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# Underutilized edible fruit species of the Indo-Gangetic Plains: a systematic review for food security and land degradation neutrality

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**Abstract:** Many underutilized edible fruit species (UEFS) are found in the Indo-Gangetic Plains (IGP), which support food security (FS) for both indigenous people and other dependent communities. Unfortunately, there is little study and fragmented information available about these naturally edible products. The UEFS of the IGP was the subject of a systematic review utilizing the PRISMA protocol, which produced implications for FS and land degradation neutrality (LDN). This review aims to survey, summarize, and annotate the published information about the angiosperms native and naturalized UEFS of IGP to identify and make use of this species, particularly for the sustainable development of this region. A systematic review confirmed that 371 species of UEFS, of which 62 species were threatened and near threatened (TNT)-UEFS. Among the TNT-UEFS, 41 species were threatened, while 21 species were NT. The threatened species were further categorized as per the International Union for Conservation of Nature (IUCN) Red List in the IGP as vulnerable (21 species), endangered (16 species), and critically endangered (four species). This systematic review suggests integration of the native and naturalized UEFS in afforestation and reforestation programs to aid in various ecosystem services. *Calamus inermis, Corypha taliera*, *Licuala peltata,* and *Saurauia punduana* are examples of multipurpose species that require immediate sustainable conservation and cultivation initiatives to save them from extinction in the near future. Multipurpose species such as *Aegle marmelos*, *Buchanania lanzan*, *Manilkara hexandra*, *Syzygium cuminii*, *Tamarindus indica* are immensely constructive and climate-smart by surviving in harsh agroclimatic conditions and have great potential for establishment on marginal and wastelands throughout the IGP region. These resilient fruit species enhance biodiversity, ecosystems, and landscapes in addition to providing food for humans. It progressively advances India's commitment to LDN, combating climate change, and achieving the UN-SDGs, which call for reducing hunger and raising FS by 2030. As a result, the study will offer baseline data for the next investigations and be helpful to policymakers in creating sustainable and scientific policies for the IGP.

**Key words:** Native species, underutilized fruits, food security, species conservation, land restoration

## 1. Introduction

### 1.1. Salient features of Indo-Gangetic Plains

The Indo-Gangetic Plains (IGP) is situated between the Ghaggar and Teesta rivers and stretch from Delhi to Kolkata in the states of Bihar, Uttar Pradesh, and West Bengal covering an area of about 0.375 million km$^2$ (Wagh, 2017) and supporting a population of over 400 million people (Sinha et al., 2005). The west-east stretched IGP is

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drained by several north-south trending river systems in a varied climatic setting. Even though the entire IGP exhibits geomorphological homogeneity, it is divided into three regions (Table 1), namely Upper Gangetic Plains (GP), Middle GP, and Lower GP based on agroclimatic zones (Khanna, 1989) and the geographic and climatic features of India (Singh, 1971). Generally, the climate of the GP is tropical and subhumid to humid climate receiving 60 mm to 1600 mm of average rainfall. Further, the western and southern part of the GP receives less rainfall in comparison to the eastern and northern parts (Saini, 2008). These soils have good drainage of southeasterly flowing Ganga and its tributaries which are extensively cultivated and habited; however, the land degradation constraints such as flooding, soil salinity, and riverine erosion are dominated in the GP (Saini, 2008). The temperature normally ranges from 5 °C to 25 °C during winter and from 20 °C to 40 °C during summer (Sinha et al., 2005). The soil characteristics are Quaternary alluvia, which is monotonous except for some variations in the peripheral northern and southern parts. Soils are bedded with varying combinations of clay, sand, gravel, and their mixture (Sinha et al., 2005). Information related to the total geographical area, population, forest area, tree cover, the total number of species, southeasterly flowing Ganga, and the number of underutilized edible fruit species (UEFS) in the IGP (present study) were recorded (Table 1).

Though India stands 2nd position in the world as the largest producer of fruits[1], it is still suffering from hunger and malnutrition (Sarkar and Rakshit, 2021). According to The State of Food Security and Nutrition in the World 2020 report, 189.2 million (14%) people are undernourished, and 34% of children under the age of five years in India are stunted (FAO, IFAD, UNICEF, WFP, and WHO, 2020). In the prevalence of stunting, Bihar ranked highest among all the states of the country, followed by Uttar Pradesh while Jharkhand followed by Bihar ranked highest in the prevalence of underweight (Swaminathan et al., 2019). The IGP still fails to address its complete food and nutritional security despite being backboned by agriculture as in many other regions of the country, and most of the rural community depend on it for their livelihood. This region is always under immense pressure to feed its ever increasing population and suffers from malnutrition, poverty, and hunger. The average operational land holdings in the states of Bihar, Uttar Pradesh, and West Bengal were less than 1 ha, which is less than the national average (Singh, 2014). Approximately 90% of farmers were classified under marginal and small categories, with an average of half a hectare. This presents serious challenges in mechanization and the use of costly inputs which is economically nonviable. Rainfed agriculture with supplemental irrigation is practiced in most of the GP. Rice-wheat cropping system is more predominant and the important cash crops such as sugarcane, potato, and tobacco, fruit crops such as mango, litchi, and banana, and vegetable crops such as brinjal, onion, and tomato are cultivated. The population density and percentage of the population below the poverty line in the GP were very high while the literacy rate was low (Census of India, 2011). Although the IGP is blessed with the environment and resources for agricultural practices fragmentation of land, green revolution, land degradation, population, urbanization, and other anthropogenic activities result in farmers' reluctance to achieve food and nutritional security (Singh, 2014).

### 1.2. Importance of UEFS in the IGP

A tiny part of the IGP is still pristine and rich in floral biodiversity, with a high occurrence of UEFS such as *Artocarpus lacucha, Baccaurea ramiflora, Cordia myxa, Diospyros melanoxylon, Elaeagnus latifolia, Ficus palmata, Glycosmis pentaphylla*, and several others (Plates 1–3). These are rare minor wild fruits that are native and unique and mostly eaten by the locals during different seasons (Jeeva, 2009; Singh et al., 2015). These natural fruits benefit poor people by supplying a nutritional diet in rural areas and generate additional income, which are rich sources of macro- and microminerals, vitamins, fibres, antioxidants, and polyphenols (Suresh et al., 2014; Singh et al., 2015). Consumption of these fruits reduces the risk of several diseases such as cancer, diabetes, heart diseases, and neurodegenerative ailments (Singh et al., 2015). Most of these UEFS are easy to grow with fewer cultural and technical inputs, hardy, and generate additional income for the farmers (Suresh et al., 2014). Besides, it depends on various native fauna and components in the farming systems, for large-scale plantations in social forestry, and to support timber and fuel availability in the region (Dwivedi, 1993).

Besides natural threats such as extreme climatic conditions, floods, tectonic movements, and unpredictable monsoons, the IGP is also overburdened due to nonjudicious management of soil, water, and other natural resources (Ingram, 2011). This cultivable land is replaced by industrialization, mining, urbanization, and other human-induced activities. Hence, the IGP is facing twin threats i.e. natural as well as human-induced, any changes in these factors are affecting the pattern of land use and land cover change, food production, human settlement, and other socioeconomic, cultural

[1]PIB Delhi (2021). Production of Fruits and Vegetables [online]. Website https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1776584 [accessed 10 March 2023].

**Table 1.** Total geographical area, population, forest area, tree cover, total number of species and tree species of the IGP.

| States | Area (Lakh Sq. km) | Population (million) as per census 2011 | Dominant tribes (Top five) | GP region | Area excluded | Forest cover per cent of Geographical area | Angiospermic species reported | UEFS reported (Present study) |
|---|---|---|---|---|---|---|---|---|
| Uttar Pradesh | 2.40 | 199.81 m,<br>Urban: 22.27%<br>Rural: 77.73%<br>Tribal: 0.57% | Tharus, Kols, Kharwar, Gond and Bhoxa (Prakash 2011) | Upper GP covers 1.49 Lakh Sq. km and Middle GP covers Eastern UP | Some parts in Central Plateau and Hills Region | 6.15%<br>VDF: 1.09%<br>MDF: 1.67%<br>OF: 3.39% | 2607 species (Khanna 2017) | 149 species |
| Bihar | 0.94 | 104.10 m, Urban: 11.30%<br>Rural: 88.70%<br>Tribal: 1.28% | Santal, Oraon, Kharwar, Gond, and Munda (Bhatt and Bhargava 2006) | Middle GP covers 1.44 Lakh Sq. km and lower GP covers tahsil of Kishanganj | - | 7.84%<br>VDF: 0.35%<br>MDF: 3.49%<br>OF: 4.00% | 2963 species, undevided Bihar with Jharkhand (Singh et al., 2001) | 219 species |
| West Bengal | 0.89 | 91.27 m,<br>Urban: 11.29%<br>Rural: 88.71%<br>Tribal: 5.80% | Santal, Oraon, Munda, Bhumijes and Koras (Dey, 2015) | Lower GP covers 0.81 Lakh Sq. km | Purulia and Darjeeling district | 18.96%<br>VDF: 3.42%<br>MDF: 4.74%<br>OF: 10.80% | 3580 species (Chakravarty et al., 1999) | 342 species |

