Online: ISSN 2771-5868
Print: ISSN 2771-585X

Original Research Article

Edible Flora: An Assessment from Kakoi Reserve Forest of Lakhimpur District, Assam

[1*]Hiranmoy Chetia, [2]Rajshekhar Hazarika, [3]Chandrama Gogoi, [4]Srusti Dhar Rout

[1]Amity Institute of Forestry and Wildlife, Amity University, Noida 201313, Uttar Pradesh, India

[2]Phatiha Nepali Bari Lower Primary School Kaitong, Dhemaji 787058, Assam, India

[3]Maharishi Vidya Mandir, Tigdo, Yupia 791110, Arunachal Pradesh, India

[4]P. G. Department of Wildlife and Biodiversity Conservation, Maharaja Sriram Chandra Bhanja Deo University Takatpur, Baripada, 757003, Odisha, India

***Corresponding author:** hiranmoychetia@gmail.com

Received: March 8, 2024; revised: June 25, 2024; accepted: July 5, 2024

https://doi.org/10.5281/zenodo.12776679

Available Online: July, 2024

Abstract

The subtropical forest ecosystem of Kakoi Reserve Forest of Assam, India, is home to a diverse range of indigenous communities, including the Ahom, Sutia, Koch, Adivasi, Mishing, Boro, Kachari, and Nepali, who have historically utilised its non-timber forest products (NTFPs) for subsistence. This study investigates the wild edible plants traditionally consumed by these communities residing near the Kakoi Reserve Forest. Employing a semi-structured interview approach, ethnobotanical data was collected between January and September 2018 from knowledgeable residents in villages bordering the forest. The primary objective was to document the traditional knowledge of these communities regarding wild edible plants. The survey identified a remarkable diversity of 86 wild edible plant species within the Kakoi Reserve Forest. Dicots were the dominant group, with 70 species documented. A detailed record was compiled, capturing the various ways these plants contribute to the local diet. This study contributes significantly to our understanding of the role that wild edible plants play in the dietary composition and nutritional security of communities surrounding the Kakoi Reserve Forest. The traditional ecological knowledge (TEK) of local communities regarding wild edible plants represents an invaluable bridge between traditional knowledge and scientific research.

Keywords: Assam, NTFP, ethnobotany, India, Kakoi Reserve Forest, traditional ecological knowledge (TEK), wild edible plants

Introduction

Throughout history, forests have been a cornerstone of human survival. It provides not only the necessities of life - food, shelter and clothing - but also play a critical role in ensuring food security for numerous communities (Shackleton and Shackleton 2004; Pierce and Emery 2005; Langat 2016). For those residing near forests, wild edible plants are a significant element in their livelihood strategies. While not necessarily a primary food source, these plants often act as valuable nutritional supplements, offering essential vitamins and minerals in the form of fruits and vegetables (Duguma 2020).

The importance of wild edible plants goes beyond their immediate nutritional value. For many ethnic groups worldwide, they constitute a staple food source. Even in

developed countries, indigenous ethnobotanical knowledge has played a crucial role in identifying and developing plants that have become staple foods (Yasodharan and Sujana 2006). This knowledge highlights the potential of wild edibles to contribute to food security and dietary diversity.

The Lakhimpur district of Assam is home to a rich tapestry of indigenous communities. Although primarily engaged in agriculture, these communities also depend on the forest for various non-timber forest products (NTFPs), including wild edible plants.

While extensive research has been conducted on wild edible plants in India and also from different parts of Assam (Yasodharan and Sujana 2006; Kumar and Hamal 2009; Dangwal *et al.* 2014; Jadav *et al.* 2011; Tiwari *et al.* 2010; Thakur *et al.* 2020; Patòiri and Borah 2007; Pagag and Borthakur 2012; Pegu *et al.* 2013; Medhi *et al.* 2014; Nath 2015), no documented surveys have been conducted specifically on the Kakoi Reserve Forest. This paper addresses this gap by collecting, identifying, and recording the wild edible plants found within this unique forest ecosystem. This study will contribute to our understanding of the role these plants play in the food security and cultural practices of the local communities of Kakoi Reserve Forest, while also providing valuable data for future conservation efforts.

Study Area

Lakhimpur district is situated in the northeastern region of Assam, bordering Arunachal Pradesh to the north, the Brahmaputra River and Majuli district to the south, Dhemaji district to the east, and Sonitpur district to the west. The district encompasses an area of approximately 2277 km², with nearly 196.42 km² designated as forest land. Lakhimpur boasts three primary reserve forests: Kakoi, Dulung and Ranga.

This study focuses on the Kakoi Reserve Forest, located in the district's northwestern corner bordering Arunachal Pradesh. The forest lies between 27.42° N and 94.11° E and 27.34° N and 94.12° E and is roughly 25 kilometres from North Lakhimpur town (Figure 1). It was declared as a

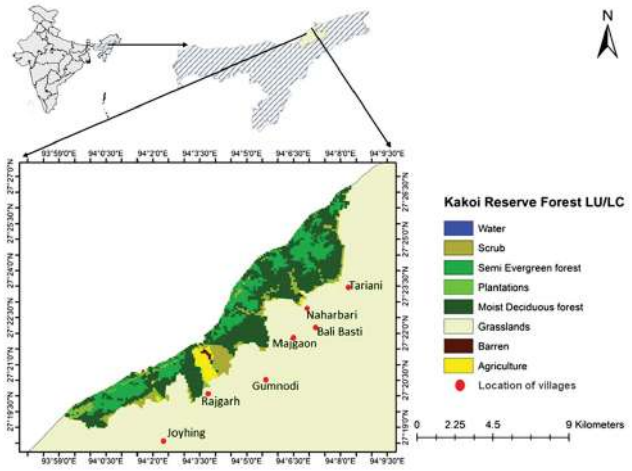


Fig. 1. Map of Kakoi Reserve Forest, depicting the locations of the villages surveyed in this study.

