also acts as an anti-oxidant.

It has also been used in traditional ayurvedic treatment for epilepsy and asthma. It is also used for treatment of ulcers, tumors, ascetics, enlarged spleen, inflammations, leprosy and anemia etc.

Family: Pedaliaceae

Sesame

Sesamum orientale L.

Assamese Name: Teal Pat

Nutritional Values:
Protein 21.5%, carbohydrate 8.9%;
fat 60.8% & ash 3.4 % along with rich source of unsaturated fatty acids, calcium and vitamins A, vitamin B & vitamin C per 100 gm.

Sesame

Sesamum orientale L.

Characteristics: An annual plant growing up to 1.6 - 3.3 ft tall. Leaves are opposite about 1.6 - 5.5 inch long with an entire margin and are broad lanceolate. The flowers are yellow, tubular, 3-5 long, with a four-lobed mouth. The flowers may vary in colour, with some being white, blue, or purple. Sesame fruit is a capsule, normally pubescent, rectangular in section, and typically grooved with a short, triangular beak. The fruit naturally splits open (dehisces) to release the seeds which are about 3 - 4 mm long x 2 mm wide and 1 mm thick. The seeds are ovate, slightly flattened, and somewhat thinner at the eye of the seed (*hilum)* than at the opposite end. The seed coat (*testa)* may be smooth or ribbed and is black in colour.

Flowering: June to July.

Fruiting: August to October.

Uses: Leaves are eaten cooked as vegetables.

Associated Traditional Knowledge: Reported to used widely in traditional medicine. The leaves and seed are astringent, used in the treatment of infant cholera, diarrhoea, dysentery and bladder troubles. The seed is reported to be diuretic and acts as a tonic for the liver and kidneys. It is taken internally in the treatment of premature hair loss and greying, convalescence, chronic dry constipation, dental caries, osteoporosis, stiff joints, dry cough etc. It also has a marked ability to increase milk production in nursing mothers.

Family: Acanthaceae

Green Chirayta/ Kalmegh

Andrographis paniculata Retz

Assamese Name: Chirota Tita

Nutritional Values:
This leafy vegetable is rich in vitamin D, vitamin E, vitamin B12 and minerals such as calcium and magnesium.

Green Chirayta/Kalmegh

Andrographis paniculata Retz

Characteristics: It grows erect to a height of 8–30 inch in moist, shady places. The slender stem is dark green, squared in cross-section with longitudinal furrows and wings along the angles. The lance-shaped leaves have hairless blades measuring up to 8 centimeters long by 2.5 wide. The small flowers are borne in spreading racemes. The fruit is a capsule around 2 centimeters long and a few millimeters wide. It contains many yellow-brown seeds.

Flowering: November to December.

Harvesting: The plant should be harvested before onset of flowering.

Uses: Whole plant part consumed as vegetable, either raw or cooked.

Associated Traditional Knowledge: Widely cultivated for its medicinal properties. The herb has a number of purported medicinal uses, although research has found evidence of its effectiveness is limited to treatment of upper respiratory infection, ulcerative colitis and rheumatic symptoms.

Family: Acanthaceae

Nongmangkha

Phlogcanthus thyrsiflorus Nees

Assamese Name: Ronga Tita Phul/ Nongmangkha

Nutritional Values:
This leafy vegetable is rich in moisture 79.1%; Ash 10.4 mg; carbohydrates 78.7 mg; protein 7.1 mg; fat 3.8 mg; sodium 2.9mg; potassium 72mg, per 100gm.

Nongmangkha

Phlogcanthus thyrsiflorus Nees

Characteristics: An evergreen shrub up to 2.5 m in height. It has quadrangular ranch, leaves are dark green, pale beneath, elliptic-lanceolate, entire and pubescent. Inflorescences are about 10 -12 inches long with orange red flowers. Capsule is about 1 inch long.

Flowering: December to February.

Fruiting: February to April.

Uses: Flowers are eaten as vegetable, roasted or dried. Very bitter in taste. Leaves are also consumed as bitter chutneys by some communities.

Associated Traditional Knowledge: It has the healing properties for cough, cold and asthma. Leaves boiled with water is consumed during dry cough by local people and also put the leaves in boiling water for bathing their small babies suffering from dry cough. Flowers are also antidote to pox and also prevent skin diseases like sore, scabies etc.

Family: Asparagaceae

Indian Asparagus/ Hundred Roots/ Asparagus roots

Asparagus racemosus Willd.

Assamese Name: Satmul

Nutritional Values:

Energy 20kcal; carbohydrates 3.38gm; protein 2.20 gm; total fat 0.12gm; dietary fibre 2.1gm; vitamin E 1.13mg; vitamin C 5.6mg; niacin 0.97mg; sodium 2mg; potassium 202 mg; calcium 24 mg;, magnesium 14 mg; phosphorus 52mg; zinc 0.54mg & small amounts of alpha-carotene and beta-carotene, per 100gm.

Indian Asparagus
Hundred Roots/Asparagus roots

Asparagus racemosus Willd.

Characteristics: A small climber plant about 1- 3 m tall. It is an extensively scandent spinous, much branched under-shrub. Roots are numerous and fusiform, succulent and tuberous with a diameter of about 0.5 to 1.5 cm and it arises as a cluster from the basal end of the stem. The stem is woody, sparsely covered with recurve spines. Leaves are reduced to small scales called as cladode which are in tufts of 2-6 in a node, finely acuminate. Inflorescence is a branched raceme. Flowers are white, fragrant and solitary. Fruits are red berries globose or obscurely 3-lobed. Seeds are black in colour and hard with brittle testa.

Flowering: June to July.

Fruiting: August to September.

Uses: Mainly for medicine especially the roots in Traditional Ayurveda.

Associated Traditional Knowledge: Considered the most important herb in Ayurvedic medicine for women. Used internally for infertility, loss of libido, threatened miscarriage, menopausal problems etc. It both nourishes and cleanses the blood and the female reproductive organs. It is also useful for hyperacidity, stomach ulcers, dysentery and bronchial infections.

Family: Zingiberaceae

Bamboo-leaved Galangal

Alpinia nigra (Gaertn) Burtt.

Assamese Name: Tora

Nutritional Values:

Energy 246kcal; carbohydrates 30.7gm; protein 11.25 gm; total fat 8.75gm; dietary fibre 31.2gm; vitamin C 95.89 mg; potassium 57.67mg; calcium 250mg & iron 9.10mg, per 100gm.

Bamboo-leaved Galangal

Alpinia nigra (Gaertn) Burtt.

Characteristics: A biennial herbaceous plant most commonly occur in swamp areas, gregarious in nature. It sometimes attains about 2.5-4 m in height. Aerial stem, shoot and leaves are slightly aromatic. The leaves are sessile or sub-sessile, elongated and pointed at the end. Leaf blade large in two rows, little hair present along the rib. Flowers are white, fragrant, occur in the apex of the shoot. The fruit is a berry having many seeds and the pericarp is thin and green when young, becoming black and brittle when it gets old.

Flowering: June to March.

Fruiting: June to July.

Uses: Young shoots, pith and inflorescence are eaten raw or cooked as vegetables. Leaves have distinctive aromatic smell, used as wrappers in roasting or boiling of various food items.

Associated Traditional Knowledge: Considered to have medicinal properties. The rhizome is used as an aphrodisiac, tonic, diuretic, expectorant, appetizer and analgesic. It is also used in the treatment of impotence and bronchitis. In tribal communities, the root is pounded and mixed with rice whisky which is applied for fungal infections such as ringworm and melasma.

Family: Nymphaceae
Fox Nut/ Gorgon Nut
Euryale ferox Salisb.
Assamese Name: Makhana

Nutritional Value:
Energy 350 kcal; carbohydrate 77 gm; protein 9.7 gm; total fat 0.1 gm; dietary sodium 210 mg; potassium 500 mg; calcium 60 mg; phosphorous 100 mg and iron 1.5 mg per 100 gm.

Fox Nut/ Gorgon Nut

Euryale ferox Salisb.

Characteristics: A very prickly aquatic herb. Leaves are large about 30-40 cm in diameter. The flowers are hermaphrodite and are about 5 cm in diameter, violet-blue or red in colour. The fruit is spongy and very prickly outside. The seeds are about the size of pea (1-1.5cm in diameter), each fruit containing about 15-30 seeds covered by a membranous layer.

Flowering: May- June.

Fruiting: July - August.

Uses: The seeds are eaten raw, roasted or boiled. It can be added in sweets, meat and makes light food with milk also.

Associated Traditional Knowledge: *Makhana* are reportedly used in traditional medicines to treat and cure various diseases, including chronic diarrhea, spleen disorders and excessive leucorrhea, diabetes and kidney problems. It is considered a good food for babies and invalids. They are also reported to have anti-oxidant and anti-bacterial properties. They help in reducing inflammation and thus reduce the chances of cardiovascular diseases in the body. They also act as aphrodisiac.

Family: Mimosaceae

Tree Bean

Parkia timoriana Merr. / *Parkia roxburghii* G. Don

Assamese Name: Khariyal/ Manipuri Urahi

Nutritional Value:
Energy 514 kcal; carbohydrate 37.3 gm; protein 26.1 gm; total fat 28.8 gm; dietary fibre 2.56 gm; ash 5.05 gm; vitamin C 22.2 mg; folic acid 7.53 gm and small amount of beta-carotene per 100 gm.

Tree Bean

Parkia timoriana Merr./ *Parkia roxburghii* G. Don

Characteristics: Tree Bean is a very large tree about 25-40 m in height endemic to North-East India. The leaves are evenly bipinnate and 30-80 cm long. The pinnae are 40-60 in number and 8-20 cm long. The leaflets are 60-140, linear-oblong, 6-12 mm long, close-set, shining above, and pointed at the tip. The flower-heads are dense, obovoid or perform, up to 6 cm long, hanging from leaf axils like old-fashioned electric bulbs on long cable-like stalks. The flowers are white and yellow, about 1 cm long. The fruit is a long, flattened legume pod about 25-30 cm long and 3.5 cm wide, rather thick, pendulous, and black and shinning when mature, and contain about 15-20 seeds. The pods are edible, and are considered a delicacy by Manipur communities. Their pulp is golden yellow, with a sweetish taste and an odor like that of violets.