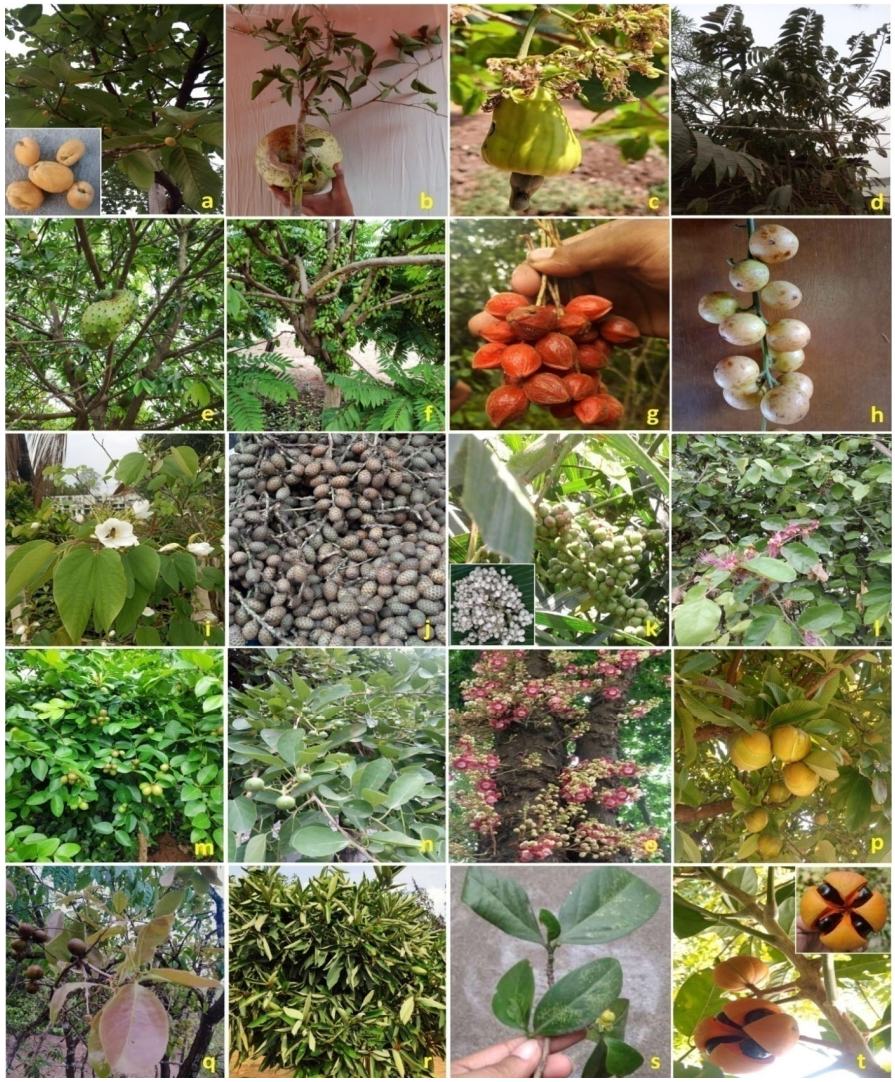

**Plate 1. Photograph of some UEFS of the IGP taken during study: a.** Monkey Jack (*Artocarpus lacucha*); **b.** Bael (*Aegle marmelos*); **c.** Cashew (*Anacardium occidentale*); **d.** Ramphal (*Annona reticulata*); **e.** Lakshman phal (*Annona muricata*); **f.** Bilimbi (*Averrhoa bilimbi*); **g.** Moottipuli (*Baccaurea courtallensis*); **h.** Latka (*Baccaurea ramiflora*); **i.** Dwarf White Bauhinia (*Bauhinia acuminata*); **j.** Bet (*Calamus Spp.*); **k.** Rattan (*Calamus viminalis*); **l.** Caper bush (*Capparis spinosa*); **m.** Karonda (*Carissa carandus*); **n.** Assyrian plum (*Cordia myxa*); **o.** Cannonball tree (*Couroupita guianensis*); **p.** Elephant Apple (*Dillenia indica*); **q.** Tendu (*Diospyros melanoxylon*); **r.** Velvet apple (*Diospyros discolor*); **s.** Date-plum (*Diospyros lotus*); **t.** Karakil (*Dysoxylum binectariferum*).

and environmental conditions of the region (Saini, 2008; Sarkar and Rakshit, 2023). Nowadays, land degradation is becoming a global challenge as it poses a high risk to land productivity, food security, and livelihood opportunities (Rakesh et al., 2023). The worst effects of land degradation are malnutrition, disease, forced migration, increased conflicts cultural damage, and poverty. Hence, it is an alarming sign to conserve biodiversity and maintain the ecological balance of the country. Land degradation neutrality (LDN) is an important concept to restore our mother earth from degradation and prevent further degradation and desertification (Quatrini and Crossman, 2018; Dinesha et al., 2023). Fortunately, tiny sporadic tropical-subtropical forests of the IGP are endowed with many UEFS that have an outstanding potential to improve food and nutritional security among vulnerable groups. Unfortunately, utilization of native UEFS has steadily declined because of lack of awareness, discontinuity in

**Plate 2. Photograph of some UEFS of the IGP taken during study: a.** Bastard oleaster (*Elaeagnus latifolia*); **b.** Indian olive (*Elaeocarpus floribundus*); **c.** Indian coral (*Erythrina variegata*); **d.** Banyan (*Ficus benghalensis*); **e.** Panjab fig (*Ficus palmata*); **f.** Cluster fig (*Ficus racemosa*); **g.** Hauili (*Ficus septica*); **h.** Fig (*Ficus spp.*); **i.** Mangosteen (*Garcinia kydia*); **j.** Aastani (*Glycosmis pentaphylla*); **k.** Phalsa (*Grewia asiatica*); **l.** Achatta (*Lepisanthes senegalensis*); **m.** Wood apple (*Limonia acidissima*); **n.** Mahua (*Madhuca latifolia*); **o.** Khirni (*Manilkara hexandra*); **p.** Bullet wood (*Mimusops elengi*); **q.** Mulberry (*Morus alba*); **r.** Orange jasmine (*Murraya exotica*); **s.** Lotus (*Nelumbo nucifera*); **t.** Nepal fig opuntia (*Opuntia ficus-indica*).

traditional culture and knowledge, intensive agriculture, limited research done, inadequate policy support, western influence, and urbanization (Tomar et al., 2015; Shankar et al., 2020). Even though they have many advantages, research attention or extension activities are meagre. Hence, the main objective of this review is to survey, summarize, and annotate the published information about the angiosperms native and naturalized UEFS of IGP to identify and make use of this species, particularly for the sustainable development of this region.

## 2. Materials and methods

### 2.1. Protocol for systematic review

This study implements the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) protocol (Moher et al., 2009; Liu et al., 2021) to review the

**Plate 3. Photograph of some UEFS of the IGP taken during study: a.** Indian trumpet (*Oroxylum indicum*); **b.** Passion Fruit (*Plassiflora edulis*); **c.** Malay gooseberry (*Phyllanthus acidus*); **d.** Amla (*Phyllanthus emblica*); **e.** Jungle Jilebi (*Pithecellobium dulce*); **f.** Chitki (*Securinega virosa*); **g.** Marking nut (*Semecarpus kurgii*); **h.** Sal (*Shorea robusta*); **i.** Jangli bhata (*Solanum indicum*); **j.** Black nightshade (*Solanum nigrum*); **k.** Jangli Badam (*Sterculia foetida*); **l.** Hirik (*Sterculia guttata*); **m.** Watery rose apple (*Syzygium aqueum*); **n.** Mountain Apple (*Syzygium jambos*); **o.** Jamun spp. (*Syzygium spp.*); **p.** Jamun (*Syzygium cuminii*); **q.** Wax apple (*Syzygium samarangense*); **r.** Black Myrobalan (*Terminalia chebula*); **s.** Giloy (*Tinospora cordifolia*); **t.** Tin koli (*Ziziphus rugosa*).

published information pertaining to the angiospermic native and naturalized UEFS of the IGP. The outline map of the study area is presented in Figure 1. A systematic review was executed using the flow diagram (Figure 2, adapted from Moher et al. (2009)). An exact explanation and categorization of major and underutilized (minor) fruits are perhaps difficult as of complexity and it depends on multiple factors such as availability, awareness, consumption, distribution, exploitation, knowledge, popularity, production, and utilization (Tripathi, 2019). Our definition of UEFS excludes species that falls under widespread to moderate commercial importance category and species which has been widely naturalized, cultivated, and well known in the IGP of Indian subcontinent. For instance, *Tamarindus indica* is well known, widespread, and

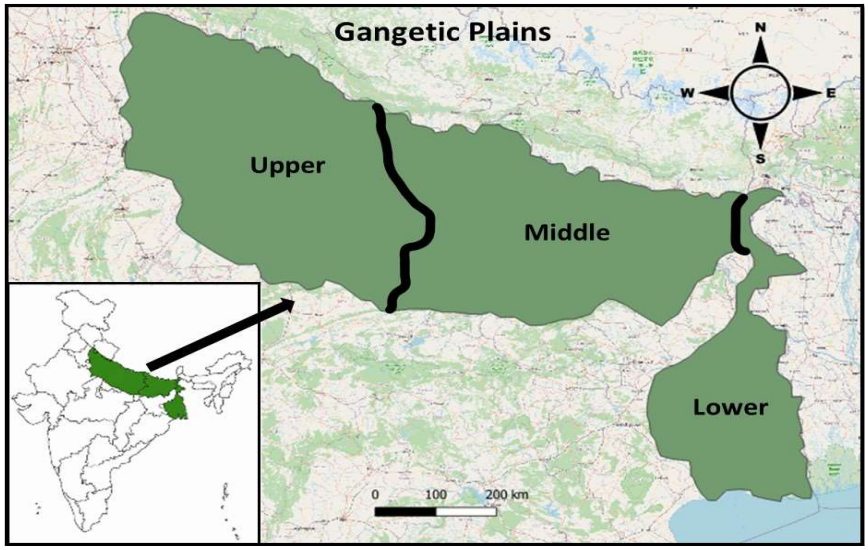


**Figure 1.** Outline map of the study area.

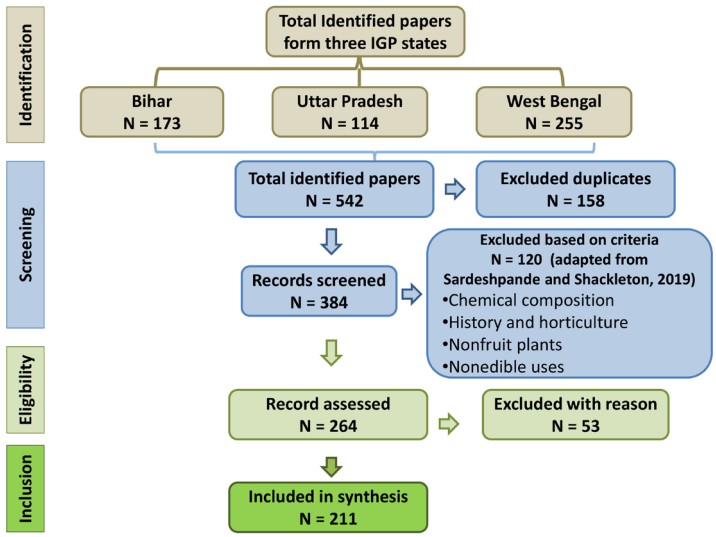


**Figure 2.** Flow diagram of UEFS of IGP (adapted from Moher et al. (2009)).

widely naturalized in southern India while in other parts of India including GP it still falls under the UEFS category (Mahapatra and Panda, 2009). However, this review includes only a lesser known, lesser distributed, underutilized, undomesticated, and wild edible fruit species from forests, agroforestry systems, gardens, vacant, and other marginal lands (Figure 3).