reserve forest in the year 1927. The forest comes under the Lakhimpur Range. The Reserve constitutes one beat called Kakoi and three camps viz., Bokanala, Dirgha and Gumnodi. The Reserve shares its boundary with Arunachal Pradesh in the North, Lakhimpur district boundary (Rajgarh) in the South, Boginadi in the East and Ranganadi in the West. The reserve covers both plain and hilly areas.

The region exhibits a mosaic of tropical semi-evergreen and tropical moist deciduous vegetation, interspersed with wetland ecosystems. Dominant plant species include *Mesua ferrea*, *Kayea assamica* (endemic to Lakhimpur district), *Bombax ceiba*, *Shorea robusta*, *Dillenia indica*, and various *Bambusa* species.

The Kakoi Reserve Forest experiences a tropical climate with high precipitation and a distinct short dry season. Generally, the region receives less rainfall in the early months (January-March) compared to the later months (April-July).

Materials and Methods

Data Collection

Field surveys were conducted between January and September 2018 in the fringe villages bordering the Kakoi Reserve Forest, including Naharbari, Gumnodi, Tariani, Joyhing, Bali Basti, Majgaon, and Rajgarh. All the villages are located along the southern border of the reserve forest (Figure 1). The communities in these villages are diverse, comprising Mishing,

Boro, Kachari (Tariani), Nepali (Gumnodi, Joyhing, Bali Basti, Naharbari), Adivasi (Gumnodi, Joyhing, Bali Basti, Naharbari, Rajgarh), Ahom, Sutia and Koch (Majgaon, Rajgarh).

The primary objective of the survey was to document the wild edible plants utilised by these communities. Information on plant species was gathered through semi-structured interviews (Bryman 2016). The interviews were conducted with knowledgeable individuals, including elderly residents, housewives, and local herbal healers of the aforementioned communities (Figure 2 a and b). Due to the fluency of all participating communities in Assamese, it was employed as the primary language for communication during interviews. Additionally, efforts were made to document the vernacular names of the plants whenever possible. Additionally, details regarding the edible parts of the plants and traditional methods of preparation were collected and recorded.

Plant Identification

The collected specimens were identified by consulting with Wild Edible Plants of Assam (Patòiri and Borah 2007).

Results

The field surveys revealed a rich traditional ecological knowledge (TEK) of wild plant utilisation among communities residing near the Kakoi Reserve Forest. These communities possess a deep understanding of the edible plants within the forest ecosystem. They can readily identify edible species and possess knowledge about the specific plant parts consumed (fruits, leaves, etc.). Additionally, they exhibit a keen awareness of plant phenology, ensuring harvest coincides with optimal ripeness.

The survey documented a total of 86 wild edible plant species. Among these, 82 species belong to 47 angiosperm families. Dicots were the most prominent group, with 70 species belonging to 41 families. Monocots were also represented, with 12 species from 6 families. The remaining 4 species belonged to the pteridophyte group.

The documented plants served a variety of dietary purposes. Several species, such as *Syzygium cumini*, *Syzygium kurzii*, *Averrhoa carambola*, *Averrhoa bilimbi*, *Zizyphus mauritiana*, *Mangifera indica*, and *Prunus domestica*, were identified as primarily consumed for their fruits.

Fig. 2. Questionnaire survey with the local communities.

In contrast, species like *Dillenia indica*, *Houttuynia cordata*, *Atriplex hortensis*, *Amaranthus tricolor*, *Amaranthus blitum*, *Bacopa monnieri*, and *Solanum nigrum* were utilised as vegetables. These vegetables could be consumed in various forms, including leaves, calyx, flowers, rhizomes, shoots, and tubers. Specific examples include leaves (*Clerodendrum colebrookianum*, *Lasia spinosa*, *Bacopa monnieri*), calyx (*Dillenia indica*), flowers (*Nyctanthes arbor-tristis*), rhizomes (*Bambusa tulda*), shoots (*Calamus erectus*, *Calamus flagellum*, *Bambusa balcooa*), and tubers (*Dioscorea alata*, *Ipomoea batatas*).

