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Original Research Article

An ethno botanical survey of wild edible plants used by the Bodo Tribe in Baksa District of BTR (Bodoland Territorial Region), Assam

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Abstract: In many parts of the world, tribal people's traditional diets frequently include a variety of wild edible plants. Northeast India is renowned for its tribal area, where the local tribes rely on natural resources to meet their nutritional needs. The Baksa district is one of the 35 districts of Assam State, Northeastern India, that are part of the Bodoland Territorial Region (BTR). The Bodo tribe and other communities make up the majority of the population. Some wild plants have long been used as food and medicine by the Bodo people of this area. The purpose of this study is to record the traditional knowledge of the Baksa District's Bodo tribe regarding the use of edible wild vegetables. A survey was carried out at a few chosen area of Baksa district. A semi-structured questionnaire was used to gather ethno botanical data from local elders, vegetable dealers and herbalists. 52 wild vegetable species in all, representing 34 families and 28 genera were found and documented. Findings reveal that several of the recorded species possess ethno medicinal value and are traditionally used for treating ailments like anemia, piles, gynecological problems, diabetic, fever, cough, hypertension etc. However, increasing modernization, habitat loss, large exploitation and generational disconnect pose a serious threat to the preservation of this indigenous knowledge. In order to improve their economic standing and ensure sustainable management in the near future, this survey highlights the critical necessity to conserve wild edible plant species and cultivate them on a wide scale.

Keywords: Baksa, edible plants, ethnobotany, vegetables, tribal, wild

Introduction:

In many parts of the world, tribal people's traditional diets frequently include a variety of wild edible plants. Several tribal people still follow their traditional eating patterns in India's Northeastern Region (NER), which is one of the World's biodiversity hotspots. For a large portion of their dietary needs, they rely on wild food sources. Wild vegetables also serve as a significant source of food, medicine, nutrition and revenue for the local tribal communities. These wild plants are safe to consume aid in meeting dietary needs and nutritious for good human health. Consuming wild edibles is also inextricably linked to almost every element of their socio-cultural, spiritual and healthy lives in many civilizations (Singh *et al.*, 2007). Most rural communities rely on wild edible plants to meet their food demands during food emergencies and as supplemental food supplements (Rashid *et al.*, 2008). In India, there are over 800 species of edible wild plants known to exist. Around 300 species are utilized by the tribal population of the North East region for food and medicinal purposes (Talang *et al.*, 2023).

Wild edible plants are one of these underutilized plant resources. They contain a high concentration of micronutrients, which are used to cure a variety of ailments. The documentation of ethnobotanical information about underutilized wild food resources is a growing field of research globally (Bharucha and Pretty, 2010; Kar *et al.*, 2012). Kokrajhar, Baksa, Chirang and Udalguri are the four districts that make up the Bodoland Territorial Area (BTR), an autonomous region in Assam, Northeast India. People in BTR, Assam, especially tribals communities, have been using wild food plants to augment their meals since ancient times. The great majority of people living in the area are members of the Bodo tribes. Assamese, Bengalis, Rabhas, Garos, Adivasis, Nepalis and Rajbonshis are among the other communities that call this region as their home land. The local population was forest-friendly, as they depended on forest resources for their survival. The local communities eat the roots, tubers, leaves, flowers, fruits and seeds of these wild edible plants, among other forms.

Many studies have been conducted in various areas of the BTR region, Assam to confirm the occurrence of wild edible plants. The use of wild plant resources in the daily lives of Bodo community has been an ancient practice. The practice is still prevailed, although its popularity has recently decreased, according to a study by Narzary *et al.* (2013) in the Kokrajhar District of Assam. The Bodo Tribe of Assam uses 52 wild plant species as vegetables, according to Kar and Borthakur (2008). Baro *et al.* (2015) documented on wild edible vegetables of Baksa District, Assam where 102 plant species documented.

The recording and ethno botanical investigation of wild edible plants utilized by the Baksa district's Bodo tribe are the subjects of the current study. As there is no ethno botanical studies of the region's wild food plants.

Materials and methods:

Study site:

Bodoland Territorial Region (BTR) is an autonomous region in Assam, Northeast India, consisting of four districts: Kokrajhar, Baksa, Chirang and Udalguri. Baksa district, located on the north bank of the river Brahmaputra, is one of Assam's 35 districts in Northeastern India. It lies in between 26°25'0" N and 26°47'0" N latitude and 91°0'0" to 91°30'0" E longitudes. The district has a total area of 2,400 square km as mentioned by Baro *et al.* (2015). The district is bounded by Bhutan in the North, Udalguri district in the East, Barpeta, Nalbari and Kamrup districts in the South and Chirang district in the West (Baruah *et al.*, 2015). Baksa is dominated by tribal populations like as Bodo, Rabha and Garo, with the Bodos being the most populous group.