### 2.2. Survey and analysis

In this analysis, we examine the literature focused on angiospermic native and naturalized UEFS of the IGP. We reviewed published articles, book chapters, and scientific reports to analyze the ethnomedicinal/traditional/indigenous use, growth pattern, and seasonal availability of UEFS in the IGP. Our search keywords are forest fruits, wild edible fruits, underutilized fruits, and lesser-known fruits, and we used Google, Google Scholar, J-Gate, Scopus, and Web of Science for our searches. The total of 542 articles which includes the UEFS conservation, documentation, ecology, economics, and ethnobotany in topics of agriculture, botany, environment, forestry and climate change studies, food science, horticulture, medicinal and aromatic plants, social science, and urban studies were considered. Finally, 211 articles were included in the synthesis after the exclusion of duplicates (N = 158), based on criteria (N = 120) and other reasons (N = 53) (Figure 2). Following the guidelines of Sardeshpande and Shackleton (2019), articles concerning the nutritional

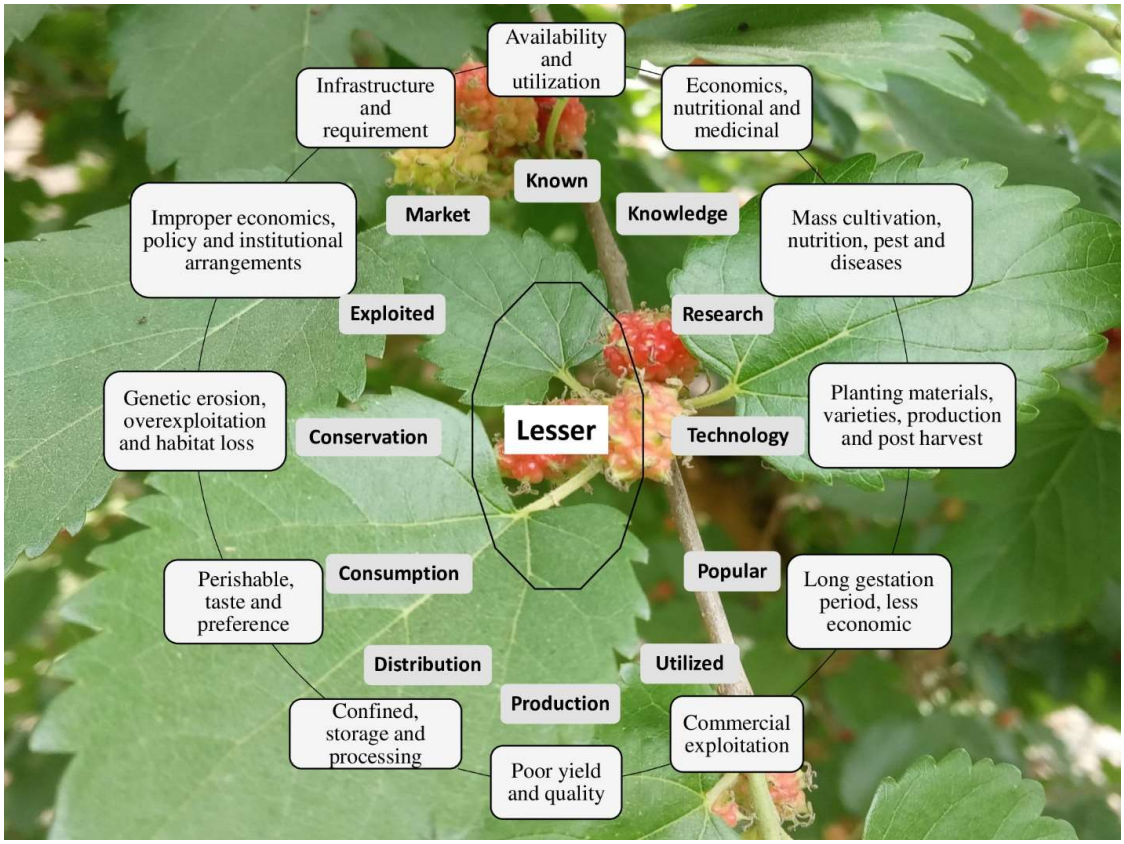


**Figure 3.** Constraints of UEFS.

value, toxicity, historical and horticultural records, and pharmacology of UEFS were excluded based on certain criteria. From these excluded 331 articles, some related to nutrient composition, evolution, genetics, chemistry, pharmacology, toxicology, immunology, medicine, etc., of UEFS were considered an accessory literature to strengthen our systematic review. The published scientific names of the UEFS were verified from online sources such as Plantlist[2] and International Plant Names Index[3]. The recorded species were divided into eight categories as per the IUCN conservation status namely not evaluated (NE), data deficient (DD), least concern (LC), near threatened (NT), vulnerable (VU), endangered (EN), critically endangered (CR) and extinct in the wild (EW) and verified from the IUCN[4]. The information from the literature found from the mentioned sources was used to prepare a comprehensive list of species with scientific names, common names, family, life form, origin, flowering and fruiting time, state-wise distribution, nutritional status, uses, products, other significance, IUCN status and sources (Table 2).

## 3. Results and discussion

### 3.1. Diversity of the UEFS

The systematic review resulted in a repository of 371 fruit species, belonging to 197 genera in 85 families. Among 85 plant families, at least the top 10 families have been found to be dominant in the IGP which was represented by the maximum number of UEFS (Figure 4). Further, our habit-wise analysis has revealed that around 268 species (72%) were trees, 52 species (14%) were shrubs, 20 species (5%) were herbs, and 32 species (9%) were climbers (Figure 5). Among these fruit species, 341 species (92%) were native and 30 species (8%) were naturalized to the IGP (Table 2). A maximum number of species was recorded in West Bengal (342 species), followed by Bihar (219 species), and a minimum (149 species) in Uttar Pradesh. The recorded 371 species were divided into eight categories (Figure 6) namely NE (115 species), DD (eight species), LC (185 species), NT (21 species), VU (21 species), EN (16 species), CR (four species), and EW (one species). The present study categorized 115 UEFS species under the NE

[2]The Plant List (2013). Version 1.1 [online]. Website http://www.theplantlist.org/ [accessed 15 March 2023].

[3]IPNI (2024). International Plant Names Index [online]. Website http://www.ipni.org, The Royal Botanic Gardens, Kew, Harvard University Herbaria & Libraries and Australian National Herbarium [accessed 15 March 2023].

[4]IUCN (2024). The IUCN Red List of Threatened Species. Version 2023-1 [online]. Website https://www.iucnredlist.org [accessed 21 April 2023].

**Table 2.** General account on reported UEFS, significance, IUCN status and references.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Moraceae** | | | | | | | | | | |
| *Artocarpus chama* Roxb. | Chaplash | T | Native | March–April and May–June | WB | Rich sources of vits A and C | Fruit is eaten raw and seeds eaten roasted form | Medicinal value (Diabetes and anti-arthritis) | NE | Biswas et al. (2018); Abdullah et al. (2020) |
| *Artocarpus hirsutus* Lam. | Wild jack | T | Native | December–March | WB | Rich in vitamins and minerals | Eaten raw | Medicinal value | LC | Biswas et al. (2018) |
| *Artocarpus lacucha* Buch.-Ham. | Monkey Jack/ Barhar | T | Native | March–April and May–June | BR; WB | Rich in minerals and vitamins | Pickle, curries, chutney and dried fruits | PBI; Medicinal and fodder use | LC | Paul (2013); Abdullah et al. (2020) |
| *Ficus benghalensis* L. | Banyan | T | Native | January–July | BR; UP; WB | Nutritionally rich | Raw fruits eaten | Medicinal (respiratory and skin disorders | LC | Bose et al. (2015) |
| *Ficus palmata* Forssk. | Panjab fig/ Bedu | T | Native | June–July | BR; UP; WB | Fruits eaten | Fruit used in foothills of Himalayas | Medicinal, prevent stress | NE | Tomar et al. (2015) |
| *Ficus racemosa* L. | Cluster fig/Red River fig | T | Native | March–May | BR; UP; WB | Ripe and unripe fruits | Vegetable, stir-fries and curries | Medicinal (diarrhoea, dysentery) | LC | Paul (2013); Abdullah et al. (2020) |
| *Ficus septica* Burm. F. | Hauili | T | Native | January–June | BR; UP; WB | Nutrient rich fruits | Eaten raw | Folk medicine | LC | Paul (2013) |
| *Morus alba* L. | Mulberry | T | Native | February–June | BR; UP; WB | Sweet and sour fruits | Jam, fodder and green leaf manure | Medicinal | LC | Paul (2013) |
| **Rutaceae** | | | | | | | | | | |
| *Aegle marmelos* L Corr. Serr. | Bael/Stone apple | T | Native | March–April | BR; UP; WB | Fruit pulp | Pulp eaten, jam, jelly and sharbat | Medicine and Sacred tree | LC | Paul (2013) |

**Table 2.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|
| *Glycosmis pentaphylla* (Retz.) DC | Aastani | S | Native | September–April | BR; WB | Rich in nutrients | Ripe berries eaten raw by tribals and villagers | Medicinal, liver problem and hair loss | LC | Mahapatra et al. (2012) |
| *Limonia acidissima* L. | Wood apple | T | Native | September–October | BR; UP; WB | Fatty acids, vitamins and minerals | Sweet and sour jams, pickle, Chutney | Religious, medicinal and insecticide use | NT | Paul (2013) |
| *Murraya exotica* L. | Orange jasmine | T | Native | May–October | BR; WB | Fruits are rarely used | Culinary uses | Medicinal use for bleeding and pain | NE | Barooah and Ahmed (2014) |
| **Anacardiaceae** | | | | | | | | | | |
| *Anacardium occidentale* L. | Cashew | T | Naturalized | January–May | BR; UP; WB | Nutrient-dense fruit | Eaten raw or used in culinary and wine making | Medicinal values | LC | Barooah and Ahmed (2014) |
| **Annonaceae** | | | | | | | | | | |
| *Annona reticulata* L. | Ramphal/ Nag-hawa | T | Native | February–October | BR; UP; WB | High in sugar and vitamins | Eaten raw | Seed used as medicine | LC | Mitra and Mukherjee (2009) |
| *Annona muricata* L. | Lakshman phal | T | Native | April–October | BR; UP; WB | Tryptophan, vitamins and mineral rich | Eaten raw | Used as medicine | LC | Mitra and Mukherjee (2009) |
| **Oxalidaceae** | | | | | | | | | | |
| *Averrhoa bilimbi* L. | Bilimbi | T | Naturalized | January–May | WB | Sour and extremely acidic fruit | Pickle, squash, vegetable | PBI; medicinal | LC | Banarjee et al. (2013) |
| **Euphorbiaceae** | | | | | | | | | | |

**Table 2.** (Continued.)

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Baccaurea courtallensis* (Wight) Muell. Arg. | Moottipuli | T | Native | January–June | WB | Sweet fruits | Eaten raw | Medicinal value | NT | Barooah and Ahmed (2014) |
| *Baccaurea ramiflora* Lour. | Latka | T | Native | March–September | WB | Ripe and unripe fruits | Consumed fresh locally | Medicinal (used for constipation) | LC | Rymbai et al. (2016) |
| **Fabaceae** | | | | | | | | | | |
| *Bauhinia acuminata* L. | Dwarf White Bauhinia | T | Native | April–August | UP; WB | Collected for local use | Culinary use | Folk medicine | LC | Barooah and Ahmed (2014) |
| *Pithecellobium dulce* (Roxb.) Benth. | Jungle Jilebi | T | Naturalized | January–March | BR; UP; WB | Rich in nutrients | Eaten raw and used in culinary | Ornamental and leguminous | LC | Dwivedi (1993) |
| **Arecaceae** | | | | | | | | | | |
| *Calamus viminalis* Willd. | Rattan | T | Native | July–August | BR; WB | Ripe fruits | Ripe fruit occasionally eaten | PBI; Shoot edible, medicinal | LC | Abdullah et al. (2020) |
| **Capparaceae** | | | | | | | | | | |
| *Capparis spinosa* L. | Caper bush/ Kalavari | S | Native | April–September | BR; WB | Nutritious fruits | Fruits are eaten raw | Medicine | LC | Ahirwar (2015) |
| **Apocynaceae** | | | | | | | | | | |
| *Carissa carandus* L. | Karonda | T | Native | February–June | BR; UP; WB | Rich in iron and vitamins | Pickled, jam, jelly, syrup and chutney | Used for toxicity and bronchitis | LC | Banarjee et al. (2013) |