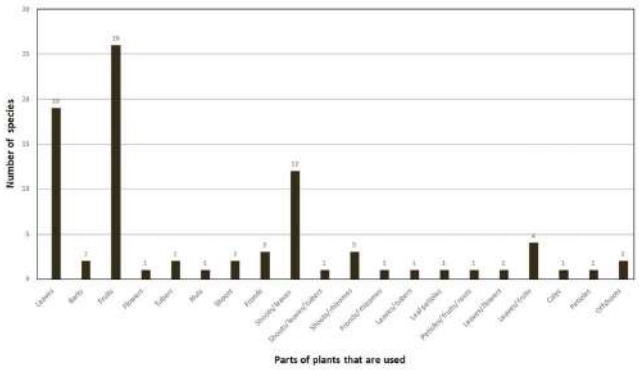
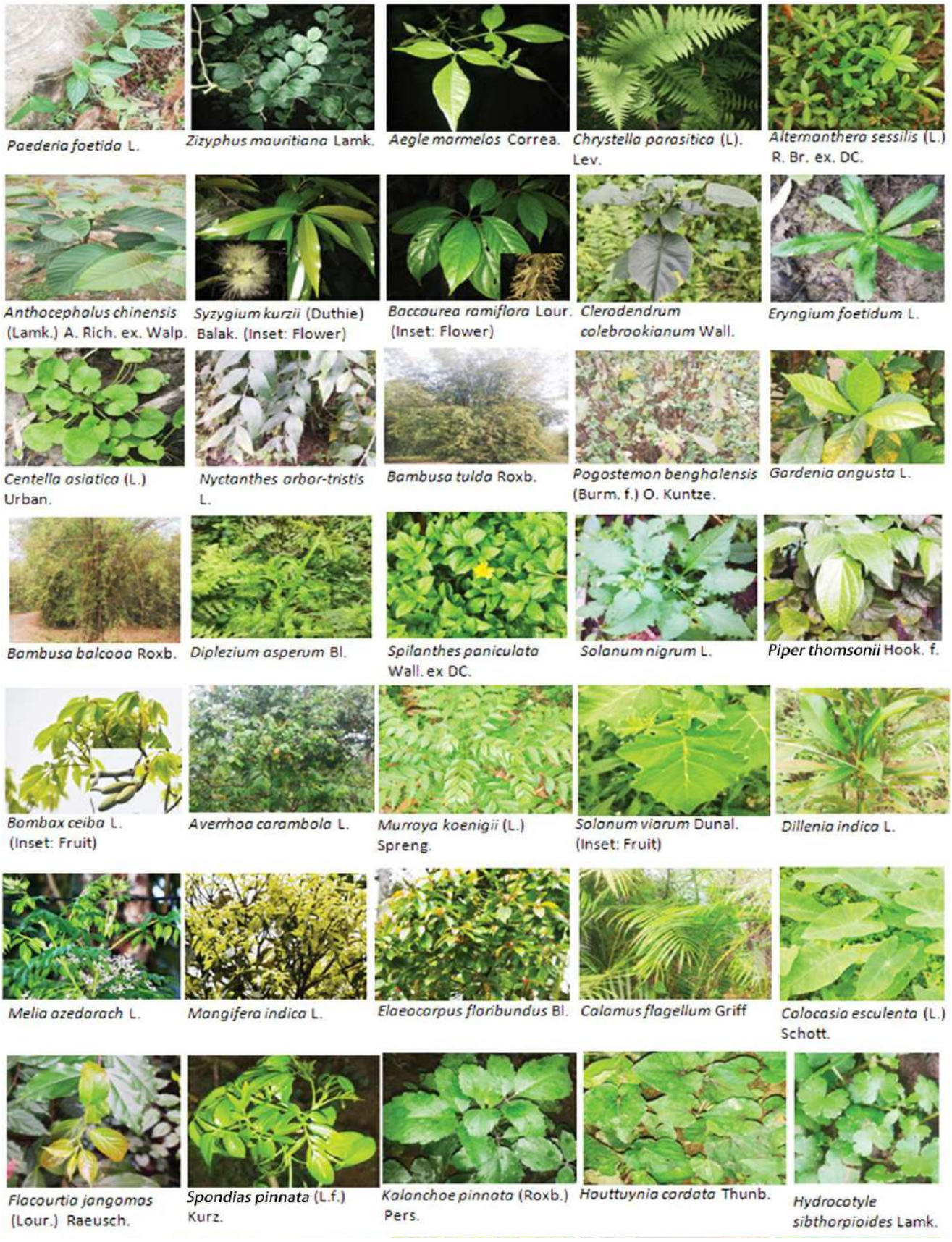


Fig. 3. Number of wild edible plant species utilised by communities near the Kakoi Reserve Forest, categorized by consumed plant parts.

Interestingly, the survey also revealed that some of these wild edible plants possess medicinal properties. Species like *Costus speciosus*, *Cissus quadrangularis*, *Kalanchoe pinnata*, *Azadirachta indica*, and *Garcinia morella* were noted for their medicinal uses by all the surveyed local communities. Figure 3 details the number of species in which different plant

Supplementary file 1: Images of some edible wild plants from Kakoi Reserve Forest