Flowering: August to September.

Fruiting: October to February.

Uses: The tender pods are eaten as vegetables especially with fishes.

Associated Traditional Knowledge: They are considered to have laxative and anti-helmintic properties. The Pods are used in treatment of bleeding piles and bark extract is used by traditional healers in the treatment of diarrhoea and dysentery. The bark and leaves are also employed for making lotion applied to sores and skin affections. Powdered seeds are considered useful when applied externally to wounds, ulcers, and the abdomen to relieve pain.

LIVELIHOOD ASPECTS OF THE STUDY AREA IN RELATION TO WILD EDIBLE BIO-RESOURCES

Conceptualizing Livelihood

There has been a rapid proliferation of livelihood research during the last decade, especially in the second half of the 1990's. For example, in Britain, the Institute of Development Studies (IDS) at the University of Sussex has collaborated with the UK Government's Department for International Development to launch a major research and policy initiative connecting livelihood research with poverty reduction objectives (Murray, 2002). The year 1992 marked the beginning of the livelihood focus in development agenda with UN Conference on Environment and Development putting "sustainable development" firmly on the international agenda. The concept of Sustainable Livelihood (SL) approaches rose to prominence in DFID from 1998 and the Natural Resources Advisers' Conference a year later offered the participants the chance to share their early experience of using SL approaches (Carney, 1998). With the emergence of SL approaches, the organizations on the forefront

of development like UNDP, FAO, and DFID spearheaded the debate and promoted new definitions and approaches, which shifted its focus on rural household and their various functionalities (www. livelihoods.org). To a Gujarati Farmer, Livelihood is "*Ghar Chalava*" (to keep the household going), (RLS research, Hogger et al., 2000). While according to Chamber and Conway, (1992), livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a sustainable livelihood is one which can cope with and recover from stress and shock, maintain or enhance its capabilities and assets and provide sustainable livelihood opportunities for the next generation. Further it contributes net benefit to other livelihoods at the local and global levels and in the long and short term. This definition on livelihood has been widely accepted. The DFID, CARE and Oxfam take up their livelihood interventions approach on their livelihood models formulated to mitigate the existing problems. Whereas the UNDP's 1995 mandate conceptually defines livelihood as means, activities, entitlements and assets by which people make a living. Thus, notwithstanding the definitional differences it remains a fact that livelihood connotes a means of securing the necessities of life.

Linking Bio-resource and Livelihood

Wild edible plants refer to species that are harvested or collected from their wild natural habitats and used as food for human consumption (Lulekal et.al, 2011; Heywood V.H., 2011; Seal T., 2012). They provide staple food for indigenous people, serve as supplementary food for non-indigenous people and are one of the primary sources of cash income for poor communities (Uprety et al., 2012; Ghorbani et al., 2012; Menendez-Baceta et al., 2012). Thus, the collection and consumption of wild edible plants has been "a way of life" to supplement dietary requirements for many rural populations throughout the world (Ford-Lloyd et al., 2011; Pandey et al., 2008; Misra et al., 2008; Shrestha et al., 2006).

However, due to social change and acculturation processes, indigenous knowledge (or traditional knowledge) about the use of wild edible species is declining and even vanishing with modernization and increasing contacts with western lifestyles (Termote et al., 2011). Meanwhile, the loss of traditional knowledge has also been recognized as one of the major factors that have negative effects on the conservation of biological diversity (Keller et al., 2005). Thus, it is becoming urgent to document and revitalize traditional knowledge of WEPs to preserve genetic and cultural diversity (Shrestha et al., 2006; Tardío et al., 2006; Luczaj et al., 2013).

The local traditional markets be it the daily, bi-weekly or the weekly markets of the study area provides a whole gamut of wild bio-resources. The local people of the study area have their culture, food habits, ethos, faith intrinsically linked with these bio-resources. Be it in worshipping their local deity or traditional medicinal practice bio-resources are a prerequisite. As the demand for these natural produce is quite high, these provides an ample opportunity for livelihood for the poor people. Thus, we find that a whole lot of people in the study area are engaged in the collection and selling of these resources in the market place, which in turn supports their livelihood. It has become a way of life for them.

Tracing the dependency of the vendors on the wild Bio-resources as a means of Livelihood

District-wise Categorisation of the Markets Surveyed - The markets in the study area have categorised accordingly based on whether the markets are daily, bi-weekly or weekly. Of the total sampled market places, about 53.3% in Nagaon are weekly markets. Similarly, 26% of the surveyed in Karbi Anglong also belongs to the same category. Whereas, 13% of the total markets surveyed in Dima Hasao belonged to the daily market category. At the same time only 6.6% of the total markets

survey was found only in the Morigaon district. It has been witnessed that the variations in the bio-resource present in the markets were generally found to be more in the weekly market rather than the daily ones. This can be attributed to the fact that in case of the weekly market the vendors get ample time for the collection of the bio-resources.

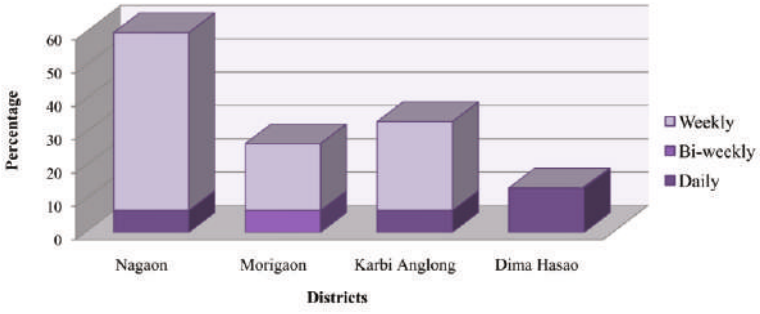


Fig 1 : District-wise Categorisation of the markets surveyed

Informant Diversity **-** The four districts under study reveals that 70% of the total vendors surveyed were females and the male vendors contributed the rest 30%. Of the total female vendors, 30% accounted for Nagaon, 18% for Karbi Anglong and the least 10% for Morigaon. For the male category too, Nagaon had the highest share of 11.6%. The lowest percent of male vendors were found in the markets of Karbi Anglong. Broadly speaking, the female informants in the study area are more dominant over the male counterparts. Where interviewed the women folk asserted that they consider selling the bio-resources as part of their household chore and for some they were afraid that their husbands would spend the money on liquor.

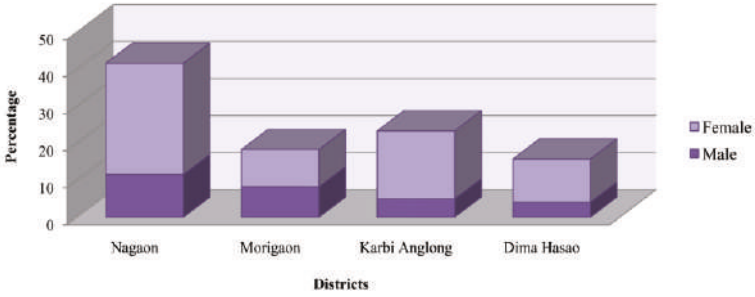


Fig 2: Informant Diversity of the vendors

Purpose of Selling Bio-resource **-** The vendors in all the surveyed markets predominantly stressed their importance on the use of the various wild bio-resources as a part of their tradition. But the overall rationale for selling the bio-resource is to generate income and contributing to an improved livelihood. But the economy is not the only consideration. Apparently, a lot of social and cultural aspect of the community where they reside is interwoven intrinsically. Depending on the time of the year and the festivals associated with the season the vendors collect the wild bio-resources and sell it in the market. The availability of the bio-resources is again marked by the seasonality and associated along with it are the various traditional medicinal practices. This has been explained in a detailed manner in Table I, II and III. Moreover, the collected wild produce is also used for self consumption apart from bringing in the economic benefit by selling them in the market. Apart from providing the necessary nutrition it has found its way in the preparation of local culinary delicacies. As for example, the use of the *'Tora Gos'* (*Alpinia Allughas*) in preparation of fish and rice has evolved the local delicacy of *'Paatat diya Maas'* or *'Tupula Bhaat'*. Thus, we see that the bio-resource provides both the economic benefit as well as the justification of carrying on the traditional benefits associated with the cultural beliefs, ethos, food habits and traditions of the local people residing in the study area.

Pattern of Collection of Bio-resources **-** The study revealed that the collection of the bio-resources is mainly associated with women folk. Of the total 120 sampled vendors, about 56% of the total female vendors' responded saying that the collection of the wild bio-resources is done by themselves. Whereas, about 19% of the total male counterpart responded that the collection is done by the other members of the family and he only sells them in the market. It is usually the wife or the mother of the family who collects the wild bio-resources.

Further, both the male and female vendors went on to admit they do ask their children too for the collection. They attributed the fact that it was necessary for their children to learn which of the wild resources are useful for consumption and which are not. It was considered as part of educating the child. Whereas for some it was a case where they had no other option but engage their child for the same for better economic benefits. Thus, it has been revealed that it is the women folk (5%) who engage their children in the collection of the wild bio-resource.

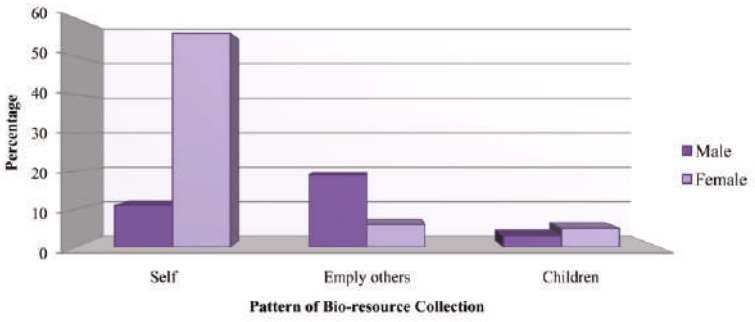


Fig 3: Pattern of collection of Bio-resources

Bio-resources as a Source of Income **-** The sampled vendors revealed that there is a disparity in the income generated by selling the wild bio-resources. There is no guarantee as to what bio-resource to sell in the next market day as it solely depends on the availability and collection of the said bio-resource. Thus the

instability in generating income is also more pronounced. The distribution of income of the sampled vendors in the study area can be categorized accordingly based on their primary occupation. Thus, the primary occupation of the vendors have been categorised under the following heads: agriculture, agricultural labour, selling bio-resource and petty jobs. Among the total vendors, 52% of them revealed that selling bio-resources in the market area is their primary occupation and they rely solely on it for their survival whereas 27% of them considered of being agricultural labour as their primary occupation. 13% of them are engaged in doing some petty jobs as carrying stones and sand, repairing pressure cooker and so on as their main occupation during the non market days. Only 10% of the vendors attributed agriculture as their primary occupation.