**Table 2.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|
| **Boraginaceae** | | | | | | | | | | |
| *Cordia myxa* L. | Assyrian plum | T | Native | July–August | BR; UP; WB | Rich in minerals and vitamins | Fruits eaten raw and pickled | Paper glue | LC | Paul (2013) |
| **Lecythidaceae** | | | | | | | | | | |
| *Couroupita guianensis* Aubl. | Cannonball tree | T | Naturalized | November–June | BR; UP; WB | Fruits rarely used | Used locally and used as animal feed | Folk medicine, cultural and religious worth | LC | Barooah and Ahmed (2014) |
| **Dilleniaceae** | | | | | | | | | | |
| *Dillenia indica* L. | Elephant Apple/Chulta | T | Native | July– August | BR; UP; WB | Ripe and unripe fruits | Chutney and pickle | Medicinal use (abdominal pains) | LC | Abdullah et al. (2020) |
| *Diospyros melanoxylon* Roxb. | Tendu | T | Native | During summer | BR; UP; WB | Rich in phenols and fibre | Fruits pulp is used | Folk medicine | NT | Kaur and Fatima (2018) |
| **Ebenaceae** | | | | | | | | | | |
| *Diospyros discolor* Willd. | Velvet apple/ kamagong | T | Native | May–August | BR; UP; WB | Sourish fruit | Pulp is used | Hard and durable wood | VU | Paul (2013) |
| *Diospyros lotus* L. | Date-plum | T | Native | April–September | WB | Nutrient-dense fruits used | Fruits used locally | Folk medicine | NE | Sarkar (2021) |
| **Meliaceae** | | | | | | | | | | |

**Table 2.** (Continued.)

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Dysoxylum binectariferum* Hook. f. ex Bedd. | Kempu Devadaru/ Karakil | T | Native | February and December | BR; WB | Pulp rich in sugars, fat, minerals and vit C | Seeds are like chestnuts after roasting. | Ayurveda, folk medicine and immune modulatory | EN | Barooah and Ahmed (2014) |
| **Elaeagnaceae** | | | | | | | | | | |
| *Elaeagnus latifolia* L. | Bastard oleaster | S | Native | January–April | BR; WB | Several good fatty acids | Eaten raw | Medicinal | LC | Rymbai et al. (2016) |
| **Elaeocarpaceae** | | | | | | | | | | |
| *Elaeocarpus floribundus* Blume | Jalpai/Indian olive | T | Native | April–May and August to October | WB | Rich in vitamins and minerals | Pickles and chutney prepared | Medicinal | LC | Abdullah et al. (2020) |
| **Papilionaceae** | | | | | | | | | | |
| *Erythrina variegata* L. | Tiger's claw/ Indian coral | T | Native | September–April | WB | Nutrient-dense fruits | Eaten raw or cooked | Medicinal use | LC | Shivprasad et al. (2016) |
| **Clusiaceae** | | | | | | | | | | |
| *Garcinia kydia* Roxb. | Mangosteen | T | Native | April to July | WB | Sour fruits are source of vitamins | Dried rind is used for cooking | Folk medicine | NE | Parthasarathy et al. (2011) |
| **Malvaceae** | | | | | | | | | | |
| *Grewia asiatica* L. | Phalsa/ Falsa | T | Native | April–September | BR; UP; WB | Sweet and sour acidic fruit | Pickles, beverages, sherbet and squash | Used as an astringent and cooling agent | LC | Banarjee et al. (2013); Paul (2013) |

**Table 2.** (Continued.)

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sapindaceae** | | | | | | | | | | |
| *Lepisanthes senegalensis* (Poir.) Leenh., Blumea | Achatta/ Kaphul | T | Naturalized | November–April | WB | Fruits and seeds | Eaten raw and cooked | Medicinal | NE | Jeeva (2009); Dwivedi (1993) |
| **Sapotaceae** | | | | | | | | | | |
| *Madhuca latifolia* (Roxb.) Cheval. | Mahua | T | Native | March–August | BR; UP; WB | Source of protein and minerals | Fruits are eaten raw and extract oil, alcoholic beverage. | Medicinal, Used in production of Tasar Silk | CR | Ajesh et al. (2012); Banarjee et al. (2013) |
| *Manilkara hexandra* (Roxb.) Dubard | Khirni | T | Native | November–June. | BR; UP; WB | Minerals, protein and vitamin rich | Sweet fruits eaten raw or after drying, seeds for cooking. | Rootstock for sapota and medicinal use | NE | Tomar et al. (2015); Ahirwar (2015) |
| *Mimusops elengi* L. | Molsari/ Bakul/ Bullet wood | T | Native | April–May | BR; UP; WB | Sweet fruit rich calcium content. | Eaten raw or used in pickles and fruit preservatives | Ayurvedic, red color wood is strong and tough | LC | Paul (2013) |
| **Nelumbonaceae** | | | | | | | | | | |
| *Nelumbo nucifera* Gaertn | Lotus/ Kamal | H | Native | April–September | BR; UP; WB | Fruits collected | Seeds eaten raw or roasted | Medicinal use | DD | Bose et al. (2015) |
| **Cactaceae** | | | | | | | | | | |
| *Opuntia ficus-indica* (L.) Mill. | Nepal fig opuntia | S | Naturalized | March–December | BR; UP; WB | Nutritious fruits | Fresh fruits eaten raw | Folk medicine | DD | Singh et al. (2020) |
| **Bignoniaceae** | | | | | | | | | | |

**Table 2.** (Continued.)

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Shorea robusta* Roth | Sal | T | Native | January–June | BR; UP; WB | Fruit pulp and oil used | Pulp eaten and oil used in culinary | Medicinal, resin and wood | LC | Barooah and Ahmed (2014) |
| **Sterculiaceae** | | | | | | | | | | |
| *Solanum indicum* L. | Jangli bhata | S | Native | June–March | BR; UP; WB | Nutrient-dense fruit | Eaten as vegetable | Medicinal use | NE | Barooah and Ahmed (2014) |
| *Solanum nigrum* L. | Black nightshade | H | Native | June–December | BR; UP; WB | Nutrient-dense fruits | Jam making or eaten raw | Folk medicine | NE | Bose et al. (2015) |
| *Sterculia foetida* L. | Jangli Badam/ Wild Indian Nut | T | Native | April–February | BR; UP; WB | Fruit collected | Eaten as vegetable | Seed oil as medicine and bark for rope. | NE | Paul (2013) |
| *Sterculia guttata* Roxb. | Hirik | T | Native | September–March | BR; UP; WB | Fruit and seeds used | The roasted seeds are eaten | Folk medicine and Siddha | NE | Barooah and Ahmed (2014) |
| **Myrtaceae** | | | | | | | | | | |
| *Syzygium aqueum* (Burm.f.) Alston | Watery rose apple | T | Native | January–October | BR; WB | Nutrient-dense fruit | Eaten raw, salads, pickles | Folk medicine | LC | Singh et al. (2001) |
| *Syzygium jambos* (L.) Alston. | Malabar Plum/ Mountain Apple | T | Native | Usually, summer months | BR; WB | Rich in minerals vits B and C | Making preserves, jellies and sweet | Folk medicine, ornamental and charcoal making | LC | Ahirwar (2015) |
| *Syzygium cuminii* L. Skeels | Jamun | T | Native | January–May | BR; UP; WB | Fruit rich in Iodine | Fruit and seed | Seed in diabetes and sacred fruits of the Hindus | LC | Paul (2013) |
| *Syzygium samarangense* (Blume) Merr. & L.M.Perry | Jamrul/ Wax apple | T | Native | January–March and May–September | BR; WB | Rich in Ca, P, K, Mg, vit C | Eaten raw, salads, pickles | Jambu dweep (India's ancient name) comes from this fruit | LC | Singh et al. (2001); Biswas et al. (2018) |

**Table 2.** (Continued.)

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Combretaceae** | | | | | | | | | | |
| *Terminalia chebula* Retz. | Haritaki/ Black Myrobalan | T | Native | March–April | BR; UP; WB | Edible fruit and seeds | Seeds as snacks, edible oil, sour fruits for salads, fries, black salt | PBI; Ayurvedic medicine (Triphala), dye, calicos | LC | Bose et al. (2015) |
| **Menispermaceae** | | | | | | | | | | |
| *Tinospora cordifolia* (Willd.) Miers | Guduchi/ Giloy | C | Native | May–October | BR; UP; WB | Rich in nutrients and minerals | Fruit eaten | Nutraceutical and medicinal use | NE | Bose et al. (2015) |
| **Rhamnaceae** | | | | | | | | | | |
| *Ziziphus rugosa* Lam. | Tin koli | S | Native | April–May | BR; WB | Sweet and acidic taste | Used in culinary | PBI; medicinal use | NE | Mahapatra et al. (2012) |

T: tree; S: shrub; H: herb; C: climber; BR: Bihar; UP: Uttar Pradesh; WB: West Bengal; NE: not evaluated; DD: data deficient; LC: least concern; NT: near threatened; VU: vulnerable; EN: endangered; CR: critically endangered; EW: extinct in the wild.

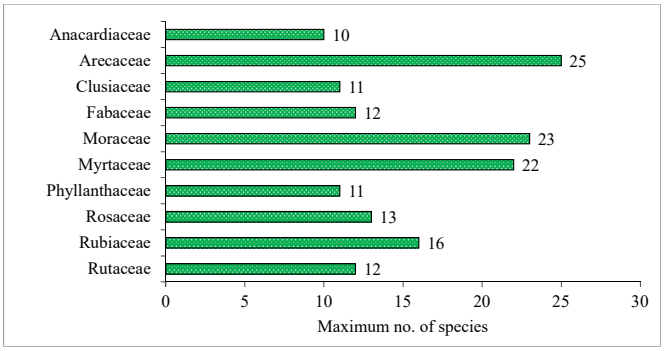


**Figure 4.** Statistics of top 10 families of UEFS of the IGP which is represented by maximum number of species.

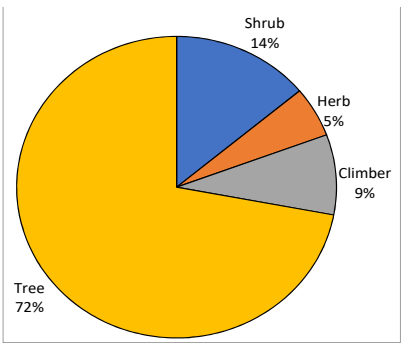


**Figure 5.** Habit-wise species distribution.

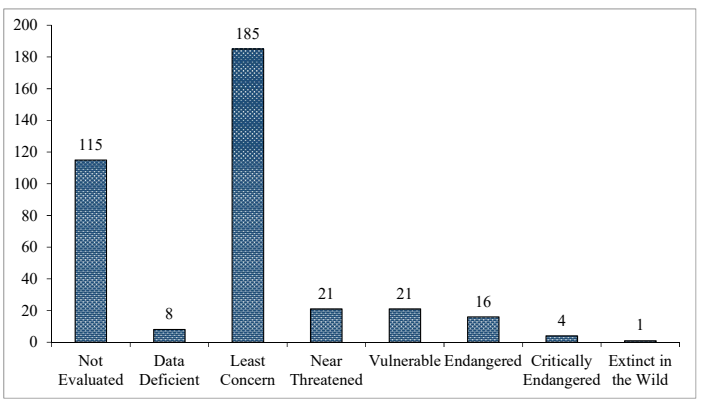


**Figure 6.** Conservation status of UEFS of IGP as per IUCN categories.

category which needs further extensive survey to enlist under the IUCN conservation list for future conservation, research, and developmental initiatives at the local and regional levels. The literature studies confirmed that, of the total 371 species of UEFS recorded, most of the species reported to have medicinal and economic values but few species were observed to be extremely rare and threatened in their native or naturalized habitat, which needs immediate conservation initiatives for scientific and sustainable conservation, production, and utilization.