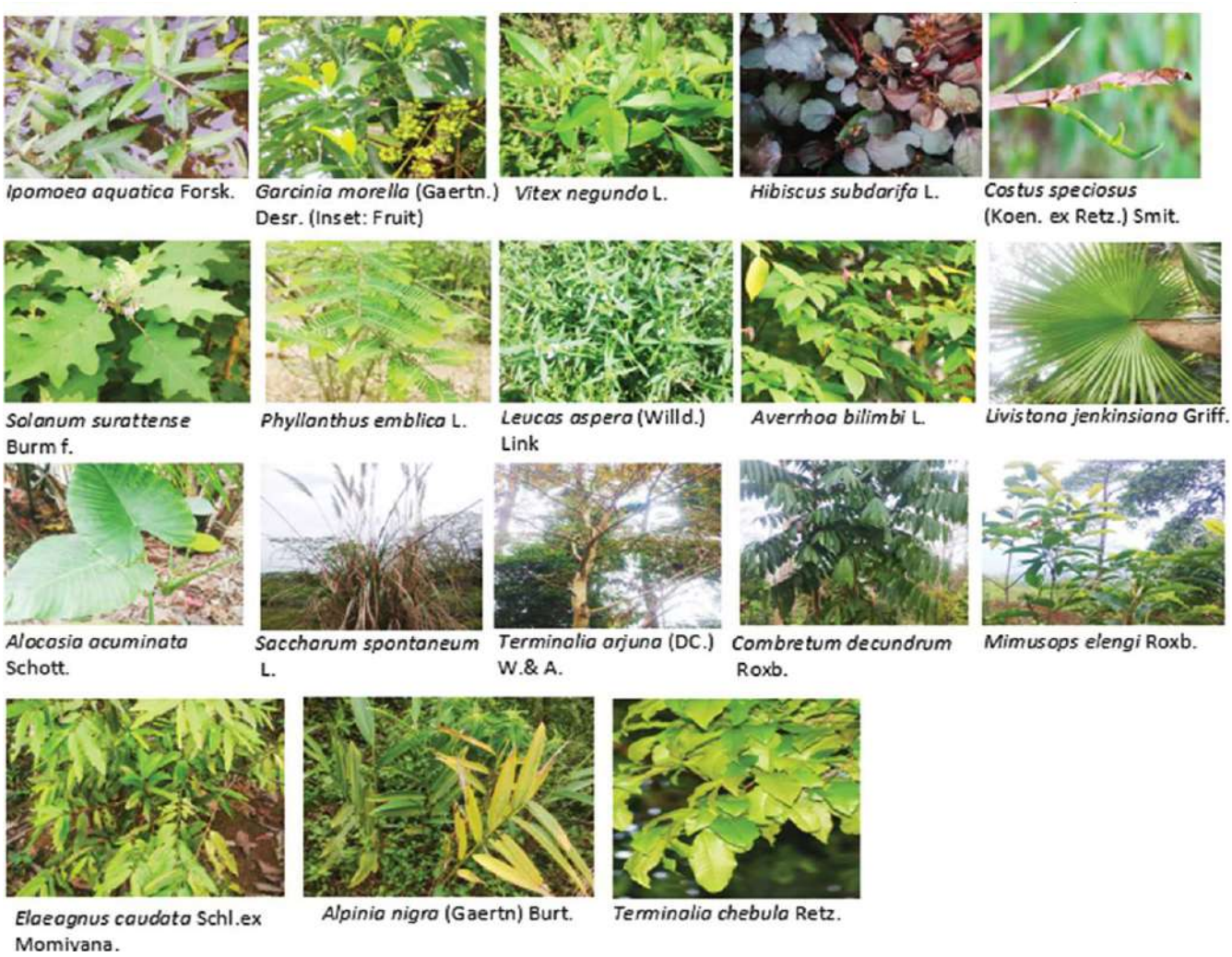


Table 1. Wild edible Dicots.

Sl. No.	Name of the species	Family	Vernacular name (Assamese)	Habit	Part used	Form of use/ Preparation
1	*Aegle marmelos* Correa.	Rutaceae	Bel	Tree	Fruit	The raw fruit is roasted and the pulp is eaten. The pulp of ripe fruit is mixed with milk and taken. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
2	*Alternanthera sessilis* (L.) R. Br. ex. DC.	Amaranthaceae	Matikanduri	Herb	Shoots/leaves	Tender shoots and leaves are taken as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
3	*Amaranthus blitum* L.	Amaranthaceae	Khutora	Herb	Shoots/ leaves	Tender shoots and leaves are taken as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
4	*Amaranthus tricolor* L.	Amaranthaceae	Ronga morisa	Herb	Shoots/ leaves	Leaves and shoots are taken as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
5	*Anthocephalus chinensis* (Lamk.) A. Rich. ex. Walp.	Rubiaceae	Kadam	Tree	Fruit	Fruit is taken as vegetables. (Mishing, Kachari)
6	*Atriplex hortensis* L.	Chenopodiaceae	Pahari paleng	Herb	Shoots/leaves	Leaves and shoots are taken as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
7	*Averrhoa bilimbi* L.	Averrhoaceae	Rohdoi	Tree	Fruit	Ripe fruit is eaten. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
8	*Averrhoa carambola* L.	Averrhoaceae	Kordoi	Tree	Fruit	Ripe fruit is eaten. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)