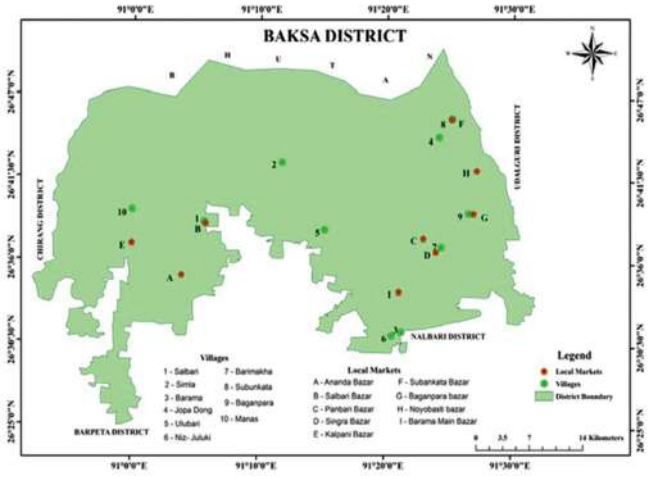

Fig. 1. Map showing the different study site (Source: prepared by the authors).

Methods:

Field trips were conducted from the month of December, 2024 to April, 2025. Ten villages (Manas, Salbari, Simla, Barama, Jopa dong, Ulubari, Niz-Juluki, Barimakha, Subunkata, Baganpara) in the Baksa District of Assam (North-East India) and 9 local markets (viz., Ananda Bazar, Salbari Bazar, Panbari, Singra Bazar, Kalpani, Subankata, Baganpara, Noyabosti, Barama Main Bazaar) were selected for the present study. A semi-structured questionnaire was used following standard method (DeJonckheere and Vaughn, 2019) to collect information, as were interviews with experienced elders, villagers, vegetable vendors and herbalists. They provided information on each plant's therapeutic applications, local

Fig. 2. A-*Lippia geminate* (Ontai bajab), **B-***Premna herbacea* (Mathigalthab), **C-** *Alternanthera philoxeroides* (Dwi-galdeb), **D-***Pouzolzia zeylanica* (L.) Benn. (Sam-louthi), **E-** *Antidesma acidum* (Lafa saikho), **F-***Ipomoea aquatic* (Mande), **G-***Costus speciosus* (Buri tokhon), **H-***Moringa oleifera* (Sojona), I-*Oroxylum indicum* (Kharokhandai), **J-***Chenopodium album* (Buthua), **K-***Oxalis corniculata* (Singri mwikhi), **L-** *Rotheca serrata* (L.) Steane & Mabb. (Khungkha), **M**-*Enhydra fluctuans* Lour. (Alangshi), **N-** *Solanum nigram* (Ganga Thwfa), **O-** *Blumea lanceolaria* (Roxb.) Druce (Jwglaori), **P-***Spilanthes paniculata* (Jari), **Q-** *Phlogocanthus thrysiformis* (Basigi bibar), **R-** *Houttuynia cordata* Thund (Maisundri).

Table 1. Wild edible plants documented used by the Bodo tribe of Baksa District.