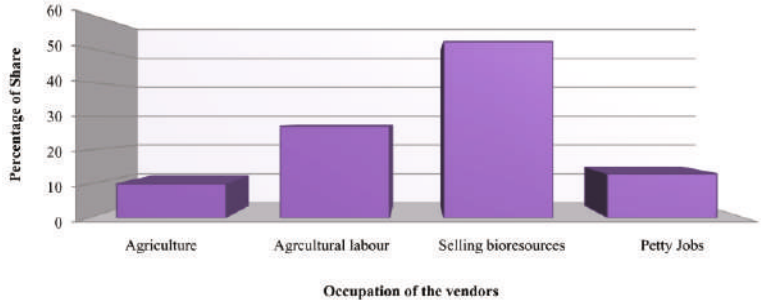


Fig 4: Source of Income of the Vendors in the Study Area

Further, the study revealed that the vendors sell the wild produce locally. There are no middle men involved in the process. The whole system of collection and selling of the wild bio-resource is done within the family itself. Both the collection and selling is done in a local basis. Therefore, no such forward linkage had been established in the area. Although potentiality wise, it seemed quite feasible in the long run.

Table-5

Income generated by the vendors'
by selling the bio-resource based according to seasonality

Income generated from Bio-Resources According to Seasonality												
Income (in ₹/Week)												
Districts	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Nagaon												
Morigaon												
Karbi Anglong												
Dima Hasao												

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	Represents income above ₹ 500/week
	Represents income between ₹ 500- 300/week
	Represents income below ₹ 300/week

Table 5 provides a detailed account of the income generated from the selling the bio-resources based on the seasonality. As the availability of these bio-resources is based on the seasonality, therefore the income also varies accordingly. In the Morigaon district, the respondents revealed that the income generated during the months of August to early October is considerably less (below Rs 300/week) than the income generated during the months ranging November to late March (which is above Rs 500/week). Karbi Anglong and Dima Hasao on the other hand portraits a similar picture in matters relating to the economic returns as both areas have hilly undulating topography, and with the same type of seasonal variations. The earnings are high (above Rs 500/week) from the months ranging from early October to late May; June and July due to heavy rainfall in the area it poses a difficulty in the collection of the wild bio-resources as a result the income during the months are comparatively less (between Rs 500-300/week). While during the months of August and September, the income is usually below Rs 300 for the districts od Nagaon, Karbi Anglong and Dima Hasao. But as for the Morigaon district, the respondents revealed that it the same scenario in income generation for the month of October too. They attributed the reason to less availability of bio-resources during these months.

Livelihood Resources of the Bio-resources Selling Households in the Study Area -

Livelihood Resources refers to the basic material and social, tangible, and intangible assets that people use for constructing their livelihoods. They are conceptualized as different types of 'capital' to stress their role as a resource base *'...from which different productive streams are derived from which livelihoods are constructed*' (Scoones, 1998). Understanding of Livelihood resources helps in the selection of the various means that the people depend upon for making a living. Resources are grouped under the different types of 'capital assets'. These capital assets are:

- Human Capital: Human capital includes age, education, gender, health status, household size, dependency ratio,

leadership potential, skills, knowledge, capacity to work (Bezemer and Lerman, 2003; Farrington *et al.*, 2002). It helps people to pursue their livelihood and develop their strategies for survival.

- Financial Capital: Savings in form of cash, bank deposits or liquid assets such as livestock or jewellery, credit access (both formal or informal) are considered as financial resources which people use to achieve their livelihood objectives.
- Social Capital: Interactions of the people that increase their ability to work together; memberships in formal organizations, mutual trust relationship, access to information all fall under social capital. These social relationships provide opportunities and benefits for the quest of livelihoods.
- Physical Capital: Goods and facilities, both public and private are physical assets. They are often termed as infrastructure. They include transport system, water supply and sanitation, communication and information, shelter, productive assets that enhance income and household goods. They form the basic requirements for maintaining livelihood.
- Natural Capital: Natural capital is the resource base on which the human beings rely for survival. That is, they are the trees, land, clean air etc. they are resources from where people derive benefits both directly and indirectly.

The sampled 120 vendors in the 20 market places in the four districts of Nagaon, Morigaon, Karbi Anglong and Dima Hasao have their household based near the market place. These vendors' households are located in the 44 different villages spread across the four districts. These households in the rural villages have their own way of life. It is marked by their preference and selection of livelihood resources for their survival. Variations exist between these villages in consequence of the possession of the different assets or capitals within these vendors' households. These resources may not necessarily be equally distributed. In order to understand the presence of livelihood variations within these vendor's households, the status of these five 'capitals' within the rural household should be analysed. In the present study, an

attempt has been made to understand the status of these households with the help of pentagon diagrams.

Pentagon diagrams are also known as spidergram. Though the value of the indicators of the five capitals varies from each other, the adjoining lines of the pentagon diagram indicate a relationship between the capitals. To measure the capitals, certain variables are created (Table: 6) and the values assigned for each indicator are calculated for every vendors' household. But as the values representing each capital differ from each other it becomes imperative to standardize the score for each variable. It is standardized following the measurement of Life Expectancy in Human Development reports (Hahn et al., 2009; Kamaruddin, 2014). The index is enumerated below:

$$Index_{sd} = \frac{S_d - S_{min}}{S_{max} - S_{min}}$$

Here, S_d was the original value for indicator d, and S_{min} and S_{max} were the minimum and maximum values, respectively, for each variable determined using data from the surveyed vendor' households. For assigning an equal weightage, an average score for each of the households were then constructed for the five capitals.

Market wise Analysis of the Livelihood Resources of the Vendor's Household

The livelihood status of the each market has been computed in terms of the pentagon diagram depicting the five capital assets; financial, physical, social, natural and human. This helps in understanding the rural livelihood scenario of the wild bio-resource selling sampled 120 vendor's households who belongs to 44 different villages that sell their produce in the 20 different market place spread across the 4 districts of central Assam. Again access to resources in rural economies determines the type of livelihoods of rural households. To investigate the access to different forms of capitals, certain set of relevant variables were considered. General scores were computed by means of a composite index. The standardized result is interpreted in Table 7.

Table-6
Measurement variables of
the Livelihood Capitals of the Vendors

Livelihood Capitals	Measuring Variables
Human Capital	Age of the seller
	Educational level of the seller
	Access to Health Facilities
Physical Capital	Personal household items
	Mode of transport used to go to the market
	House type
Natural Capital	Source of drinking water
	Access to forest
	Access to the various bio resources
	Landholding size
Financial Capital	Savings of the family
	Income from the selling bio resources
	Access to credit
Social Capital	Social activity and participation
	Participation in the MNREGA scheme
	Access to market information

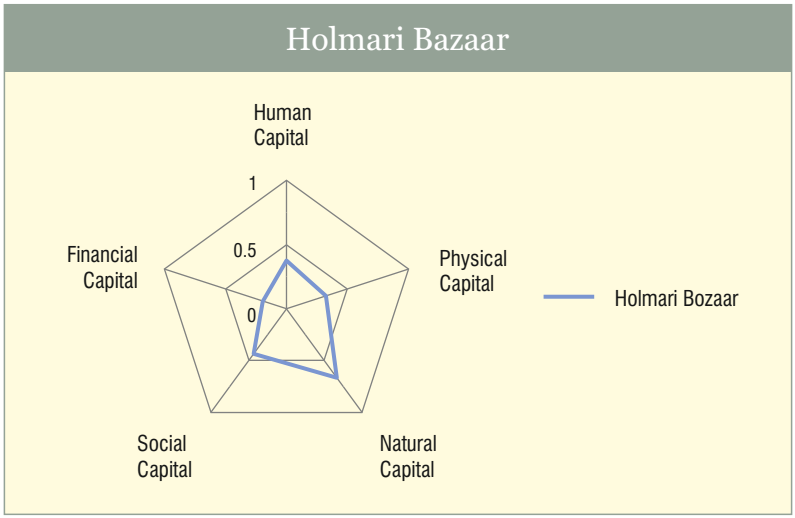
Table-7
The Livelihood Capital Values for the Vendors' Household in the Study Districts of Central Assam, 2015

District	Markets	Human Capital	Physical Capital	Natural Capital	Social Capital	Financial Capital
Nagaon	Holmari Bozaar	0.37	0.33	0.66	0.45	0.20
	Lumding Market	0.51	0.23	0.47	0.44	0.21
	Kothiatoli Bozaar	0.46	0.21	0.47	0.33	0.16
	Hojai Bozaar	0.38	0.38	0.65	0.44	0.21
	Parokhowa Bozaar	0.43	0.39	0.74	0.31	0.18
	Bokolia Bozaarx	0.39	0.39	0.71	0.35	0.32
	Dengaon Bozaar	0.29	0.37	0.51	0.42	0.30
	Dhing Bozaar	0.32	0.34	0.57	0.32	0.42
	Phuloguri Bozaar	0.22	0.25	0.47	0.33	0.41
Karbi Anglong	Langhin Bozaar	0.23	0.46	0.59	0.24	0.21
	Diphu Market	0.66	0.57	0.35	0.21	0.23
	Lorulangu Bozaar	0.27	0.58	0.43	0.28	0.32
	Dakmoka Bozaar	0.37	0.20	0.67	0.42	0.20
	Manja Bozaar	0.51	0.21	0.47	0.32	0.21
Morigaon	Sitajakhala Bozaar	0.46	0.16	0.59	0.33	0.16
	Boidyabari Bozaar	0.38	0.21	0.65	0.24	0.21
	Burha-Buri/ Buragaon Bozaar	0.43	0.18	0.43	0.31	0.18
	Jagiroad Bozaar	0.48	0.32	0.53	0.30	0.38
Dima Hasao	Haflong Bozaar	0.51	0.30	0.51	0.28	0.41
	Langting Bozaar	0.46	0.42	0.50	0.31	0.43