9	*Azadirachta indica* A. Juss.	Meliaceae	Mahaneem	Tree	Leaves	Leaves are taken as vegetables. Leaves are also taken to cure stomach ailments. (Nepali, Mishing, Kachari, Adivasi, Ahom, Sutia, Koch)
10	*Baccaurea ramiflora* Lour.	Euphorbiaceae	Leteku	Tree	Fruit	The pulp of the ripe fruit is eaten. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
11	*Bacopa monneri* (L.) Pennel.	Scrophulariaceae	Brahmi xaak	Herb	Shoot/ leaves	Tender shoots and leaves are taken as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch).
12	*Bombax ceiba* L.	Bombacaceae	Himolu	Tree	Fruit	Medicine: The unripe fruit is eaten raw. (Mishing)
13	*Centella asiatica* (L.) Urban.	Apiaceae	Bor manimuni	Herb	Shoots/leaves	Young shoots and leaves are taken as vegetables. Leaves are considered to have medicinal properties. (Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
14	*Chenopodium ambrosioides* L.	Chenopodiaceae	Jilmil	Herb	Shoots/ leaves	Tender shoots and leaves are cooked and taken as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
15	*Cissus quadrangularis* L.	Vitaceae	Harjura lota	Climber	Shoots/ leaves	Medicine: Tender shoots and leaves are cooked and taken as vegetables. Leaves are also used as medicine for bone fractures. (Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
16	*Citrus medica* L.	Rutaceae	Jora tenga	Shrub	Fruit	The citrus fruit is eaten. Also, the juice of the fruit is taken as refreshment during the summer months. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
17	*Clerodendrum colebrookianum* Wall.	Verbenaceae	Nephaphu	Shrub	Leaves	Leaves are cooked as taken as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
18	*Combretum decundrum* Roxb.	Combretaceae	Dhuna chali	Climber	Bark	Medicine: Bark is chewed to relieve stomach pain. (Nepali, Mishing, Kachari, Adivasi, Ahom, Sutia, Koch)
19	*Dillenia indica* L.	Dilleniaceae	Outenga	Tree	Calyx	The fleshy calyx is cooked eaten. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
20	*Elaeagnus caudata* Schl.ex Momiyana.	Elaeagnaceae	Mirika tenga	Shrub	Fruit	Ripe fruit is eaten. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
21	*Elaeocarpus floribundus* Bl.	Elaeocarpaceae	Jalphai	Tree	Fruit	Ripe fruit is eaten. Pickles are also prepared from the fruits. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
22	*Eryngium foetidum* L.	Apiaceae	Mahn dhania	Herb	Leaves	Leaves are cooked with other vegetables or meat to increase the taste. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
23	*Ficus hispida* L.	Moraceae	Dimoru	Tree	Shoots/leaves	Young shoots and leaves are cooked as vegetables. (Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
24	*Flacourtia jangomas* (Lour.) Raeusch.	Flacourtiaceae	Panial	Tree	Fruits	Ripe fruits are eaten raw. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
25	*Garcinia morella* (Gaertn.) Desr.	Clusiaceae	Kuji thekera	Tree	Fruits	Ripe fruits are eaten raw. Dried fruits are taken as medicine to cure stomach upsets. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
26	*Garcinia xanthochymus* Hook. f.	Clusiaceae	Tepor tenga	Tree	Fruits	Ripe fruits are eaten raw or are cooked with other vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
27	*Gardenia angusta* L.	Rubiaceae	Togor	Shrub	Flower	Medicine: Petals of flowers are cooked and eaten. (Nepali, Mishing, Boro, Kachari, Ahom, Sutia, Koch)
28	*Hedyotis diffusa* (Willd.) Roxb.	Rubiaceae	Bonjaluk	Herb	Leaves	Leaves are cooked with other vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
29	*Hibiscus subdarifa* L.	Malvaceae	Tengamora	Herb	Leaves/ fruits	Leaves and fruits are taken as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
30	*Houttuynia cordata* Thunb.	Saururaceae	Masundori	Herb	Leaves	Medicine: Leaves are eaten raw or cooked with other vegetables. Leaves are considered to have medicinal properties. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
31	*Hydrocotyle sibthorpioides* Lamk.	Apiaceae	Haru manimuni	Herb	Shoots/ leaves	Young shoots and leaves are taken as vegetables. Leaves are considered to have medicinal properties. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
32	*Ipomoea aquatica* Forsk.	Convolvulaceae	Kolmou	Herb	Leaves	Leaves are cooked and eaten as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)