Sl. No.	Family	Botanical Name	Local Name	Parts used	Ethno medicinal value
1.	Acanthaceae	*Phlogocanthus thrysiformis*	Basigi bibar (Bd.) Titaphul (Ass.)	Flower	Dysentery
		Justicia adhatoda L.	Barsika (Bd.)	Flower	Cough, Cold, Allergy
2.	Agaricaceae	*Macrolepiota albuminosa*	Mwikhun (Bd.)/ Kaatfoola (Ass.)	Cap and stem	Diabetes
3.	Alismataceae	*Sagittaria sagittifolia*	Thaso laojeng (Bd.)	Tubers and young leaf	Kidney stone
4.	Amaranthaceae	*Alternanthera philoxeroides*	Dwi-galdeb (Bd.)/ Panikhutra (Ass.)	Leaf and young shoots	Used as antiseptic
		Alternanthera sessilis	Ha-galdeb (Bd.)	Tender shoots	Respiratory problems
		Amaranthus spinosus	Su gwnang khuduna (Bd.)/Kata khutura (Ass.)	Leaf and tender shoots	Fever, Rheumatic problem
		Chenopodium album	Buthua (Bd.)	Tender shoots	Blood Purifier
5.	Apiaceae	*Hydrocotyle sibthorpioides*	Manimuni fisa (Bd.)/ Horu manimuni (Ass.)	Whole plant	Stomach ache
6.	Araceae	*Alocasia acuminata* Schott	Thaso gwswm (Bd.)/ Kosu (Ass.)	Leaf petioles	-
		Amorphophallus sylvaticus	Olodor (Bd.)	Whole plant	Blood purifier, skin diseases
		Colocasia esculenta (L.) Schott	Thaso gwswm (Bd.)	Young leaf, tubers, flowers	-
		Lassia spinosa	Chibru (Bd.)/ Chengmora (Ass.)	Leaf petioles	Gynecological problems
7.	Asteraceae	*Blumea lanceolaria* (Roxb.) Druce	Jwglaori (Bd.)	Young shoots and leaf	Stomach trouble, cough
		Enhydra fluctuans Lour.	Alangshi (Bd.)/Helochi/ Helancha (Ass.)	Leaf and shoots	Used to overcome liver complaints, skin diseases
		Sphaeranthus indicus	Jolonga banthu (Bd.)	Leaf and shoots	Diabetes, cough
		Spilanthes paniculata	Jari (Bd.)/Bhringraj (Ass.)	Leaf	Toothaches and other ailments
8.	Athyriaceae	*Diplazium esculantum*	Dingkhiya (Bd.)/Dhekia (Ass.)	Young shoot	Rheumatic
9.	Basellaceae	*Basella alba*	Mwifrai (Bd.)/Ronga puroi sak (Ass.)	Young shoots and tender leaf	Anaemia and skin allergies
10.	Bignoniaceae	*Oroxylum indicum*	Kharokhandai (Bd.)/ Bhatghila (Ass.)	Flowers	Dysentery
11.	Caryophyllaceae	*Drymaria cordata*	Jabsri (Bd.)/Lai jabori (Ass.)	Tender leaf and shoots	Sinus problems, Cough, Tonsil
		Stellaria media	Nabiki (Bd.)/Morolia sak (Ass.)	Whole plant	Gastro
12.	Chenopodiaceae	*Chenopodium album* L.	Buthua (Bd.)	Tender shoots	Blood purifier
13.	Convolvulaceae	*Ipomoea aquatica*	Mande (Bd.)/Kolmou (Ass.)	Leaf and tender shoots	Piles, High blood pressure
14.	Costaceae	*Costus speciosus*	Buri tokhon (Bd.)/ Devi tokon (Ass.)	Young shoots	Rhizome for jaundice and urinary trouble
15.	Cucurbitaceae	*Momordica subangulata*	Kaila fithai (Bd.)/Taota guti (Ass.)	Green fruits	Diabetes