Many studies have provided a comprehensive review of UEFS in the context of World, Continent, India, and portion of the GP (Verheij et al., 1991; Mahapatra et al., 2012; Suresh et al., 2014; Singh et al., 2015). Native and naturalized UEFS are primarily organic, nutritious and have huge cultural, medicinal, regulatory, and supporting values. UEFS constitutes the major source of subsidiary nutrients to the tribal, forest dwellers, and marginalized local communities since the cultivar fruits are less familiar and not accessible to them. On the other hand, urban

communities are not familiar with the UEFS which tribal and local communities utilize. Most of the forest dwellers and tribal populations largely depend on forest resources for their livelihood and sustenance. Though they collect a portion of the excessively available fruits from the forest for their sustenance, huge quantities are wasted as uncollected. Documentation of indigenous knowledge on medicinal, therapeutic, and nutritional properties of UEFS through ethnobotanical studies is significant for the sustainable bioprospecting, conservation, and utilization of natural products (Biswas et al., 2018).

**3.2. Collection calendar of UEFS**

UEFS are mainly collected from forests and other unmanaged landscapes, and they supplement diverse nutrient-dense food and also enhance ecosystem services, livelihoods, and climate resilience (Mahapatra and Panda, 2009; Biswas et al., 2018). The collection calendar includes the flowering and fruiting periods in the months for each species were recorded (Table 2) and the additional details of other species under various families have also been illustrated in Supplementary Table. The extent of the collection of UEFS depends on various factors such as agriculture failure, adverse climatic conditions, erratic rainfall, famine, war, and other lean times (Mahapatra and Panda, 2009). In this study, the most concentrated period of UEFS collection was from April to August, and some species were collected year-round. The year-round availability of UEFS from different species supplements a diverse and nutrient-dense food supply and enhances the livelihoods of the dependent communities (Mahapatra and Panda, 2009). *Madhuca latifolia* was collected from March to August (Ajesh et al., 2012; Banarjee et al., 2013); *Mangifera sylvatica* was collected from April to September (Paul, 2013; Abdullah et al., 2020); *Licuala peltata* was collected from September to May (Mondal, 2019). *Corypha taliera*, a monocarpic species, is presently categorized as extinct in the wild (EW) under the IUCN Red list category and few are present in Kolkata, India. The flowering and fruiting period (October–February) of this species is also important to develop appropriate conservation measures to save this species from the extinction in near future (Johnson, 1998; Paul, 2013; Kour et al., 2018).

**3.3. Nutritional status and value-added products of UEFS**

UEFS can fulfill the growing need of alternative bionutritional sources for food and nutritional security through bioprospecting of these natural products. Many studies showed the significance of UEFS as an important source of nutrient for rural poor and tribals (Mahapatra and Panda, 2009; Suresh et al., 2014; Tomar et al., 2015). The nutritional values of many UEFS such as *Mimusops elengi* for carbohydrate content, *Ziziphus rugosa* for sugar content, *Bridelia tomentosa* for protein content, *Terminalia citrine* for vitamin C content were found to be at par with the domesticated popular fruits such as banana, guava, mango, papaya, strawberry, and various other fruits (Mahapatra et al., 2012). Higher total soluble solid (TSS), amino acids, vitamins, minerals, and antioxidants of UEFS are reported globally (Deshmukh and Waghmode, 2011; Mahapatra et al., 2012; Suresh et al., 2014; Biswas et al., 2018). UEFS have been found to improve household food and nutritional security under normal circumstances as well as during food scarcity in both rural and urban contexts (Mahapatra and Panda, 2009; Biswas et al., 2018).

UEFS would facilitate small-scale commercial production of value-added products in rural poor and tribal communities and also help in promoting food security, doubling farmers' income, reducing postharvest losses, and contributing to the sustainable development of the dependent communities. Many studies demonstrated the production of good quality dry fruits, jams, juices, and other drinks using simple procedures that are suitable for small-scale commercial production. Many UEFS are used in pickle preparation by the indigenous tribes and pulp is used for making jam, jelly, wine, and refreshing drinks. Seeds of some UEFS are used for the extraction of crude oil for culinary (e.g., *Carallia brachiata, Diploknema butyracea, Garcinia xanthochymus, Madhuca latifolia* and *Terminalia chebula*), medicinal (e.g., *Atalantia monophylla, Gynocardia odorata, Hodgsonia macrocarpa, Sterculia foetida* and *Terminalia bellirica*) and many other purposes including cosmetics, fuel, and manufactured products. Most of these species are used as an ingredient in the preparation of *Triphala*, *Chavanprash*, and other Ayurvedic formulations such as *Asava* and *Arishta*. Information on the nutritional properties of most of the UEFS lacks details regarding their economic potential, nutrition, utility, and storage capability. These aspects are the least researched and unfamiliar, except for their consumption value and taste (Mahapatra et al., 2012). The present study indicates the scope of using UEFS for dietary supplements since it has valuable ingredients such as Fe, Na, K, Ca, and several others. Physicochemical analysis of UEFS aids in the provision of developing new varieties (Mahapatra et al., 2012).

**3.4. Contribution to food security and livelihoods**

The contribution of UEFS to food security and livelihoods of the dependent community is well documented even during erratic times such as agriculture failure, adverse climatic conditions, unpredictable rainfall, famine, war, and other lean times (Jeeva, 2009; Mahapatra and Panda, 2009). Most of the UEFS are available around the year and they supply diverse nutrient-dense foods to the dependent communities. Rural and tribal communities in many regions of the world depend on wild resources including UEFS to meet their food and livelihood needs. These UEFS add diversity to family diet and contribute

to household food and nutritional security along with livelihood improvements. Improving the food value can be a commendable step towards ensuring food and nutritional security as it further strengthens the education, employment, and health sectors, small-scale industries, tourism, transportation, and socioeconomical status, women empowerment, etc. Grading, processing, value addition, and packaging are the important practices to fetch better prices in the market. A considerable quantity of UEFS is wasted due to the lack of adequate storage facilities. This waste can be significantly reduced by using advanced and appropriate storage facilities. These UEFS can be processed into various products, including dry fruits, pickles, jams, jellies, juices, wines, and numerous others, through the application of traditional knowledge and advanced techniques. The quality and shelf life of the products could be improved considerably and reduce postharvest losses with the application of modern techniques such as solar drying, electric tray dehydration, pretreatment techniques, and several other methods (Meghwal and Singh, 2016). The application of postharvest value addition technologies may result in the development of small-scale industries which provide livelihoods to the rural masses throughout the year.

### 3.5. Other significant uses

Apart from the edibility, most of these UEFS are multiuse biological resources that have potential for cosmetic, medicinal, nutraceutical, ornamental, religious, therapeutic, wood, nonwood, and other ancillary purposes (Jeeva, 2009; Mahapatra and Panda, 2009). For example, *Gynocardia odorata*, *Hodgsonia macrocarpa*, and *Terminalia bellirica* are used for medicinal, cosmetics, and manufactured products (Table 2 and Supplementary Table). Species such as *Bridelia tomentosa*, *Carissa carandus*, and *Ziziphus rugosa* are highly recognized for their nutraceutical values and *Aegle marmelos*, *Ficus religiosa*, and *Limonia acidissima* have strong folklore and religious connections. Species such as *Grewia asiatica*, *Morinda angustifolia*, and *Stixis suaveolens* are used for aromatic and beverage purposes (Table 2 and Supplementary Table).

#### 3.5.1. Medicinal and therapeutic potentials of UEFS

UEFS is used in the treatment of a wide range of ailments as they are rich sources of antioxidants, minerals, and vitamins. For instance, some fruits rich in vitamin C are easily assimilated by the human body and have great antioxidant properties. Thus, they can be used to cure insomnia, scurvy, and constipation, and rejuvenate skin cells and hair growth. Phytochemicals of some UEFS possess diuretic, antibacterial, and antifungal properties and nematode toxicity. For instance, a decoction from the root and bark of wild ber is beneficial in the treatment of dysentery, diarrhea, sore throat, and bleeding gums (Kour et al., 2018). Bael fruits are rich in marmelosin active constituent which acts as an astringent, cardiac depressant, diuretic, laxative, and stomachic and these fruits are also used as a common home remedy for diarrhea, digestive disorders, and dysentery (Mahapatra and Panda, 2009). The kernels of chironji yield light yellow oil, a substitute for olive or almond oils in folk medicine and this seed oil is applied to glandular swellings of neck, itching, and other skin complaints (Mahapatra and Panda, 2009). UEFS such as *Atalantia monophylla, Diploknema butyracea, Pandanus odorifer, Protium serratum, Sterculia foetida* and *Terminalia bellirica* are used for numerous therapeutic advantages (Mahapatra and Panda, 2009; Paul, 2013). In addition, these UEFS possess comparatively more nutrients than major fruits; hence, they are used to treat many nutrient deficiencies and other ailments (Meghwal and Singh, 2016).

#### 3.5.2. UEFS association with culture, folklore, and socioeconomy

UEFS has been integrally associated with the culture, socioeconomy, and folklore of indigenous people. Approximately 7000 species of UEFS are documented globally (Grivetti and Ogle, 2000). Out of which, 1000 species were identified in America, 1200 species in Africa, and 800 species in Asia (Verheij et al., 1991). Out of 800 species, approximately 371 species (present study) are prevalent in the IGP. Tribals of various ethnic groups such as Kols, Gonds, Oraons, Mundas, Santals, Tharus, and others are predominant in the various parts of the IGP and follow traditional farm practices (Table 1). Most of the UEFS are used in their diverse and seasonal diets, often shared among each other or sold in local markets. Tribal and rural poor are accustomed to consuming UEFS in a variety of forms, including raw, pickled, boiled or cooked with other dishes (Shankar et al., 2020). In numerous developing nations, wild fruits are often the only fruits consumed by rural poor and tribals as they cannot afford cultivated commercial fruits (Mahapatra et al., 2012). Some UEFS have commercial values while others possess medicinal, religious, or sociocultural values. Hence, there is a need for further research on domestication, as well as ex situ and in situ conservation.