Source: Author's derivation from fieldwork

Of the five capitals, the highest value for the human capital (0.66) is witnessed among the vendors of Diphu market and physical capital (0.67) is witnessed among the vendors' of Lorulangu Bozaar . While Parokhowa Bozaar accounted for the highest value (0.74) in terms of natural capital (0.82). The highest value for the social capital was witnessed among the vendors' of Holmari Bozaar (0.45) and the highest financial capital was found to be in Langting Bozaar (0.43). The livelihood status of the vendors' in the 20 markets surveyed is summarized and presented in pentagon diagrams for a better pictoral understanding in Fig depicting the five capital assets; natural, human, social physical and financial. The high value in natural capital (0.63) in Parokhowa Bozaar indicates that nature acts as a stimulus to these households for their livelihood. The easily available forested area helps them to collect the bio-resources. The high social capital in Holmari Bozaar indicates that the participation of the vendors in village committee meetings or in any other organisational gathering is high. At the same time, the communication and information dissemination among the vendors' household also seemed quite high. But at the same time the values for financial capital is quite less as the highest value is itself is (0.43) which is in Langting Bozaar. The financial values directly influence the accumulation of the physical capital unless income is gained from other sources. With high physical capital (0.67) among the vendors' of Lorulangu Bozaar indicates that they belong to those sections of vendors who are also involved in other source of livelihood apart from selling bio-resources.

Fig -6
Pentagon Diagrams of the Vendors' Household
in the Surveyed Markets of Nagaon District



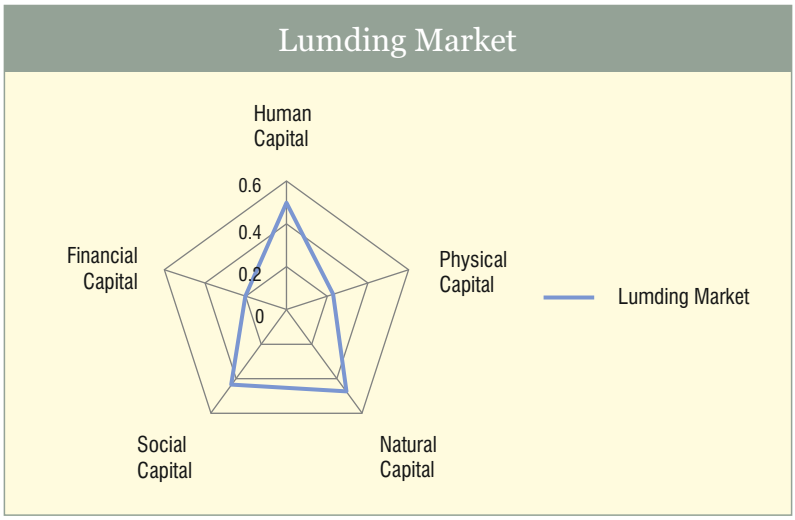
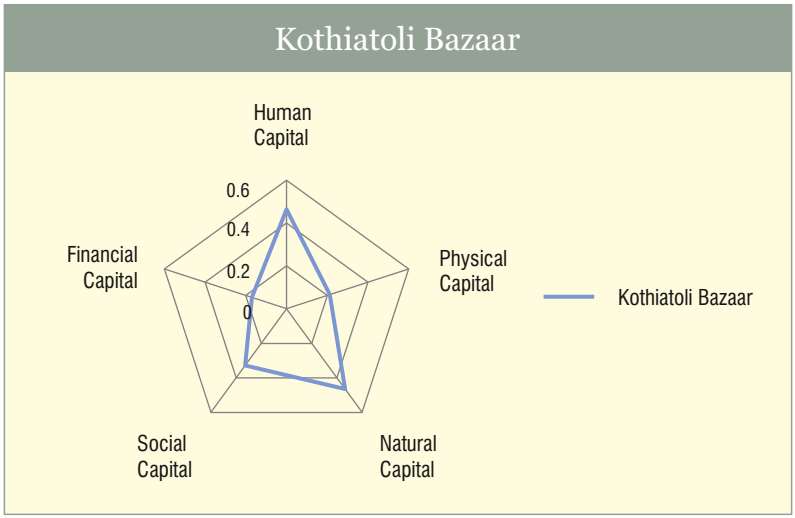


Fig -6 contd.


Kothiatoli Bazaar
Human Capital
0.6
0.4
0.2
0
Physical Capital
Natural Capital
Social Capital
Financial Capital
Kothiatoli Bazaar

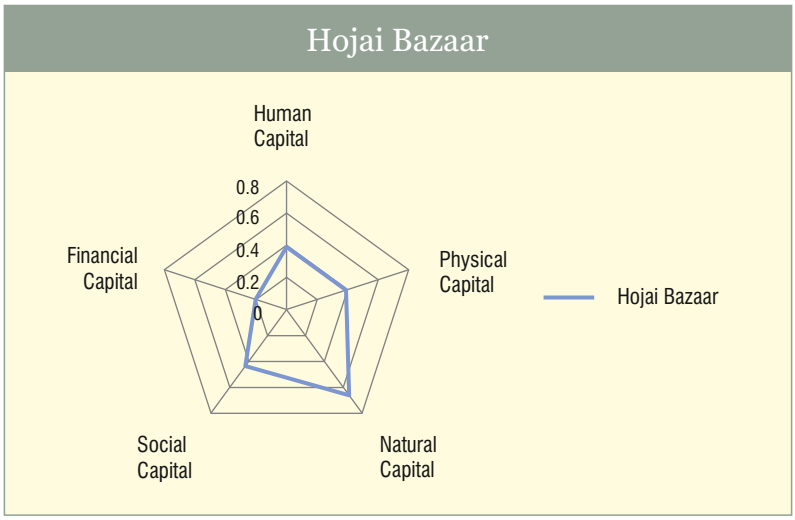
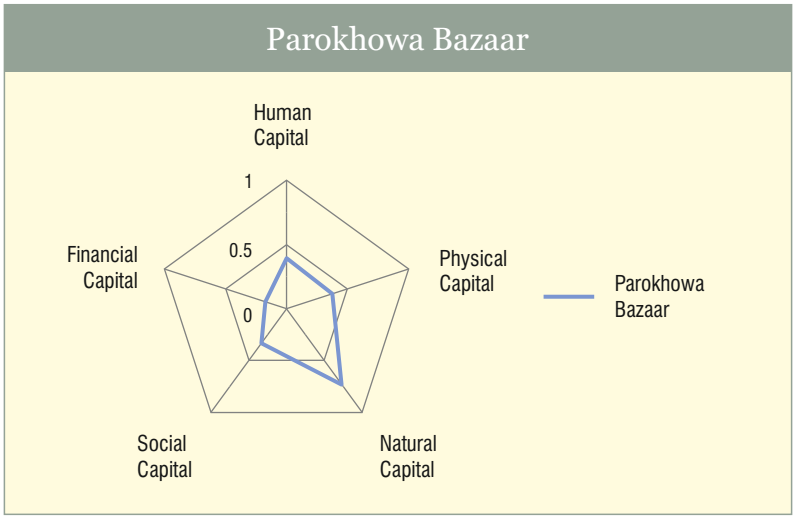

Hojai Bazaar
Human Capital
0.8
0.6
0.4
0.2
0
Physical Capital
Natural Capital
Social Capital
Financial Capital
Hojai Bazaar

Fig -6 contd.


Parokhowa Bazaar
Human Capital
1
0.5
0
Financial Capital
Physical Capital
Social Capital
Natural Capital
Parokhowa Bazaar

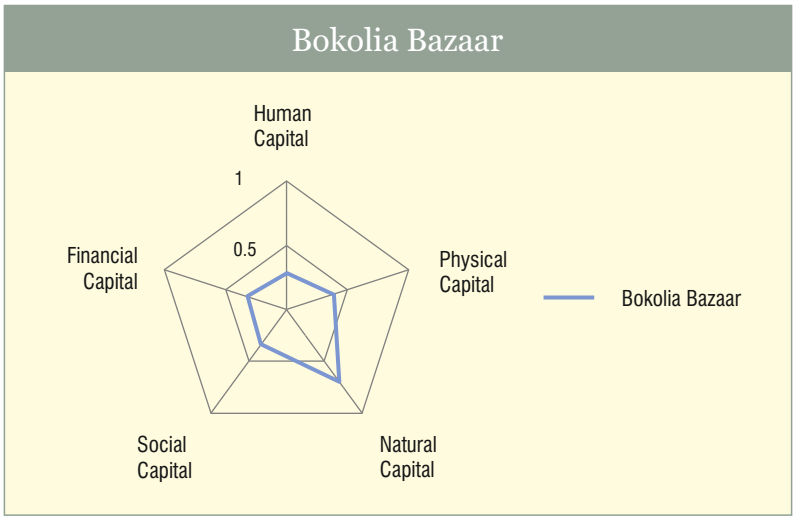
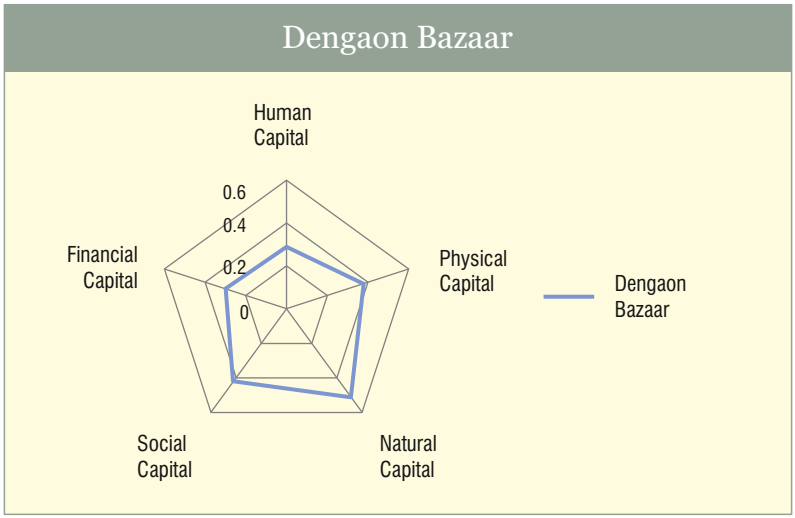

Bokolia Bazaar
Human Capital
1
0.5
Financial Capital
Physical Capital
Social Capital
Natural Capital
Bokolia Bazaar

Fig -6 contd.