16.	Lamiaceae	*Clerodendrum infortunatum*	Mukhuna	Flowers	Chicken pox
		Clerodendrum indicum (L.) Kuntze	Ekhlabwr (Bd.)	Flowers	Diabetes
		Leucas plukenetii	Durung fool (Bd.)/Doron (Ass.)	Flower /Young leaf/ shoots	Leaves are used to treat indigestion, rheumatic pain,Flower for stomach trouble
		Premna herbacea Roxb.	Mathigalthab (Bd.)	Young shoot and leaf	Fever, sleeping sickness
		Rotheca serrata (L.) Steane & Mabb.	Khungkha (Bd.)/ Bharangi (Ass.)	Tender leaf	Diabetic
17.	Menispermaceae	*Tinosporia cordifolia*	Daothuli (Bd)	Leaf, Stem	Diabetic
18.	Moringaceae	*Moringa oleifera*	Sojona (Bd.)/Sajina (Ass.)	Young leaf, flowers and fruits	Reducing high blood pressure
19.	Nympheaceae	*Nympheae nouchali*	Thoblo bibar (Bd.)/ Bhetphul(Ass.)	Rhizomes, flowers, seeds and filaments	Urinary tract issues and menstrual disorders
20.	Oxalidaceae	*Oxalis corniculata*	Singri mwikhi (Bd.)/ Jengechi tenga (Ass.)	Young stems and leaf	Digestive disorders
21.	Phyllanthaceae	*Antidesma acidum*	Lafa saikho (Bd.)/Abu tenga (Ass.)	Leaf	Malarial fever
22.	Poaceae	*Bambusa tulda* Roxb.	Auwa gubwi	Young shoots	Menstrual issues
23.	Polygonaceae	*Polygnum microcephalum*	Modhusuleng (Ass.)	Young shoots and leaf	Anti-inflammatory
		Rumex maritimus L.	Bonpaleng (Ass.)	Leaf	Skin problem
24.	Pontederiaceae	*Monochoria hastata*	Ajinai (Bd.)/Jonakiphul (Ass.)	Flower buds	Stomach aches
		Rumex scutatus	Mwitha sikhla (Bd.)	Leaf	Diarrhea
25.	Portulacaceae	*Portulaca oleracea* L.	Hangshw garama (Bd.)/ Hanh tenga (Ass.)	Stems and Leaf	Wound healing
26.	Pteridaceae	*Pteris ensiformis*	Dingkhiya mwigong (Bd.)/Dhekiya sak (Ass.)	Young fronds	Fever
27.	Rubiaceae	*Paederia foetida*	Khiphi bendwng (Bd.)	Leaf	Stomach aches and Gastric problems
28.	Salicaceae	*Casearia glomerata* Roxb.	Dauphenda (Bd.)	Leaf and stems	Respiratory Problems
29.	Saururaceae	*Houttuynia cordata* Thund	Maisundri (Bd.)	Leaf	Gynecological problems
30.	Solanaceae	*Solanum indicum* Linn.	Khunthai (Bd)./ Titabhekuri (Ass.)	Berries and leaf	Diabetic
		Solanum nigram	Ganga Thwfa (Bd.) / Laskochi (Ass.)	Berries, leaf and young stem	Liver disorders
31.	Urticaceae	*Pouzolzia zeylanica* (L.) Benn.	Sam-louthi (Bd.)	Young stems and leaf	Leaf used for dysentery
32.	Verbanaceae	*Lippia geminata* Kunth	Onthai bajab (Bd.)	Leaf	Can be used to treat cold and cough
33.	Vitaceae	*Vitis rependa*	Dausrem (Bd.)/Pani bel (Ass).	Leaf, young shoots, roots, stems	Bone fractures
34.	Zingiberaceae	*Alpinia nigra*	Tharai (Bd.)/Bogi tara (Ass.)	Rhizome, Leaf , shoots	Gastric

names (Bodo) and plant parts used. Professional taxonomists and pertinent taxonomic literature, including Flora of British India Vol. 1-7 (Hooker, 1875-1897), Materials for the Flora of Arunachal Vol. 1 (Hajra *et al.*, 1996), Vol. 2 (Giri *et al.*, 2008) and Vol. 3 (Chowdhery *et al.*, 2009), were consulted in order to identify the wild edible plants. The plant species that were gathered were kept in the Botany Department at B.H. College, Howly.

Results:

52 species of wild plants from 28 genera were identified in this study. The Bodo tribe of Baksa District (Bodoland Territorial

Region), Assam, uses these green vegetables for their local food security, either fresh or cooked. A diverse group of wild edible vegetables (WEVs) that comprises of 34 families were documented. The wild vegetables used by the Baksa district's Bodo people are listed in **Table 1**. In alphabetical order, the documented wild edible vegetables are listed by family name, local name (Bodo), parts used and ethnomedicinal value. Out of all the families, the Lamiaceae has the most species utilized as vegetables (5 species). Lamiaceae is followed by Araceae, Asteraceae and Amaranthaceae with 4 species. Out of 52 species of wild edible vegetables documented, 50 species were of ethno medicinally importance as mentioned by the local informants. Leaves or tender shoots, tubers, petioles, stems, flowers, fruits, and rhizomes are the primary edible plant parts. Of these, leaves or tender shoots are the most often used edible portion for making a variety of traditional recipes. While the whole plant parts of only 3 species are used as vegetable.

Many of these wild edible plant species are found to be sold in the local markets by poor tribals families, generating a supplementary income to their household. It is revealed that many of the wild edible food plants have medicinal uses as well as other economic uses too. Some of the important edible plant species such as *Oroxylum indicum*, mentioned in present study has been reported to have medicinal uses indicated in various literatures. *Oroxylum indicum* has been used against treatment of jaundice and have nutritional and prophylactic effect (Mamidala and Gujjeti, 2013). *Hydrocotyles sibthorpioides* has been reported to cure edema, dysentery, rheumatalgia, whooping cough, jaundice, throat pain, hepatitis-B infection, soothing pain, brain tonic, and also reported as detoxifying agent, anti-cancer, antiviral, antibacterial, antifungal and hepatoprotective agent (Ananta and Manita, 2021). *Alternanthera philoxeroides*, *Alternanthera sessilis*, *Ipomoea aquatica*, *Lasia spinosa*, *Bambusa tulda* Roxb., *Diplazium esculantum*, are among the important plant species used for the preparation of local dishes. *Clerodendrum infortunatum* (twigs) are primarily used for the preparation of fermented yeast cake (Emao) mixed with rice power for fermentation of local wine. *Blumea lanceolaria* (Roxb.) Druce and *Rotheca serrata* (L.) Steane & Mabb. are found harvested and used as major source of carbohydrate, vitamins, proteins, minerals and amino acid beside selling in the market to support livelihood. These two plants are also reported to have medicinal properties in addition to its nutritional value (Khakhalary and Narzari, 2024).