33	*Ipomoea batatas* (L.) Lamk.	Convolvulaceae	Mitha alu	Herbaceous vine	Tuber	Root tuber is eaten raw, boiled or fried. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
34	*Ipomoea quamoclit* L.	Convolvulaceae	Kunja lota	Climber	Leaves	Medicine: Leaves are eaten as vegetables. (Nepali, Mishing, Boro, Kachari, Ahom, Sutia, Koch)
35	*Kalanchoe pinnata* (Roxb.) Pers.	Crassulaceae	Dupar tenga	Succulent	Leaves	Medicine: Leaves are eaten as vegetables. Leaves are used in the treatment of urine infections. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
36	*Leucas aspera* (Willd.) Link	Lamiaceae	Drun bon	Herb	Leaves	Medicine: Leaves are eaten as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
37	*Mangifera indica* L.	Anacardiaceae	Tiliki Aam	Tree	Fruit	Both raw and ripe fruit is eaten. Pickles are also prepared from the fruits. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
38	*Melia azedarach* L.	Meliaceae	Ghoraneem	Tree	Leaves	Medicine: Leaves are taken as vegetables. (Ahom, Sutia, Koch)
39	*Mimusops elengi* Roxb.	Sapotaceae	Bakul	Tree	Fruit	Ripe fruits are eaten. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
40	*Moringa oleifera* Lamk.	Moringaceae	Sajina	Tree	Fruit/leaves	Fruits and leaves are cooked as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
41	*Murraya koenigii* (L.) Spreng.	Rutaceae	Narashingha	Shrub	Leaves	Leaves are cooked with other vegetables to increase the taste. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
42	*Nelumbo nucifera* Gaertn.	Nelumbonaceae	Padum	Herb	Petioles	Petioles are eaten as vegetables
43	*Nyctanthes arbor-tristis* L.	Oleaceae	Xewali	Tree	Leaves/ flowers	Medicine: Leaves and flowers are cooked and eaten and considered to contain some medicinal properties. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
44	*Nymphaea rubra* Roxb.ex Andrews.	Nymphaeaceae	Seluk	Herb	Petioles/ fruits/ roots	Leaf petioles, fruis and roots are cooked as vegetables. Roots are also eaten raw. (Nepali, Mishing, Boro, Kachari, Ahom, Sutia, Koch)
45	*Oxalis corniculata* L.	Oxalidaceae	Horu tengeshi	Herb	Shoots/ leaves	Young shoots and leaves are cooked as vegetables. (Nepali, Mishing, Boro, Kachari, Ahom, Sutia, Koch)
46	*Oxalis debilis* H.B.K. var. corymbosa (DC.) Lour.	Oxalidaceae	Bor tengeshi	Herb	Leaves	Leaves are cooked as vegetable. (Nepali, Mishing, Boro, Kachari, Ahom, Sutia, Koch)
47	*Paederia foetida* L.	Rubiaceae	Bhedai lota	Climber	Leaves	Leaves are cooked as vegetable. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
48	*Persicaria microcephala* (D.Don) H.Gross	Polygonaceae	Madhuxuleng	Herb	Leaves	Leaves are cooked as vegetable. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
49	*Phyllanthus emblica* L.	Euphorbiaceae	Amlokhi	Tree	Fruit	Medicine: Fruit is eaten raw, dried or pickled. Considered to have medicinal properties. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
50	*Piper thomsonii* Hook. f.	Piperaceae	Auni paan	Herbaceous climber	Leaves	Leaves are eaten as substitute for betel leaves with betel nuts. (Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
51	*Pogostemon benghalensis* (Burm. f.) O. Kuntze.	Lamiaceae	Huklati	Shrub	Leaves	Young leaves are used as vegetables. Most are prepared with fish. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
52	*Prunus domestica* L.	Rosaceae	Ahom bogori	Shrub	Fruit	Mature fruit is eaten raw. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
53	*Prunus jenkinsii* Hook f. & Th.	Rosaceae	Thereju	Tree	Fruit	Ripe fruit is eaten raw. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
54	*Prunus persica* (L.) Stokes.	Rosaceae	Nara bogori	Tree	Fruit	Ripe fruit is eaten raw. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
55	*Sarcochlamys pulcherrima* Goud.	Urticaceae	Mesaki	Tree	Leaves	Leaves are cooked as vegetables. (Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
56	*Solanum nigrum* L.	Solanaceae	Los koshi	Herb	Fruit/ leaves	Young leaves and fruits are cooked as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
57	*Solanum surattense* Burm f.	Solanaceae	Bikhuri tita	Herb	Fruit	Fruit is eaten as vegetable. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
58	*Solanum viarum* Dunal.	Solanaceae	Tita bhekuri	Undershrub	Fruit	Fruit is eaten raw as well as cooked as vegetable. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)

59	*Spilanthes paniculata* Wall. ex DC.	Asteraceae	Marsang/ Malkaathi	Herb	Leaves/ fruit	Medicine: Leaves are cooked as vegetables. Fruit (achene) is used to treat blisters in mouth and toothache. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
60	*Spondias pinnata* (L.f.) Kurz.	Anacardiaceae	Amora	Tree	Fruit	Ripe fruit is eaten raw. Pickles are also prepared from the fruits. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
61	*Syzygium cumini* (L.) Skeels.	Myrtaceae	Kola jamu	Tree	Fruit	Ripe fruit are eaten raw. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
62	*Syzygium kurzii* (Duthie) Balak.	Myrtaceae	Bogi jamu	Tree	Fruit	Ripe fruit are eaten raw. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
63	*Tamarindus indica* L.	Caesalpiniaceae	Teteli	Tree	Fruit	Ripe fruits are eaten raw. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
64	*Terminalia arjuna* (DC.) W.& A.	Combretaceae	Arjun	Tree	Barks	Medicine: Barks are dried and used in the preparation of tea. (Nepali, Mishing, Boro, Kachari, Ahom, Sutia, Koch)
65	*Terminalia chebula* Retz.	Combretaceae	Hilikha	Tree	Fruit	Medicine: Both raw and ripe fruits are eaten. (Nepali, Mishing, Boro, Kachari, Ahom, Sutia, Koch)
66	*Tetrastigma thomsonianum* Planch.	Vitaceae	Nal tenga	Herbaceous climber	Shoots/ leaves	Tender shoots and leaves are eaten as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
67	*Vitex negundo* L.	Verbanaceae	Posotia	Tree	Leaves	Medicine: Tender leaves are used as vegetable. Leaves are considered to be of high medicinal properties. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
68	*Xanthium strumarium* L.	Asteraceae	Ogora	Herb	Leaves	Medicine: Tender leaves are cooked with other vegetables. (Mishing, Kachari, Ahom, Sutia, Koch)
69	*Zizyphus mauritiana* Lamk.	Rhamnaceae	Bogori	Tree	Fruits	Fruit is eaten raw and is used in the preparation of pickle. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
70	*Zizyphus rugosa* Lamk.	Rhamnaceae	Bon bogori	Tree	Fruits	Ripe fruit is eaten raw. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)