Earlier studies have demonstrated that different tribe communities used various wild fruits for different purposes, showing the diversity of knowledge among the indigenous people from region to region and nation to nation (Grivetti and Ogle, 2000; Deshmukh and Waghmode, 2011). The knowledge and utilization of UEFS depends on availability, habit, habitat, frequency of food shortages, and people's way of life in terms of their social (including age and gender perceptions), cultural, religious (for e.g., sacred groves), and economic domains (Suresh et al., 2014; Kour et al., 2018). In India, some species such as *Aegle marmelos,*

*Limonia acidissima, Ficus* sp., and many other species have strong connections with culture, folklore, and religious beliefs. Nowadays, this traditional culture and knowledge are losing significance due to Western influence, intensive agriculture, and urbanization, resulting in the degradation of harmonious relations among biodiversity, farming, and folklore. Hence, it is imperative to renew, document, and utilize traditional knowledge systems for socioeconomic benefits and environmental balance.

**3.5.3. Ecological and environmental implications**

UEFS also have numerous socioeconomic and ecological advantages in addition to food, nutrition, medicinal, and therapeutic advantage. Most of these UEFS contribute to the diversity of flora and fauna of the region and offer potential niches to various biotas. UEFS are being exploited continuously and unscientifically from the wild without any conservation efforts to propagate them. Promoting and domesticating these UEFS not only improves nutritional and livelihood security to the local and dependent communities but also helps in situ conservation and well-being of the ecosystem (Singh et al., 2015). These underexploited species, therefore, need to be studied, which could help in selecting promising species for inclusion in various afforestation and reforestation programs that have so far focused only on timber yielding species (Mahapatra et al., 2012). Integration of UEFS not only improves food and nutritional security for humans but also helps in sustaining wild macro- and microfauna such as frugivore, herbivore, and many others. Apart from wood and nonwood products such as timber, dye, fibre, gum, honey, and resins, UEFS are also used for various purposes such as aromatic and beverages (*Grewia asiatica, Morinda angustifolia* and *Stixis suaveolens*), birds and bee foraging (*Ehretia acuminate, Elaeagnus pyriformis* and *Syzygium cuminii)*, fodder (*Artocarpus lacucha, Meliosma pinnata,* and *Morus alba*), fuel (*Borassus flaballifer, Ficus semicordata,* and *Muntingia calabura*), aesthetic and ornamental purposes (*Phoenix rupicola, Prunus cerasoides*, and *Syzygium jambos*). These UEFS have also been acknowledged as critical resources for long-term ecological security as they provide multifarious ecosystem services, grow in varied climatic conditions, and are resistant to biotic and abiotic stresses (Suresh et al., 2014; Mahapatra et al., 2012). Such species are encouraged for commercial production, which plays a significant role in maintaining ecological balance and environmental stability through carbon sequestration, nitrogen fixation, phytoremediation, and soil and moisture conservation.

**3.5.4. Potential of further improvement**

The narrow altitude difference, coupled with varied tropical to subtropical biogeographic conditions, was found in the IGP. This region is home to variability, variety, and depository of genetic resources of our country, where many species originated and are reported to occur in the tiny sporadic tropical-subtropical forests of the GP and the foothills of the Himalayas (Shankar et al., 2020). Most of these UEFS thrive well under adverse climatic conditions and are good sources of several desirable, resistant, or tolerant genes for various biotic and abiotic constraints. These genes can be transferred to cultivated species using various intergeneric or interspecific breeding programs. For instance, *Prunus nepalensis*, commonly known as Khasi cherry, is resistant to collar rot and powdery mildew (Pareek et al., 1998). The environment plays a significant role in the biosynthesis of plant bioactive compounds and these compounds in fruits grown in one province may differ from those in the other region. Some fruits like *Diospyros* spp. have an astringent taste, which leads to low consumer preference. This can be improved through natural ripening and genetic improvement. Therefore, further investigations into the nutritional aspects, consumer preference, and genetic improvement of these UEFS are vital concerns.

**3.6. Promotion of documentation, cultivation, utilization, and marketing of UEFS**

The role of UEFS is now widely recognized, yet unfortunately data available on their documentation, composition, cultivation, marketing, and utilization is scanty and sporadic (Suresh et al., 2014). Hence, further studies are needed to ensure that they become well-known to everyone and, in return, aid in the conservation, development, and production of native and naturalized biodiversity. Nexus among conservation, cultivation, documentation, marketing, and utilization is important to achieve adaptability, productivity, and sustainability of UEFS integrated cultivation practices.

**3.6.1. Documentation**

The documentation of some UEFS, namely amla, bael, ber, fig, jamun, wood apple, and many others, is found in various ancient literatures, including Charaka Samhita and Vrikshayurveda from the 4th century BC to the present (Mahapatra and Panda, 2009). Keeping records will help in assessment, cultivation, domestication, improvement, and sustainable utilization which can diversify food and enrich the livelihoods of rural poor and tribals (Mahapatra et al., 2012). Also, documentation helps to surmount biodiversity loss and conservation of these valuable bioresources (Laha et al., 2018). There is a need for the scientific collation and validation of traditional knowledge available in Vedas, Grantas, Vrikshayurveda, and numerous other sources.

**3.6.2. Cultivation**

In ancient Indian times, natural resource-based traditional cultivation was practiced in collaboration with the indigenous knowledge and experience of the practitioners, which safeguards the nation of low population with food security and ecological balance. In recent times, the rapid increase in population, which ancient agriculture

was unable to sustain, and the Green Revolution in India, which emerged in the mid-60s in response to the postindependence demand for food, have come into focus. The overuse of chemical fertilizers, pesticides, and numerous other synthetic substances, with the objective of producing more food from limited land area, has consciously led India to sacrifice its ecological balance and environmental safety. Furthermore, numerous indigenous traditional landraces have been driven to extinction as a consequence of the introduction of hybrids and GM crops. Although the Green Revolution has incurred a significant influence on the agricultural sector, initially boosting crop productivity from the late 1990s onwards, it has begun to lose its efficacy due to stagnation in yield, long-term soil health and environmental deterioration.

Nowadays, people are realizing the potential of UEFS and the demand for quality planting material is increasing. To meet this demand, vegetative propagation techniques such as stem cutting, layering, stooling, and grafting are viable options for commercial multiplication. Various fruit crop-based models can be adopted to diversify farm income, minimize the risk, and enhance productivity. Plantation of UEFS should be done at closer spacing with locally available perennial organic mulches and proper management of the canopy. This approach can double productivity and income, leading to better livelihoods (Singh et al., 2020). Species such as *Eugenia rothii, Mimusops elengi, Ziziphus oenoplia, Ziziphus rugosa, Bridelia tomentosa,* and *Carissa carandus* were great sources of minerals and micronutrients. Therefore, they were used as promising species for promoting farming systems suffering from crop loss, food shortage, and chronic malnutrition. Intercropping during the initial years of an orchard of bael, chironji, wood apple, and jamun had no adverse impact on plant growth up to seven years. This can be extended to three more years if the spacing is increased to 10 m × 10 m, which can be expected to increase an income 2–3 times higher (Singh et al., 2020). Generally, the productivity of native and naturalized UEFS of the IGP is very low compared with other major fruit crops grown in India; this might be attributed to the low productivity of soil, species established through natural regeneration, and eventually bearing fruits with inferior quality after a long gestation period. Hence, to solve such major constraints, there is a critical need to develop improved varieties and package of practices, and further demonstrate and expose the established fruit-based farming models to the growers for popularizing the UEFS.

#### 3.6.3. Utilization

UEFS are eaten worldwide as raw, unripe, and cooked forms as it covers the greatest area (FAO, 2011). However, its consumption has gradually decreased due to the introduction of exotic fruits, undervaluation and utilization of native fruits, overpopulation, urbanization, deforestation, intensive agriculture, and numerous other factors (Deshmukh and Waghmode, 2011). UEFS have been playing a dual role in supplementing the community with food and income and buffering food rescuing lives during food shortages and famines (Grivetti and Ogle, 2000). In a community, their traditional knowledge, demand, availability in terms of duration and distance, tastes, and preferences influence the exploitation of UEFS in a particular area. Poverty and undernourishment are prevalent in the IGP, while the present study hints that the UEFS can help to substantiate the food and nutrition security in this region. Hence, there is a need for a strong linkage between nutritious food security and biodiversity for the formulation of policy support to promote the utilization, value addition, and conservation of UEFS (Grivetti and Ogle, 2000).

#### 3.6.4. Marketing

Improvement in infrastructure and processing technology will be needed for cleaning, grading, drying, cooling, storage, and handling of produce to improve their quality and self-life, reduce losses and cost of transportation, and to increase income and employment opportunities, particularly in rural areas. Promoting UEFS-based small food industries will contribute to sustainable rural development by providing manyfold employment opportunities in agro-based industries, packaging, storage, preservation, transportation, marketing, and various other sectors. In addition, a detailed survey is needed for exploring market potential and developing linkages. Furthermore, creating awareness and providing training to various stakeholders through various central and state government schemes helps to gain a proper marketing strategy. There is a need for financial, policy, scientific, and technical support for the effective marketing of UEFS.

### 3.7. Implications for LDN

Earlier studies show a successful restoration of various degraded and denuded ecosystems such as degraded forests (Babu et al., 2009), mined areas (Ahirwal and Pandey, 2021), and marginal and wastelands (Ghosh et al., 2021). Successful long-term case studies, research collaboration from various disciplines, and integration of practitioner and policy support are important to achieve LDN with the help of restoration science. The degradation and denudation of forest ecosystems mainly through anthropogenic activities is a major driver of biodiversity loss, carbon (C) emission, and uncertainty of food and livelihood for forest-dependent communities. Greenhouse gases such as carbon dioxide ($CO_2$), nitrous oxide ($N_2O$), methane ($CH_4$), carbon monoxide (CO), chlorofluorocarbons (CFC), etc., increase the earth's temperature; among them, $CO_2$ is the key gas playing role in global warming, which leads to climate change (Lal,

2004; Sarkar et al., 2020). These climate-change induced floods, droughts, etc., are degrading soil productivity, crop yields, and environmental quality (Rakesh et al., 2019). Additionally, human-induced intensive agriculture is also degrading the productive soils (Srinivasarao et al., 2021). According to the data published by the Indian Council of Agricultural Research (ICAR) and National Academy of Agricultural Sciences (NAAS) in 2010, there is about 120.72 Mha of land degraded out of 328.73 Mha. Thus, sequestration of atmospheric C would be the possible solution for improving soil quality, yield sustainability, and climate change mitigation (Lal, 2004; Rakesh et al., 2020; 2022a). Planting trees through agroforestry would help in achieving restoration of degraded lands (Rakesh et al., 2022b), and plantation forestry helps in improving the soil C sequestration and nutrient dynamics through continuous litter fall (Dinesha et al., 2020; 2024).