Dengaon Bazaar
Human Capital
0.6
0.4
0.2
0
Physical Capital
Natural Capital
Social Capital
Financial Capital
Dengaon Bazaar

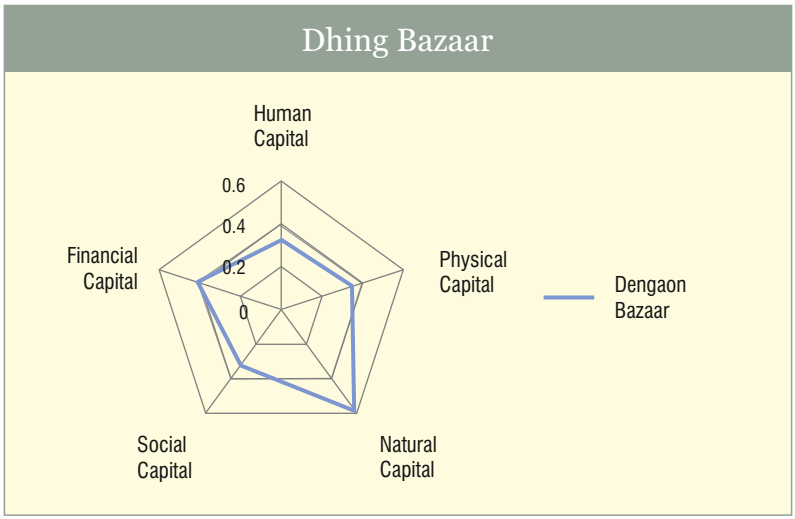
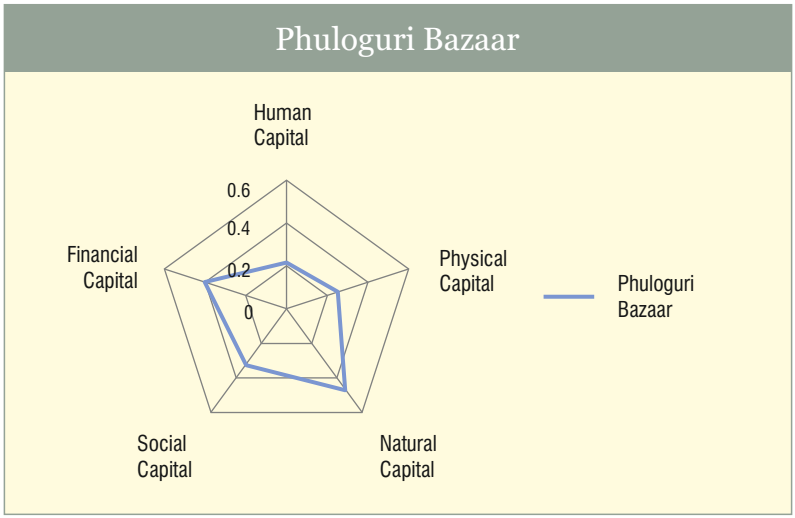

Dhing Bazaar
Human Capital
0.6
0.4
0.2
0
Physical Capital
Natural Capital
Social Capital
Financial Capital
Dengaon Bazaar

Fig -6 contd.


Phuloguri Bazaar
Human Capital
0.6
0.4
0.2
0
Physical Capital
Natural Capital
Social Capital
Financial Capital
Phuloguri Bazaar

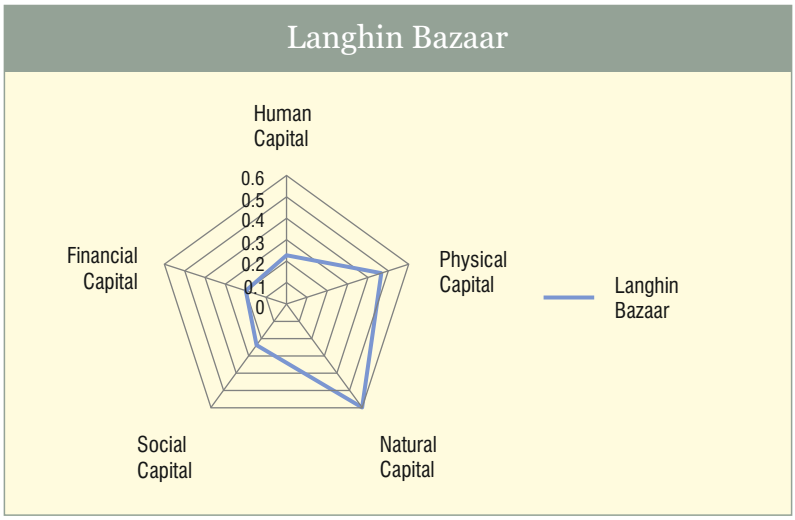
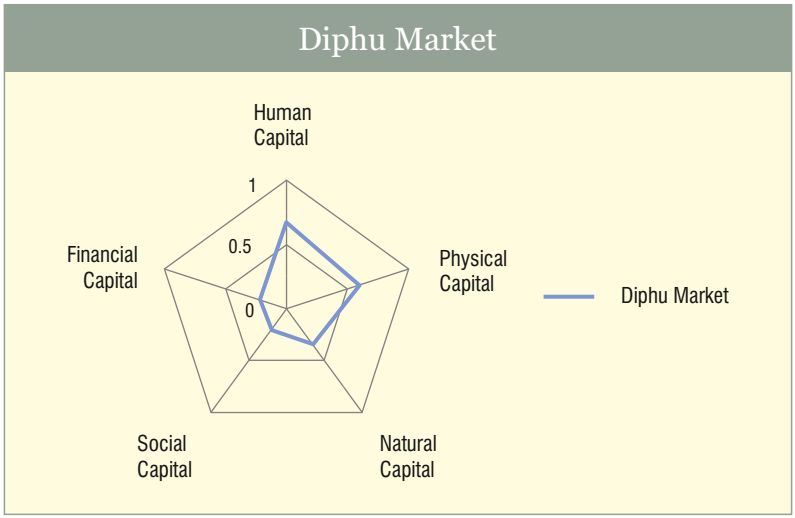

Langhin Bazaar
Human Capital
0.6
0.5
0.4
0.3
0.2
0.1
0
Physical Capital
Natural Capital
Social Capital
Financial Capital
Langhin Bazaar

Fig -7
Pentagon Diagrams of the Vendors' Household
in the Surveyed Markets of Karbi Anglong District



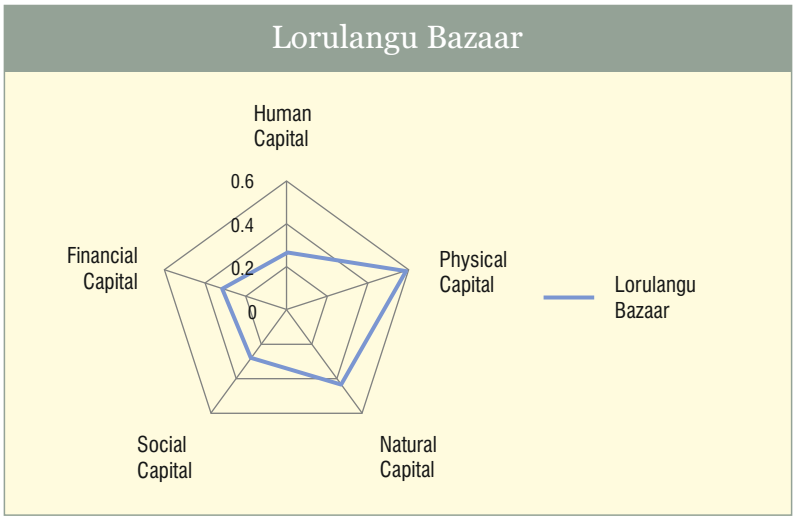
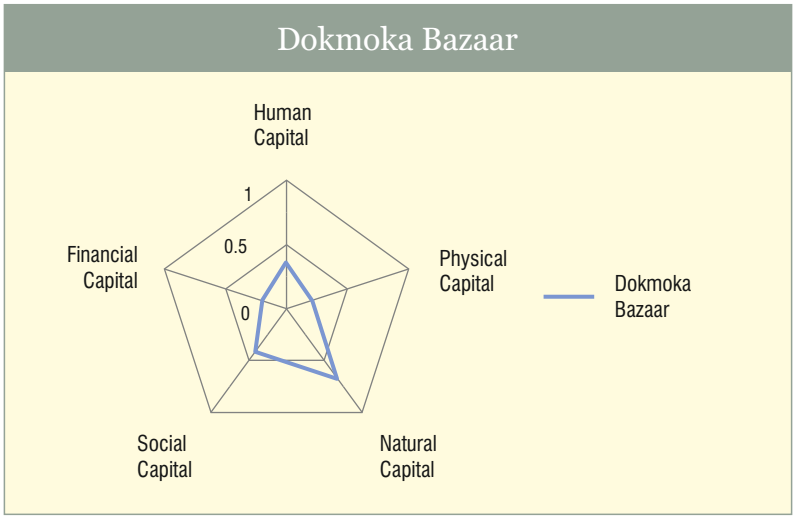


Fig -7 contd.