Table 2. Wild edible Monocots

Sl. No.	Name of the species	Family	Vernacular name (Assamese)	Habit	Part used	Form of use/ Preparation
1	*Alocasia acuminata* Schott.	Araceae	Kosu	Tuberous herb	Shoots/ leaves/ tubers	Shoots, leaves, and tubers are cooked and eaten. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
2	*Alpinia nigra* (Gaertn) Burt.	Zingiberaceae	Tora	Herb	Shoots/ rhizomes	Young shoots and rhizomes are cooked and eaten. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
3	*Bambusa balcooa* Roxb.	Poaceae	Bhalooka bah	Tall rigid grass	Offshoot	Young offshoots are cooked and eaten. Dried offshoots are used in the preparation of "Khorisa" (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
4	*Bambusa tulda* Roxb.	Poaceae	Jati bah	Tall rigid grass	Offshoot	Young offshoots are cooked and eaten. Dried offshoots are used in the preparation of "Khorisa" (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
5	*Calamus erectus* Roxb.	Arecaceae	Raidang bet	Tall grass	Shoots	The soft inner of the young shoots are cooked and eaten. (Mishing, Boro, Kachari, Ahom, Sutia, Koch)
6	*Calamus flagellum* Griff.	Arecaceae	Jeng bet	Tall grass	Shoots	The soft inner of the young shoots are cooked and eaten. (Mishing, Boro, Kachari, Ahom, Sutia, Koch
7	*Colocasia esculenta* (L.) Schott.	Araceae	Kola kosu	Tuberous herb	Leaves/ tubers	Tender leaves and tubers are cooked and taken as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
8	*Costus speciosus* (Koen. ex Retz.) Smit.	Costaceae	Jam lakhuti	Herb	Shoots/ rhizomes	Medicine: Tender shoots are eaten as vegetables. Juice from rhizome is taken as a medicine for Jaundice. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
9	*Dioscorea alata* L.	Discoreaceae	Kath alu	Climber	Tubers	Root tubers are eaten as vegetables. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
10	*Lasia spinosa* (L.) Thaw.	Araceae	Chengmora	Herb	Leaf petioles	Leaf petioles are taken as (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch) vegetables.
11	*Livistona jenkinsiana* Griff.	Arecaceae	Tokou	Tree	Nut	The nuts are chewed. (Mishing, Kachari, Ahom, Sutia, Koch)
12	*Saccharum spontaneum* L.	Poaceae	Khagori	Herb	Shoots/ rhizomes	Shoots and rhizomes are eaten as sugarcane. (Mishing, Kachari, Ahom, Sutia, Koch)

Table 3. Wild edible Pteridophytes.

Sl. No.	Name of the species	Family	Vernacular name (Assamese)	Habit	Part used	Form of use/ Preparation
1	*Ceratopteris thalictroides* (L.) Brongn.	Pteridaceae	Pani dhekia	Fern	Fronds	Tender fronds are cooked and eaten. (Mishing, Boro, Kachari, Ahom, Sutia, Koch)
2	*Chrystella parasitica* (L). Lev.	Thelypteridaceae	Bihlogoni	Fern	Fronds	Tender fronds are cooked and eaten. (Nepali, Mishing, Boro, Kachari, Ahom)
3	*Diplezium asperum* Bl.	Athyriaceae	Dhekia	Rhizomatous fern	Fronds	Tender fronds are cooked and eaten. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)
4	*Diplezium esculentum* (Retz.) Sw.	Athyriaceae	Dhekia	Rhizomatous fern	Fronds/ rhizomes	Tender fronds and rhizomes are cooked and eaten. (Nepali, Mishing, Boro, Kachari, Adivasi, Ahom, Sutia, Koch)

parts were used by the communities living near Kakoi Reserve Forest.

The survey results are further categorized and presented in three separate tables. Table 1 details the dicots, Table 2 focuses on the monocots, and Table 3 explores the pteridophytes identified in the survey. Photographs of some of the edible wild plants are given in Supplementary file 1.

Discussion

The rich tapestry of wild edible plants documented in the Kakoi Reserve Forest underscores their critical role in the lives of surrounding communities. This section delves into the significance of these plants, exploring their contribution to dietary diversity, nutritional value, and potential for sustainable management.

For communities residing near forests, wild edible plants act as a vital supplement, diversifying diets and enhancing nutritional well-being (Mandal *et al.* 2023). The survey results in this study echo this notion, revealing a diverse range of 86 edible plants utilised by the communities bordering the Kakoi Reserve Forest. This diversity aligns with reports from other regions of India. Estimates suggest over 1532 edible wild food species are documented in India, with over 675 species found specifically in the Indian Himalayan region (Reddy *et al.* 2007; Pat *et al.* 2014). Studies from various locations across the Himalayas report the use of wild edibles by local communities, ranging from 49 to 58 species (Kumar and Hamal 2009; Dangwal *et al.* 2014; Jadav *et al.* 2011; Tiwari *et al.* 2010; Thakur *et al.* 2020). These plants are consumed as fruits, vegetables, and even flavouring agents (Jadav *et al.* 2011). Similar patterns are observed in Assam, with studies documenting the use of wild edibles in Dima Hasao district (168 species), Western Assam (75 species), Majuli and Darrang districts (69 species), Poba Reserve Forest of Dhemaji district (122 species), and wetlands of Lakhimpur district (55 species) (Medhi et al. 2014; Nath 2015; Barua *et al.* 2006; Pegu *et al.* 2013; Pagag and Borthakur 2012). Fruits from species like *Syzygium cumini*, *Syzygium kurzii*, *Averrhoa carambola* and *Averrhoa bilimbi* likely provide essential vitamins and minerals, while vegetables like *Amaranthus tricolor* and *Solanum nigrum* contribute valuable dietary fibre and micronutrients (Mandal *et al.* 2023).