Restoration of ecosystems degraded due to mining is a more challenging task than degraded forests or wastelands because of inadequate hydrological and topographical features and soil physicochemical and biological properties (Ahirwal and Pandey, 2021). Successful afforestation or reforestation measures mainly include assisted natural regeneration, planting or sowing of native seeds or promising naturalized species, improving edaphic and topographic factors, drainage, and hydrological features, and protecting from various biotic and abiotic damages such as fire, flood, grazing, and invasive species (Babu et al., 2009). The most prominent effects on the success of restoration of the planted native and naturalized species depend on the climate, existing natural vegetation, hydrological features, and soil quality. The reclamation, rehabilitation, and restoration of degraded ecosystems such as marginal and wastelands have intensively been studied in India and provided effective methods for the management of degraded marginal and wastelands (Babu et al., 2009; Ghosh et al., 2021). However, region-specific models are vital for effective restoration through vegetation intervention in various geographical regions of India including the IGP. These UEFS like bael, jamun, tamarind, chironji, khirni custard apple, etc., are climate smart, meaning they can survive in harsh climates and can be established on degraded lands (Singh et al., 2020). UEFS have great potential for establishment on marginal and wastelands throughout the GP region. These resilient fruit species apart from feeding humans also augment biodiversity, ecosystem, and landscape. This study suggests the integration of these native and naturalized UEFS for achieving India's national commitment to LDN. Of the 196 countries, 123 countries committed to LDN including India as they participated in the 14th Conference of Parties (COP14) to the United Nations Convention to Combat Desertification (UNCCD) in 2019. India, therefore, committed to 26 Mha of degraded land to restore land productivity and ecosystem services by adopting a landscape restoration approach. The integration of UEFS to achieve LDN through afforestation or reforestation in various degraded, denuded, and marginalized ecosystems has been illustrated in Figure 7. The study we have conducted is based on data from published literature; further fieldwork is needed for cultivational aspects, in-depth analysis of biochemical characteristics, and a record of indigenous knowledge through ethnobotanical investigations.

### 3.8. Current status: risks and conservation

The convention on biological diversity recognizes the sovereign right of each country over their biodiversity, and it is therefore necessary to strengthen their scientific and technological capabilities to ensure this sovereignty (Prakash, 2011). Documentation, evaluation, and prioritization of endemic, endangered, and threatened plant species and their conservation for sustainable utilization is a vital concern (Singh et al., 2020). UEFS have remained neglected in many regions of the country, including the GP, and some of the genetic resources of these species are still available in outfields or forests. Apart from this, some are in the hands of tribals and local communities, and they use it solely for their subsistence while also protecting it as part of their folkloric responsibilities. The diversity of some of the UEFS is yet to be explored and there is a discontinuity between the species and regions in terms of scientific research, collection, documentation, and sustainable utilization. There is a need for intensive species-specific surveys and explorations in target variability pockets in diversity-rich areas of the IGP for systematic evaluation, characterization, and conservation of indigenous germplasm. Some of the improved varieties such as bael, jamun, chironji, and tamarind need to be planted on a commercial scale at farmer's field with assured incentives and technical support. There is a need for scientific, technical, financial, and policy provisions for maintaining a large number of diverse germplasms of UEFS of the IGP in the field repository.

### 3.9. Researchable issues and the way forward

Research work on UEFS should be expanded (Figure 8) in order to maximize output and economy and overcome disease and pest problems. Furthermore, linking policy makers, researchers, and practitioners may build a strong association between India's national policies and ecosystem restoration initiatives. Nutrition surveys need to be carried out at various levels to understand the use of native and naturalized UEFS in food and nutritional security. Awareness and education about nutrition may help to improve the diversity and quality of complementary foods by using locally available native and naturalized food resources. Further studies are needed for the analysis of nutritional, phytochemical, and therapeutic properties that

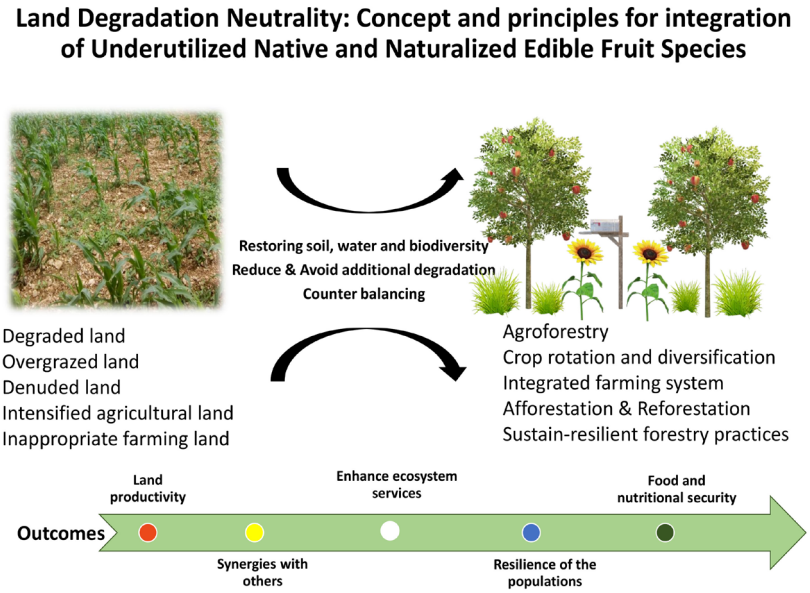


**Figure 7.** Integration of UEFS to achieve LDN through afforestation or reforestation.


**Figure 8.** Researchable issues and the way forward.

will benefit society, and additional studies will also help to improve knowledge about these species' habitats according to the climatic zones of the IGP. Development of improved varieties, quality planting materials and seeds, extension services, postharvest management, preservation, marketing, and transport are vital concerns. Studies on exploration, collection, documentation, and utilization of UEFS would be useful in selecting underutilized nutritious fruit species from wild resources of the IGP. Further research is needed on extension services in terms of creating awareness about new technologies, providing the latest information, and conducting field demonstrations and training programs for the growers. Furthermore, a detailed survey is needed to explore market potential and developing linkage. The intensive species-specific surveys and exploration in target variability pockets in diversity-rich areas of the IGP will be useful for inventory and management purposes. States of the IGP should come up with a clear-cut policy to encourage and promote cultivation, marketing, and utilization of UEFS.

## 4. Summary and conclusion

UEFS play a vital role in the food and nutrition of the people and have potential nutraceutical properties. Many of these enlisted species were economically potential such as edible, medicinal, ornamental, timber, and many other uses. There is a need for coordinated research efforts for the survey, documentation, evaluation, cultivation, and conservation (ex situ and in situ) of UEFS. The inclusion of UEFS through afforestation or reforestation will be effective for conservation and popularization through awareness and providing suitable standardized cultivation practices and developed technologies through training and demonstrations. In addition, developmental activities like supply of quality planting materials and processing units for gear-up of their value-added products at commercial levels through small-scale industries, self-help groups, and farmer-producer organizations are considered necessary. The government should also actively participate in this regard by providing necessary inputs, technical support, and policy interventions through various schemes for the establishment of commercial orchards of these underutilized fruit trees. These fruits are highly adaptable and show resistance to various insect pests and diseases; hence, pesticide and other chemical requirements are almost negligible. Thus, they can fit well into organic and natural farming, as they require less attention from the cultivars. On the other hand, the government is giving more emphasis on promoting indigenous species through the slogan 'vocal for local' and 'local for global'.

There is a gap between national or state policies and restoration initiatives in India. Replacing natural forests with fast growing nonnative species for timber and other purposes may support economic development but at the cost of losing valuable biodiversity and various ecosystem services. Many studies and projects are already available at the national and state levels. However, we lack region-specific technologies that are accepted by the poor farmers with fragmented land holdings and fewer technological inputs. This must be considered by the government while framing policies for sustainable, environmental, and economic developments, so that we can connect loose links between researchers, policymakers, and practitioners. This study suggests that the integration of these UEFS in LDN programs through afforestation and reforestation can provide food and nutritional security and health benefits, restore degraded land, and also help in the conservation of indigenous species. India's commitment to LDN by 2030, outlined in the 14th Conference of Parties of the United Nations Convention to Combat Desertification (UNCCD), to restore 26 Mha of degraded area, can also be addressed. Ensuring sustain-resilient production of foods with increasing resource use efficiency and neutralizing land degradation is vital. So that it also contributes to the United Nations Sustainable Development Goals of no poverty, zero hunger, climate action, and good health and well-being in addition to increasing food and nutritional security by 2030.

In conclusion, this systematic review has provided some illumination on all facets of the UEFS and is anticipated to serve as a guide for practitioners integrating the UEFS, a point of reference for researchers interested in delving into its myriad fascinating facets, and a tool for policymakers crafting sustainable and scientifically sound policies in the IGP region.

### Contribution of authors

Conceptualization: RS; DS (Dinesha S). Literature search: DS (Dinesha S); RS; DS (Deepranjan Sarkar); PKJ; Shikha. Writing—original draft preparation: DS (Dinesha S); RS; DS (Deepranjan Sarkar). Writing—review and editing: RS; DS (Deepranjan Sarkar); PKJ; RB; Shikha; SKK; VS; AR; RD; SE. Figure: RS; DS (Dinesha S); DS (Deepranjan Sarkar); RB.

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### Data availability

The data used to support the findings of this study are available from the corresponding author upon request.

### Conflict of interest

The authors declare that they have no conflict of interest.