Dokmoka Bazaar
Human Capital
1
0.5
0
Physical Capital
Natural Capital
Social Capital
Financial Capital
Dokmoka Bazaar

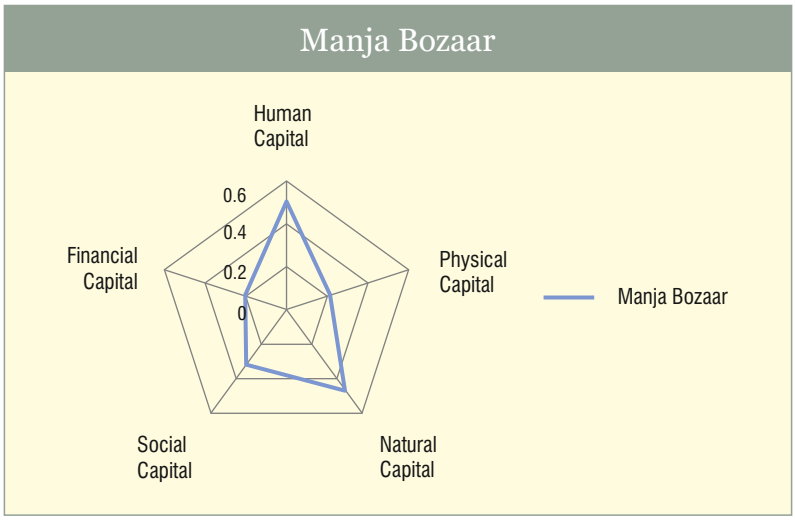
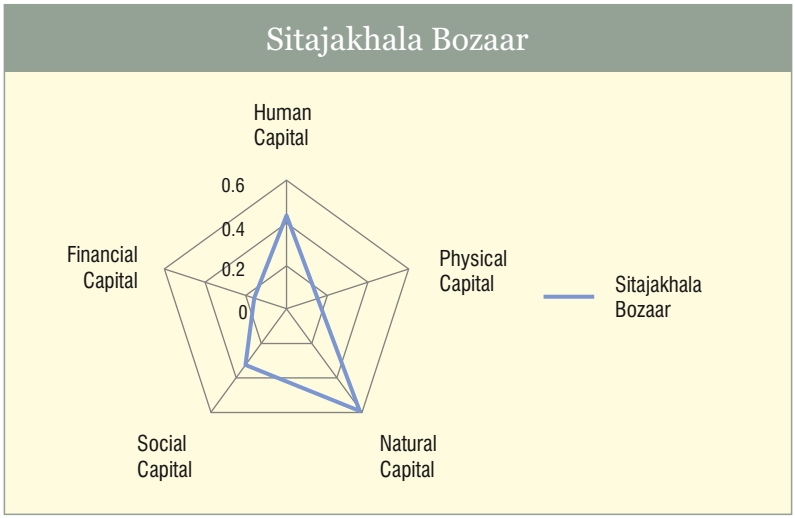

Manja Bozaar
Human Capital
0.6
0.4
0.2
0
Physical Capital
Natural Capital
Social Capital
Financial Capital
Manja Bozaar

Fig -8
Pentagon Diagrams of the Vendors' Household
in the Surveyed Markets of Morigaon District



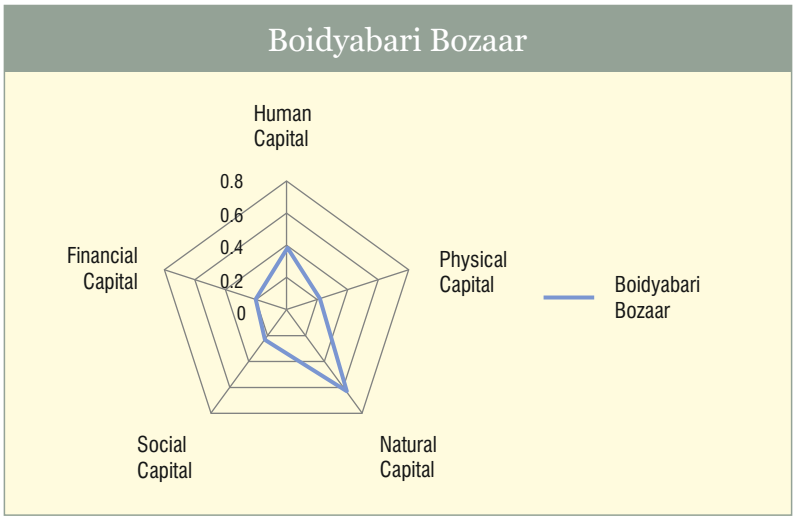
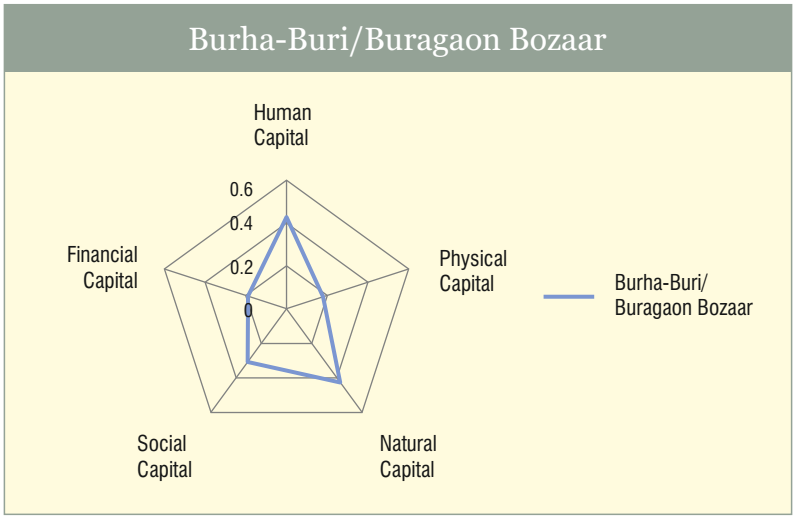


Fig -8 contd.


Burha-Buri/Buragaon Bozaar
Human Capital
0.6
0.4
0.2
0
Physical Capital
Natural Capital
Social Capital
Financial Capital
Burha-Buri/ Buragaon Bozaar

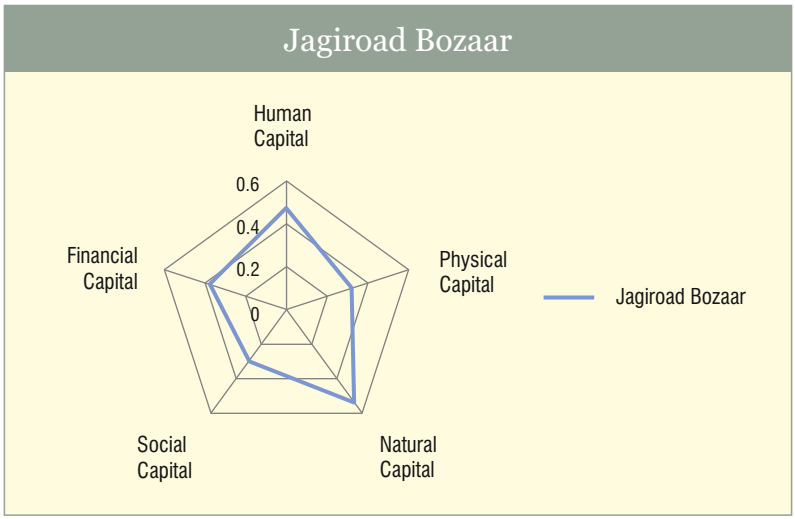
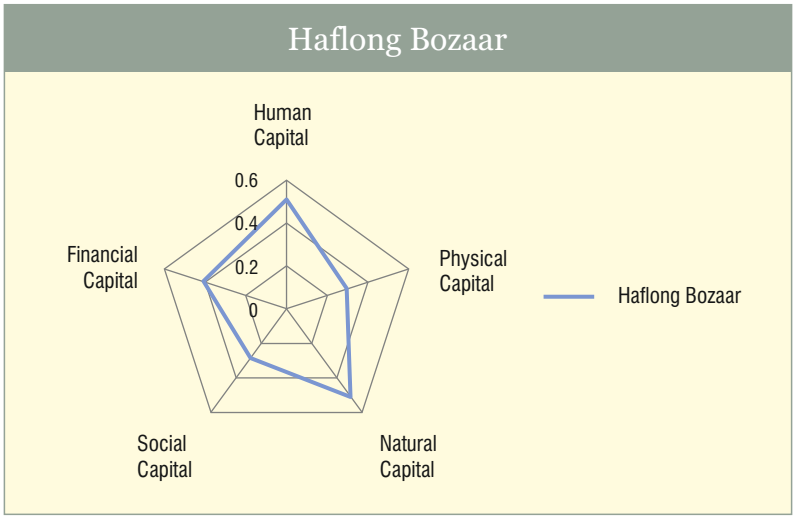
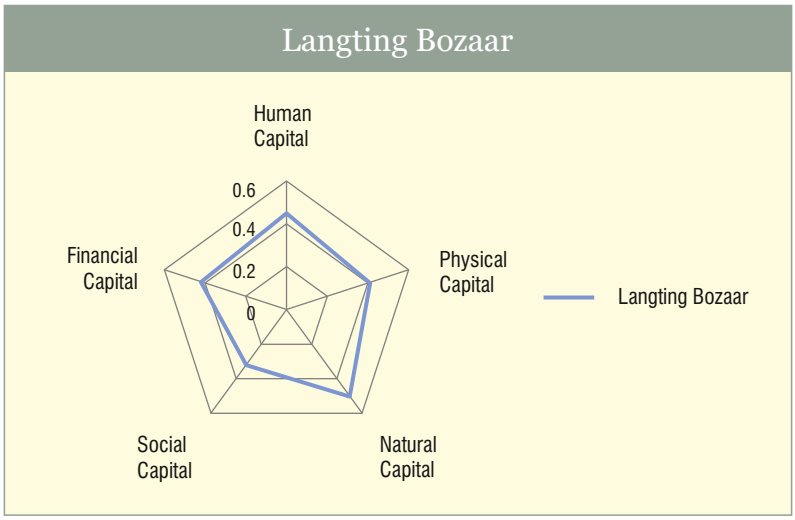

Jagiroad Bozaar
Human Capital
0.6
0.4
0.2
0
Physical Capital
Natural Capital
Social Capital
Financial Capital
Jagiroad Bozaar

Fig -9
Pentagon Diagrams of the Vendors' Household
in the Surveyed Markets of Dima Hasao District





RECOMMENDATIONS

In order to stem the recurrent exploitation on the wild bio-resources, a conservation strategy to promote the sustained use of these resources needs to be developed and implemented. Finding the appropriate solutions should involve the local people channelizing the process of subsistence in a sustainable way. These bio-resources need to be rejuvenated and used in an appropriate manner both beneficial to the society and the ecosystem as a whole.