The TEK possessed by local communities regarding these plants is a valuable asset. The survey highlighted their understanding of proper preparation methods to avoid adverse effects, such as, all the local communities reported about throat irritation caused by improperly prepared *Colocasia esculenta,* which aligns with the studies on ethnobotanical knowledge (Yasodharan and Sujana 2006). This knowledge extends to harvesting practices that coincide with optimal plant phenology, ensuring sustainable utilisation (Hanazaki *et al.* 2018).

Integrating this TEK with scientific research can unlock the full potential of wild edibles. Collaborative efforts can foster the development of sustainable harvesting practices and cultivation techniques, ensuring the long-term availability of these resources for local communities.

This research not only expands our understanding of the role that wild edible plants play in these communities' lives but also provides valuable data for future studies on sustainable practices, food security and ethnobotany in the region. The rich biodiversity of the Kakoi Reserve Forest

warrants further investigation to ensure its continued role in supporting both ecological and cultural well-being.

Acknowledgement

We are grateful to the local communities residing near the Kakoi Reserve Forest for their invaluable cooperation and willingness to share their knowledge of wild edible plants. Their hospitality and participation were instrumental in the success of this study. We would also like to express our sincere thanks to Mr. Mintu Borah for his invaluable assistance during the field surveys. His knowledge of the local terrain and his connections within the communities proved to be a tremendous asset.

Conflict of Interest

The authors declare no conflict of interest.

References

Barua U, Hore DK and Sarma R. (2007). Wild edible plants of Majuli island and Darrang districts of Assam. Indian Journal of Traditional Knowledge. 6(1): 191-194.

Bryman A. (2016). *Social research methods*. Oxford University Press. Oxford, England

Dangwal LR, Singh T and Singh A. (2014). Exploration of wild edible plants used by Gujjar and Bakerwal tribes of District Rajouri (J&K), India. Journal of Applied and Natural Science. 6(1): 164-169.

Duguma HT. (2020). Wild edible plant nutritional contribution and consumer perception in Ethiopia. International Journal of Food Science. 1-16.

Hanazaki N, Zank S, Fonseca-Kruel VS and Schmidt IB. (2018). Indigenous and traditional knowledge, sustainable harvest, and the long road ahead to reach the 2020 Global Strategy for Plant Conservation objectives. Rodriguesia. 69: 1587-1601.

Jadhav VD, Mahadkar SD and Valvi SR. (2011). Documentation and ethnobotanical survey of wild edible plants from Kolhapur district. Recent research in Science and Technology. 3(12): 58-63.

Kumar S and Hamal IA. (2009). Wild edibles of Kishtwar high altitude national park in northwest Himalaya, Jammu and Kashmir (India). Ethnobotanical Leaflets. 2009(1): 23.

Langat DK, Maranga EK, Aboud AA and Cheboiwo JK. (2016). Role of forest resources to local livelihoods: The case of East Mau Forest ecosystem, Kenya. International Journal of Forestry Research. 1-10

Mandal SK, Saha S and Saha S. (2023). The importance of wild edible plant and macrofungi diversity to attain food security for the tribes of eastern India-a quantitative study. Frontiers in Sustainable Food Systems. 7: 1-25.

Medhi P, Sarma A and Borthakur SK. (2014). Wild edible plants from the Dima Hasao district of Assam, India. Pleione. 8(1): 133-148.

Nath N. (2015). Research article wild edible vegetables from Western Assam. Scholars Academic Journal of Biosciences. 3(12): 1044-1050.

Pagag K and Borthakur SK. (2012). Wild edible wetland plants from Lakhimpur district of Assam, India. Pleione. 6(2): 322-327.

Pal RS, Kumar RA, Kant L and Bhatt JC. (2014). Kilmora, a wild edible potential nutraceutical fruit in Indian Himalayan Region. Popular Kheti. 2(3): 199-203.

Patòiri B and Borah A. (2007). *Wild edible plants of Assam*., Department of Forest and Environment, Govt. of Assam.

Pegu R, Gogoi J, Tamuli AK and Teron R. (2013). Ethnobotanical study of wild edible plants in Poba Reserved Forest, Assam, India: multiple functions and implications for conservation. Research Journal of Agriculture and Forestry Sciences. 1(3): 1-10.

Pierce AR and Emery MR. (2005). The use of forests in times of crisis: Ecological literacy as a safety net. Forests, trees and livelihoods. 15(3): 249-252.

Reddy KN, Pattanaik C, Reddy CS and Raju VS. (2007). Traditional knowledge on wild food plants in Andhra Pradesh. Indian Journal of Traditional Knowledge. 6: 223-229.

Shackleton C and Shackleton S. (2004). The importance of non-timber forest products in rural livelihood security and as safety nets: a review of evidence from South Africa. South African Journal of Science. 100(11): 658-664.

Thakur A, Singh S and Puri S. (2020). Exploration of wild edible plants used as food by Gaddis-a tribal community of the Western Himalaya. The Scientific World Journal. 1-6.

Tiwari J K, Ballabha R and Tiwari P. (2010). Some promising wild edible plants of Srinagar and its adjacent area in Alaknanda valley of Garhwal Himalaya, India. Journal of American Science. 6(4): 167-174.

Yesodharan K and Sujana K A. (2007). Ethnomedicinal knowledge among Malamalasar tribe of Parambikulam wildlife sanctuary, Kerala. Indian Journal of Traditional Knowledge. 6(3): 481-485.