Discussion:

An important component of comprehending indigenous knowledge systems is the evaluation of wild edible vegetables (WEVs) using the ethno botanical approach (Uprety *et al.*, 2008; Kayang, 2007; Panda, 2010). It was widely known that indigenous knowledge was used to identify and develop many of the plants that are now used and grown in civilized societies. According to ethno botanical investigations of wild plants, about 7000 species have been used as food by humans at some point in history (Grivetti and Ogle, 2000). But day by day, this crucial understanding is gradually eroding.

According to the current study and documentation of WEVs, the local Baksa residents consumed some ethno medicinal plants as food, including *Blumea lanceolaria* (Roxb.) Druce, *Clerodendrum infortunatum*, *Rotheca serrata* (L.) Steane & Mabb. and *Costus speciosus*, among others. The majority of the local population currently uses these WEVs as food and medication. Due to their natural ability to be collected and sold in local marketplaces, these plants also offer rural households additional sources of income. The results of this study also showed that informants had an excellent understanding of WEVs, which the local population shared to a large extent. Unfortunately, there is a decline in knowledge with the use of native food plants in rural regions. It is possible that the introduction of modernized and processed food items has resulted in a rapid decline in awareness of wild edible plants. Changes in the current socioeconomic environment have caused some information to be lost and younger generations show little interest in putting this knowledge to use. Another danger is the loss of vegetation and the exploitation of land for cash crops, which results in the removal of these vital food supplies from their natural habitat (Yadav *et al.*, 2012).

Wild edible vegetables are being collected from their native habitats. As a result, their populations are steadily declining. Wild edible plants (WEPs) are species that are neither farmed or domesticated, but are available in their natural habitat and consumed as a source of food (Kiran *et al*., 2019; Chakravarty *et al*., 2016). Some of the extensively consumed wild green vegetables in Baksa district's tribal lands include *Clerodendrum infortunatum*, *Sphaeranthus indicus*, *Oroxylum indicum*, *Colocasia esculenta*, *Blumea lanceolaria* (Roxb.) Druce, *Rotheca serrata* (L.) Steane & Mabb. and *Lassia spinosa*. They are extremely popular in local markets. The species listed above exclusively exist in woods and are not cultivated. As a result, several species are widely exploited for commercial purposes and thereby the population of these species is decreasing with each passing day.

Wild edible plants are more nutritious than many farmed species (Burlingame, 2002). Traditionally consumed wild veggies may play an important part in enhancing our immune system's ability to combat infections and meet our need for fresh food. A literature review suggests that adequate vegetable diet can protect against some chronic diseases such as cancer, obesity, diabetes, cardiovascular disease, and metabolic syndrome, as well as ameliorate risk factors associated with these diseases (Rao *et al*., 1989). As a result, there is an urgent need to reduce large-scale extraction while also raising awareness about the necessity of increasing the number of these species in order to protect the traditional source of healthy food.

Recent research has highlighted the nutritional value of wild edible plants, which are also classified as functional foods because to their health-promoting qualities (Aswani *et al*., 2024). These plants provide a low-cost source of protein, carbohydrates, minerals and vitamins to tribal and rural people. However, many regional wild edible plants are disregarded in local and global food systems due to a lack of focus on natural food resources and globalization (Nawaz *et al*., 2024). In order to establish the scientific validity of the traditional claims made by local informants in Baksa district, BTR, Assam, the current study shows that the ethno botanical information of the wild edible vegetables collected offers a prospect for nutritional study of a few unexplored wild edible plants.

Conclusion

The information gathered for this study indicates that the residents of Baksa District use various plant components, such as tubers, leaves and bulbils, for both food and medical purposes. Many plant species are in danger of going extinct because of factors like modernization, lack of awareness, vegetation loss, widespread plant exploitation and the rapid deterioration of traditional knowledge. According to the study, in order to increase demand, efforts must be made to raise knowledge about the use of WLVs. The study also helps to conserve those wild food species and their large-scale cultivation for the near future to ensure sustainable management and boost their economic status. Further research is needed to determine these unidentified wild food plants' nutritional and medicinal advantages.

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