Some recommendations for conserving not only the wild bio-resources but the overall traditional knowledge system and the livelihood scenario of the people listed below:

1. Research Initiatives:

The most crucial questions regarding the bio-resources are to understand the detailed status of these bio-resources in an extensive manner. Focus on scientific research on wild food resources will in turn help in the protection of the natural environment and habitat for wild food plants. In a word, more ethno-botanical surveys should be carried out for information and conservation as well as for the sustainable utilization of local wild edible plants to preserve cultural and genetic diversity in the study area.

2. Conservation and Management of Wild Food Plants:

The bio-resources that have been surveyed have many qualities. Be it in terms of medicinal, ornamental, and cultural and other uses that are important in the local culture. Furthermore, some are crop wild relatives and could provide useful genes for crop improvement, which may have significant consequence on food security. However, along with the conservation proper management should be emphasized as associated traditional knowledge is eroding rapidly. Therefore, sustainable management of these resources as well as conserving bio-resource is of the utmost importance.

3. Setting up of Arboretum:

Setting up of an Arboretum will help the people of the study area in propagating the scientific temperament without de-linking the social norms of the society. Further it will help to preserve the biological diversity of the study area. Arboretum plays an important role in the area of conservation and preservation as it helps in protecting the endangered species of plants.

4. Control of Over-exploitation of wild Bio-resources:

The local people all had a fair idea about the benefits that they were extracting from the bio-resources. But at the same time it is important to make them aware that overexploitation of these resources would lead to their disappearance which would put the indigenous knowledge and practices to non use. This will in turn affect the local people's physical, social and economic well being. Thus, it becomes imperative to keep a check on overexploitation of these bio-resources.

5. Creation of Employment Opportunities:

Lack of employment is another factor contributing to the overexploitation of bio-resources. Employment opportunities should be created for the local youths. These opportunities will help in alternative channelizing towards a different source of livelihood instead of gaining economic returns by means of over

exploitation. It is generally the youth for profitable economic returns are engaged in the unfair or unhealthy competition for the collection of products resulting to the erosion of the bio-resource from the study area.

6. State intervention:

There is a need for effective state intervention over use and conservation of bio-resources, through people's participation. Such conservation efforts should be backed by scientific input compatible with the social needs and aspirations. This process calls for an adequacy of laws, policies and action plans.

PHOTO PLATES

Local Markets

Bhuragaon Bazar

Bhuragaon Bazar

Dakmoka Bazar

Diphu Market

Haflong Bazar

Holmari Bazar

Local Markets

Kothiatoli Bazar

Langhin Bazar

Lorulangu Market

Manza Bazar

Parokhowa Bazar

Sitajakhala Bazar

Banana varieties

Athia Kol
Musa balbisiana

Senduri Kol
Musa velutina

Jahaji Kol
Musa chinensis

Seni champa Kol
Musa champa

Malbhog Kol
Musa assamica

Manohar Kol
Musa sapientum

Nutritional Value: Energy 90kcal; carbohydrate 22.84gm; protein 1.09gm; total fat 0.33gm; dietry fibres 2.6 gm; vitamin C 8.7 mg; vitamin E 0.10 mg; sodium 1mg; potassium 358 mg; calcium 5 mg; magnesium 27 mg; phosphorus 22mg; zinc 0.15mg & small amount of alpha & beta-carotene, per 100gm.

Citrus varities

Nemu
Citrus sp. 1

Elashi Nemu
Citrus sp. 2

Nemu Tenga
Citrus limon

Sokora Tenga
Citrus sp. 3

Photo: N. Mahanta

Mausambi
Citrus sinensis

Gol Nemu
Citrus aurantifolia sp.

Photo: N. Mahanta

Nutritional Value: Energy 29 kcal; total fat 0.3gm; sodium 2mg; potassium 128mg; carbohydrate 9 gm; dietry fibres 2.8 gm; sugar 2.5 gm; protein 1.1 gm; vitamin C 88%; vitamin B6 5%; calcium 2 %; iron 3% & magnesium 2% per 100 gms.

Edible Fruits/Seeds/Pulbs/Stems

Heibi (Meyna)
Meyna laxiflora

Amphis

Podum Thari
Nelumbo nusifera

Podum Guti
Nelumbo nusifera

Neela Bhet
Nympheae nouchali

Ronga Bhet
Nympheae rubra

These non-conventional wild edibles are consumed for their rich vitamins and minerals contents. They are also a source of generating income for the economically poor rural population.

Edible Sweet Potatoes and Yams

Boga Mitha Aalu
Ipomoea batatas

Ronga Mitha Aalu
Ipomoca batatas

Ronga Simolu Aalu
Manihot esculenta

Boga Simolu Aalu
Manihot esculenta

Kath Aalu
Diascorea alata

Batrais

Nutritional Values: Energy 180 kcal; carbohydrates 41.4gm; protein 4.0 gm; total fat 0.3gm; omega-3 8mg; omega-6 120mg; vitamin E 1.4mg; vitamin C 39.2mg; niacin 3.0mg; Choline 26.2mg; Betaine 69.2 mg; sodium 72mg; potassium 950 mg; calcium 76mg; iron 1.4mg, magnesium 54 mg & phosphorus 108mg, water 152 gm & ash 2.7gm.

Edible Taro varities

Ol Kochu
Amorphophallus bulbiferra

Nal Kochu
Alocasia indica

Ronga Dahi Kochu
Alocasia odora

Koni Kochu
Alocasia sp.

Panch Mukhi Kochu
Allocasia cucullata

Ronga Koni Kochu
Alocasia sp.

Nutritional Values: Energy 112kcal; carbohydrates 26.46gm; protein 1.5 gm; total fat 0.2gm; dietary fibre 4.1 gm; vitamin C 4.5mg; niacin 0.6mg; sodium 11mg; potassium 591 mg; calcium 43 mg; iron 0.55mg, magnesium 33 mg; copper 0.17mg & small amounts of beta-carotene.

Edible Banana flowers

Malbhog Kol Phul
Musa assamica

Kol Phul
Musa sp. 1

Kol Phul
Musa sp. 2

Kol Phul
Musa sp. 3

Kol Phul
Musa sp. 4

Manohar Kol Phul
Musa sapientun

Nutritional Values: Energy 51kcal; carbohydrates 9.9gm; protein 1.6 gm; total fat 0.6gm; dietary fibre 5.7 gm; vitamin E 1.07mg; potassium 533.3 mg; calcium 56 mg; iron 56.4mg; magnesium 48.7 mg & phosphorus 73.3mg.

Edible Plants

Bon Tita Karela
Mukia maderaspatana

Wild Bhol

Kochu Phul

Kochu Thuri

Pachala (Kol gosh)

Ol Kosu
Amorphophallus bulbiferra

These non-conventional wild edible plant resources are consumed for their rich vitamins and minerals contents. They are also a source of generating income for the economically poor rural population.

Edible Spices

Dalcheni
Cinnamonum zeylanicum

Bon Halodhi
Curcuma aromatica

Jhaluk
Piper nigrum

Maroi mara
Allium hookeri

Aada
Zingiber officinale

Bhot Jalokia
Capsicum annum

Nutritional Value: Energy 247 kcal; carbohydrate 50.59 gm; protein 3.99 gm; dietary fibres 53.1 gm; vitamin C 3.8 mg; vitamin E 10.44 mg; sodium 10 mg; potassium 431 mg; calcium 908mg; iron 8.32 mg; magnesium 60mg; phosphorous 64mg; zinc 1,83 and small amounts of beta-carotene per 100 gm.

Edible Plants

Dimoru Pat
Ficus hispida

Wild Simi
Canavalia gladiata

Lofa Xak
Malva verticilliaea

Ithang

Deori Tita/Leipungkha
Solanum anguivi

Irathai

These non-conventional wild edible plant resources are consumed for their rich vitamins and minerals contents. They are also a source of generating income for the economically poor rural population.

Edible Plants

Kash Kol
Musa paradisiaca

Hanthu Pat

Phulmista Tenga

Mukthrubi
Zanthoxylum rhetsa

Mithu Pat

Bon Ghehu/Yelang
Polygonum barbata

These non-conventional wild edible plant resources are consumed for their rich vitamins and minerals contents. They are also a source of generating income for the economically poor rural population.

Edible Plants

Omita Phul
Carica papaya

Bhet Phul
Nymphaea nouchali

Sewali Phul
Nyctanthes arbor-tristis

Bet
Callamus erectus

Kalmou Xak
Ipomoea aquatica

Dhekia Xak
Diplazium esculentum

These non-conventional wild edible plant resources are consumed for their rich vitamins and minerals contents. They are also a source of generating income for the economically poor rural population.

Edible Plants

Manimuni
Hydrocotyle sibehorpioides

Nephaphu
Clarodendrum glandulosum

Uthum
Ficus geniculata

Bakhar

Ronga Puroi Xak
Basella alba sp.

Bhat Ghila
Oroxylum indicum

These non-conventional wild edible plant resources are consumed for their rich vitamins and minerals contents. They are also a source of generating income for the economically poor rural population.

Edible Bamboo shoots

Bah Gaaj

Kako Bah Gaaj
Dendrocalamus hamiltoni

Bah Gaaj

Bah Gaaj

Bah Gaaj

Kharicha
Fermented Bamboo Shoots

Nutritional Values: Energy 27kcal; carbohydrates 5.3gm; protein 2.6 gm; total fat 0.3gm; dietary fibre 2.2 gm; omega-3 20mg; omega-6 114mg; vitamin E 1mg; vitamin C 4mg; niacin 0.6mg; potassium 533 mg; calcium 13 mg; iron 0.5mg, magnesium 3 mg & phosphorus 59mg, zinc 1.1 mg & copper 0.2mg.

Edible Fungi

Uyen
Pleurotus ostreatus

Mushroom
Pleurotus squarrosulus

Kanglayen
Schizophyllum commune

Uchina
Auracularia delicata

Nutritional Values: Energy 22kcal; carbohydrates 2.3gm; protein 2.2 gm; total fat 0.2gm; dietary fibre 1 gm; omega-6 97.3mg; vitamin C 1.5mg; niacin 2.5mg; Choline 12.1mg; Betaine 6.6mg; potassium 223 mg; calcium 2.1mg; iron 0.3mg, magnesium 6.3 mg & phosphorus 60.2 mg, sodium 5mg & water 64.7gm.

Other Edibles

Hamuk
Turitella sp.

Nutritional Values: Energy 90kcal; carbohydrates 2gm; protein 16.1 gm; total fat 1.4gm; omega-3 218mg; omega-6 17mg; cholesterol 50mg; vitamin E 5mg; niacin 1.4mg; Choline 65mg; sodium 70mg; potassium 382 mg; calcium 10 mg; iron 3.5mg, magnesium 250 mg; phosphorus 272mg, zinc 1 mg; water 79.2gm & ash 1.3gm.

Kekura
Barytelphusa guerini

Nutritional Values: Energy 97.8kcal; protein 20.2 gm; total fat 1.3gm; omega-3 416mg; omega-6 6.8mg; vitamin C 6.1mg; niacin 2.5mg; sodium 587mg; potassium 170 mg; calcium 28.1mg; iron 2.4mg, magnesium 53.5mg, phosphorus 109mg, zinc 3.1 mg, cholesterol 60.4mg, water 63.8gm & ash 2.2gm.

Amroli Poruwa
Oecophylla smaragdina

Nutritional Values: Energy 243kcal; protein 53.5 gm; total fat 13.5gm; dietary fibre 6.9gm; sodium 0.8 gm; magnesium 0.7gm; phosphorus 0.18gm; chlorine 0.21 gm & small quantities of vitamin B1, B2 & B3.

Eri Pupae Eri Larvae
Samia cynthia ricini

Nutritional Values: Energy 607kcal; moisture 71.5gm; carbohydrates 1.5gm; protein 16.5 gm; total fat 8.2gm; dietary fibre 1.5gm; calcium 24 mg; iron 7.0mg, magnesium 54 mg; phosphorus 180 mg & zinc 2.1 mg.

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GLOSSARY

Achenes: A type of fruit which normally contains only one seed and which is indehiscent i.e. it does not split open and released the seed.

Acuminate: Leaf shape narrowing to a slender point.

Aphrodisiac: a drug or other agent that stimulates sexual desire.

Apomictic: Reproduction in plants not involving the fusion of male and female gametes.

Arils: Fleshy and usually brightly coloured cover of some seeds that develops from the ovule stalk and partially or entirely envelops the seed.

Axillary: Used for describing the position of an organ like bud, inflorescence, flower, meristem etc in the axis of a leaf or other similar organ.

Bract: A leaf-like organ which is extending an inflorescence.

Bracteoles: A small leaf on a flower stalk.

Branchlets: A small branch or division of a branch (especially a terminal division).

Calyx: The outer part of a flower. They protect the inner parts of the flower when it is in bud and are usually green but sometimes they are brightly coloured as in the marsh marigold.

Carpel: The female structure of a flower.

Coriaceous: Used for a structure having a leathery texture.

Corymb: flat-topped or convex inflorescence in which the individual flower stalks grow upward from various points on the main stem to approximately the same height; outer flower open first.

Corymbose: resembling a corymb.

Crenate: Having a margin with rounded projections.

Cyme: More or less falt-topped cluster of flowers in which the central or terminal flower opens first.

Cymose: Having a usually flat-topped flower cluster in which the main and branch stems each end in a flower that opens before those below it or its side.

Deciduous Tree/Plant: Plants shedding foliate at the end of the growing season.

Dicotyledons: Commonly referred to as dicots, are flowering plants whose seeds are covered by two embryonic leaves or cotyledons.

Dimorphic: Occurring or existing in two different forms.

Dioecious: Having male and female reproductive organs in separate plants or animals.

Drupe: Fleshy indehiscent fruit with a single seed.

Dyspepsiac: a disorder of digestive function characterized by discomfort or heartburn or nausea.

Ellipsoid: A surface whose plane sections are all ellipses or circles.

Elliptic: Leaf shape in the form of an ellipse or rounded like an egg.

Endocarp: The hard inner layer of the pericarp of some fruits that contains the seed.

Evergreen: A plant having foliage that persists and remains green throughout the year.

Febrifuge: Any medicine that lowers body temperature to prevent or alleviate fever.

Flavone: A colourless crystalline compound that is a part of a number of white or yellow plant pigments.

Flavonoid: Any of a large class of plant pigments having a chemical structure based on or similar to flavone.

Fungi: The taxonomic kingdom including yeast, molds, smuts, mushrooms and toadstools.

Glabrous: Having no hair or similar growth; smooth,

Herb: A plant lacking a permanent woody stem.

Hermaphrodite Plants: Plants having both male and female reproductive organs.

Indehiscent: Not opening spontaneously at maturity to release seeds.

Inflorescence: The whole flowering part of a plant- including its stalks or arrangement of flowers on a stalk.

Lanceolate: Leaf shaped like a lance head; narrow and tapering to a pointed apex

Monocotyledons: Commonly referred to as monocots, are flowering plants whose seeds typically contain only one embryonic leaf or cotyledon.

Monoecious: Having male and female reproductive organs in the same plant or animal.

Obovate: An egg-shaped leaf with the narrower end at the base.

Obovoid: Approximately obovate in shape.

Obtuse: Leaf shape rounded at the apex.

Ovate: An egg-shaped leaf with the broader end at the base.

Peduncle: A stalk of an inflorescence.

Perennial: Plants that lasts three seasons or more.

Perianth: The floral envelop, it includes the calyx and corolla, or any of them.

Pericarp: A layer of vegetative tissues which is covering a fruit-body.

Petals: One of the parts forming the corolla of a flower, usually brightly coloured and conspicuous.

Petiole: The slender stem that supports the blade of a leaf.

Pteridophyta: All the vascular plants that do not bear seeds.

Pteridophyte: Plants having vascular tissue and reproducing by spores.

Pubescent: Covered with fine soft hairs or down.

Raceme: Usually elongate cluster of flowers along the main stem in which the flowers at teh base open first.

Rhizome: A horizontal plant stem with shoots above and roots below serving as reproductive structure.

Rhomboid: Shaped like a rhombus (a parallelogram with four equal sides).

Scandent: Plants having a tendency to climb.

Sepal: One of the green parts that form the calyx of a flower.

Sessile: Permanently attached to a substrate; not free to move about.

Shrub: A low woody perennial plant usually having several major stems.

Spadix: The fleshy axils of a spike often surrounded by a spathe.

Spathe: A conspicuous bract surrounding or subtending a Spadix or other inflorescence.

Spathulate: Having a broad rounded apex and a narrow base.

Spike: A racemose inflorescence in which flowers are sessile and are borne on an elongated axis as in what.

Spinous: Shaped like a spine or thorn.

Stipule: A small leafy outgrowth at the base of a leaf or its stalk or simply the basal appendages of a leaf or petiole.

Sub-sessile: Not quite sessile.

Succulent: A plant adapted to arid conditions and characterized by fleshy water-storing tissues that act as water reservoirs.

Tomemtose: Covered with densely matted filaments.

Trifoliate: Having three leaflets.

Unisexual: Having the male and female sexual parts in separate flowers.

Vermifuge: A medication capable of causing the evacuation of parasitic intestinal worms.

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Edible Fruits

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Others

Note:

Dr. Puspa Komor

A post-graduate in Social Sciences from Gauhati University with specialization in Fluvial Geomorphology, she completed her PhD on Impact of Traditional Dairy Farming Practices of Nepali community on Rural Livelihood at Lower Dibang Valley, NE India. She has been an ICSSR Research Fellow and she also cleared her NE-SLET exam in 2008 and UGC NET exam in 2009. She works extensively on socio-economic and livelihood aspects of local communities. She has contributed many popular articles and 5 research papers in reputed journals. She also authored a book "Living through Dairying: Understanding the Practices and Prospects of Traditional Nepali Dairy Farming Community" in 2011. She has also participated in many national and International training & workshop programmes and presented research papers at national level and abroad namely at the SCCS conference at New York, USA in 2011.

Presently, she is working as subject teacher at Dawson Higher Secondary School, Nagaon. She is also associated with Society for Socio-Economic Awareness and Environment Protection, Nagaon as Project Co-ordinator and involved in various research and development projects such as National Green Crops Project which is targeted at spreading awareness regarding tree plantation by forming eco clubs at school level. She is also associated with the Board from the past one year as the Principal Investigator of the research project "Documentation of Wild Edible Bio-Resources from local markets of Central Assam".

Dr. Oinam Sunanda Devi

A post-graduate in Life Sciences from Gauhati University with specialization in Animal Ecology & Wildlife Biology, she completed her PhD on Diversity & Ecology of Frugivorous Birds in Eastern Assam. As a researcher, she has worked in the field of wildlife conservation especially avian fauna and contributed 25 popular articles on various aspects of biodiversity in leading local newspapers and also published 11 research papers in reputed journals. She has also completed four individual projects funded by Oriental Bird Club, UK, ATREE, Foundation for Ecological Security & The Rufford Small Grants Foundation, UK. She has participated in various national and International training & workshop programmes on biodiversity conservation and also presented research papers at national level and abroad namely at the SCCS conferences at Cambridge, UK and New York, USA in 2011.

Presently, she is working as Scientific Officer with the Assam State Biodiversity Board and is involved in the implementation of Biological Diversity Act 2002 by way of generating awareness amongst stakeholders, formation of Biodiversity Management Committees, preparation of People's Biodiversity Registers and documentation of traditional knowledge associated with bio-resources in the state. She has also been associated with research activities & various publications of the Board including Booklets & brochures. She has recently co-authored a book "Common Spiders- from select Protected Areas of Assam".

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