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**Supplementary Table.** General account on reported UEFS, significance, IUCN status and references.

| Sl. No. | Scientific name and family | Common name | Life form | Origin | Flowering-fruiting | State | Nutritional status | Part used and products | Other significance | IUCN Status | References |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Acanthaceae** | | | | | | | | | | | |
| 1 | *Avicennia marina* (Forssk) Vierh. | Grey mangrove/ Peyara ban | T | Native | February–August | WB | Rich in phytochemicals | Eaten raw by the local people | Medicinal, insect repellent, dye, tannins, timber | LC | Mitra and Mukherjee (2009) |
| **Achariaceae** | | | | | | | | | | | |
| 2 | *Gynocardia odorata* R. Br. | Chaulmogra | T | Native | March–December | WB | Fruit and seeds | Crude oil from seeds | Medicinal | NE | Rymbai et al. (2016) |
| **Actinidiaceae** | | | | | | | | | | | |
| 3 | *Actinidia callosa* Lindl. | Tekhiphal | S | Native | April–August | UP; WB | Nutritionally rich | Eaten raw | Folk medicine | NE | Jeeva (2009) |
| 4 | *Saurauia punduana* Wall. | Pandua Gogan | T | Native | April–December | WB | Nutritious berry fruit used | Fruits are boiled and pickles are prepared | Firewood and charcoal | CR | Laha et al. (2018) |
| **Adoxaceae** | | | | | | | | | | | |
| 5 | *Viburnum foetidum* Wall. | Himalayan Viburnum | S | Native | May–September | BR; WB | Sweet fruit | Drupe fruit eaten raw | Medicinal use | LC | Rymbai et al. (2016) |
| **Alangiaceae** | | | | | | | | | | | |
| 6 | *Alangium salvifolium*(L.f.) Kuntze | Ankol | T | Native | February–May | BR; UP; WB | Fruits used | Pulp of fruit is edible | Fruit powder for burning and root bark for diarrhoea | NT | Ahirwar (2015) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **Anacardiaceae** | | | | | | | | | | | |
| 7 | *Anacardium occidentale* L. | Cashew | T | Naturalized | January–May | BR; UP; WB | Nutrient-dense fruit | Eaten raw or used in culinary and wine making | Medicinal values | LC | Barooah and Ahmed (2014) |
| 8 | *Buchanania lanzan* Spreng. | Chironji | T | Native | January–May | BR; UP; WB | Nutritious seed | Sold locally | Fruit is laxative | LC | Shivprasad et al. (2016) |
| 9 | *Choerospondias axillaris* (Roxb.) B.L Burtt & A.W. | Hill Hog plum/ Bonamra | T | Native | January–June | WB | Sour fruit used | Ripped fruit eaten raw | Medicinal | LC | Khruomo and Deb (2018) |
| 10 | *Lannea coromandelica* (Houtt.) Merr. | Jhingan / Bonamra | T | Native | March–June | WB | Fruits are eaten or cooked | Pickles making | Commercial gum and medicinal use | LC | Dhore et al. (2012) |
| 11 | *Mangifera blommesteinii* Kosterm. | Wild mango | T | Native | January–June | WB | Sour fruit used | Harvested from the wild for local use | Folk medicine | EN | Paul (2013) |
| 12 | *Mangifera sylvatica* Roxb. | Bon Am/ Himalayan or Nepal Mango | T | Native | April–September | BR; UP; WB | Unripe and ripe fruits | Jam, pickle | Folk medicine | VU | Abdullah et al (2020) |
| 13 | *Pegia nitida* Colebr | Pegia | S | Native | January–May | WB | Acidic and aromatic fruits | Whole fruit is eaten raw | Medicine use | LC | Singh and Asha (2017) |
| 14 | *Rhus chinensis* Mill. | Nutgall tree/ Bhalay | T | Native | December–April | WB | Fruit as a digestive | Eaten raw | Medicinal (Dysentery) | LC | Mitra and Mukherjee (2009) |
| 15 | *Spondias axillaris* Roxb. | Theseli | T | Native | February–December | WB | fruits are rich in vit C | Eaten raw, pickled and processed food | Medicinal | LC | Bhutia et al. (2018) |
| 16 | *Spondius cythera* Sonn | Amra Hog Plum | T | Native | July–August | WB | Ripe fruits eaten raw | Chutney and culinary use | Ayrvedic properties, | LC | Paul (2013) |
| 17 | *Spondias pinnata* (L.f.) Kurz | Hog plum (Means, Pigs feedstuff) | T | Native | April–June and August–September | BR; UP; WB | Sour in taste | eaten raw or as chutney, pickles, jams, jellies, juices | Medicine (dysentery) | LC | Abdullah et al. (2020) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **Annonaceae** | | | | | | | | | | | |
| 18 | *Annona reticulata* L. | Ramphal/ Nag-hawa | T | Native | February–October | BR; UP; WB | High in sugar and vitamins | Eaten raw | Seed used as medicine | LC | Mitra and Mukherjee (2009) |
| 19 | *Annona muricata* L. | Lakshman phal | T | Native | April–October | BR; UP; WB | Tryptophan, vitamins and mineral rich | Eaten raw | Used as medicine | LC | Mitra and Mukherjee (2009) |
| 20 | *Miliusa macrocarpa* Hook.f.Thomson | - | T | Native | April–November | WB | Nutritious fruits collected | Fruits eaten raw | - | NE | Singh and Asha et al. (2017) |
| 21 | *Polyalthia suberosa* (Roxb.) Thwaites | Gua koli | T | Native | April–August | BR; WB | Rich in minerals | Fruits edible | Medicinal | NT | Mahapatra et al. (2012) |
| 22 | *Uvaria cordata* (Dunal) Alston | Maladi/ Cananga | C | Native | June–August | BR; WB | Sweet in taste | Fruits are used | Medicine and fibre use | NE | Singh et al. (2001) |
| 23 | *Uvaria lutea* Roxb. | Uvaria grape | T | Native | June–August | BR; WB | Sweet and edible | Used locally | Firewood | NE | Laha et al. (2018) |
| 24 | *Uvaria tomentosa* Roxb. | Dom-Sal/ Hoom | T | Native | April–July | UP | Nutrient-dense fruit | Fruit is eaten | Medicinal use | NE | Prakash (2011) |
| 25 | *Uvaria velutina* Dunal | Beri | T | Native | February–October | UP | Nutrient-dense fruit | Fruit cooked and used as a vegetable | Folk medicine | LC | Prakash (2011) |
| **Apocynaceae** | | | | | | | | | | | |
| 26 | *Carissa carandus* L. | Karonda | T | Native | February–June | BR; UP; WB | Rich in iron and vitamins | Pickled, jam, jelly, syrup and chutney | Used for toxicity and bronchitis | LC | Banarjee et al. (2013) |
| 27 | *Carissa opaca* Stapf. | Kanod | S | Native | February–June | BR | Rich in minerals | Eaten raw | Folk medicine | LC | Kumar (2016) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 28 | *Holarrhena pubescens* Wall. ex G. Don | Kurchi | T | Native | February–July | WB | Nutritious flowers and seeds | Flowers and seeds were used | Medicinal (Tumor and snake bite) | LC | Prakash (2011) |
| 29 | *Holostemma ada-kodien* Schult. | Chirvel | C | Native | September–December | BR; UP; WB | Rich in minerals | Fruits are eaten | Medicinal | VU | Singh et al. (2001) |
| 30 | *Leptadenia pyrotechnica* (Forssk.) Decne. | Khimpoli | S | Native | February–March | UP | Pod like fruits are used | Cooked as vegetables | Folk medicine, fodder and fiber for making ropes | LC | Barooah and Ahmed (2014) |
| 31 | *Willughbeia edulis* Roxb. | Aguh Gitan | C | Native | May–August | WB | Acidic pulp | Fruit is eaten by tribals | Latex used as medicine | NE | Barooah and Ahmed (2014) |
| **Arecaceae** | | | | | | | | | | | |
| 32 | *Borassus flaballifer*L. | Doub palm/ tala palm/ ice apple | T | Native | March–April and July–September | BR; UP; WB | Sweet sap from flowers | Fruit and seed eaten raw, pickled and jiggery making | Folk medicine, ornamental, thatching and fuel | LC | Mondal (2019) |
| 33 | *Calamus flagellum* Griff. ex Mart. | Putli bet/ Rab bet | T | Native | June–November | WB | Fruit eaten | Fruit is used | PBI; Medicinal, furniture industry | EN | Mondal (2019) |
| 34 | *Calamus floribundus* Griff. | Lejai/Tenga Bet | T | Native | April–August | WB | Fruit eaten | Fruit pulp is used | PBI; Medicinal, furniture industry | EN | Mondal (2019) |
| 35 | *Calamus gracilis* Roxb. | Chulibet | T | Native | April–February | WB | Fruit eaten | Fruit pulp is used | PBI; Religious use | NT | Mondal (2019) |
| 36 | *Calamus inermis* T. Anderson | - | T | Native | July–August | BR; WB | Fruit eaten | Fruit pulp is used | PBI; High quality and most traded | CR | Rymbai et al. (2016) |
| 37 | *Calamus pseudotenuis* Becc. | Betgara, Otla bet | T | Native | December–May | WB | Fruit eaten | Fruit pulp is used | Fruits for diabetes | EN | Mondal (2019) |
| 38 | *Calamus tenuis* Roxb. | Heiri/ Rattans | T | Native | March–April | BR; WB | Highly acidic fruit | Used as digestive | PBI; Medicinal and furniture use | LC | Singh et al. (2015) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 39 | *Calamus viminalis* Willd. | Rattan | T | Native | July–August | BR; WB | Ripe fruits | Ripe fruit occasionally eaten | PBI; Shoot edible, medicinal | LC | Abdullah et al. (2020) |
| 40 | *Daemonorops jenkinsiana* (Griff.) Mart. | Golak Bet/ Golla Bet | T | Native | July–May | WB | Fruit eaten | Fruit pulp is used | Fruit eaten by wildlife | NT | Mondal (2019) |
| 41 | *Caryota mitis* Lour | Fishtail Palm | T | Native | January–June | BR; WB | Flower and ftuits used | Sap for making wine and sugar | Medicine | LC | Laha et al. (2018) |
| 42 | *Caryota urens* L. | *Sugar palm/ Jaggary Palm* | T | Native | January–April | BR; UP; WB | Rich in sugar | Making Jaggery and country liquor | Construction and seeds used in place of betel nut | LC | Patiri and Borah (2007) |
| 43 | *Corypha taliera* Roxb. DC. | Tali Palm/ Talipalm | T | Native | October–February | WB | Sweet in taste | Fruit is used | Monocarpic species and few are present in Kolkatta, India | EW | Johnson (1998) |
| 44 | *Corypha utan* Lamk. | Gebang Palm/ Buri Palm | T | Native | November–April | WB | Sweet kernals used | Fruit and seeds used as vegetable | Thatching, fibre and floor mats | LC | Mondal (2019) |
| 45 | *Corypha umbraculifera* L. | Talipot Palm/ Bene Tali | T | Native | November–April | BR; WB | Sweet sap collected | Edible starch and liquor | Thatching, rope and floor mats | DD | Mondal (2019) |
| 46 | *Licuala peltata* Roxb. ex Buch.-Ham. | Chatapat | T | Native | September–May | WB | Flower and fruit used | Edible fruit | Thatching and rope | CR | Mondal (2019) |
| 47 | *Livistona jenkinsiana* Griff. | Tokon/ Talainyom | T | Native | February–December | WB | Sweet in taste | Edible starch and liquor | Thatching, fibre and rain coat | NT | Mondal (2019) |
| 48 | *Lasia spinosa* (L.) Thwaites | Kantakochu | H | Native | July–August | WB | Sweet in taste | Eaten raw | Medicinal value | LC | Mitra and Mukherjee (2009) |
| 49 | *Nypa fruticans* (Thumb.) Wurmb | Golpata Nipa palm | T | Native | November–July | WB | Sap for making wine and sugar | Juice is collected and fruit is eaten like Taal | Medicinal | LC | Paul (2013) |
| 50 | *Pinanga gracilis* Blume | Golden palm | T | Native | April–March | BR; WB | Ripe seeds consumed | Seeds eaten like areca nut | Folk medicine | NE | Singh and Asha (2017) |

**Supplementary Table.** (Continued.)

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 51 | *Phoenix acaulis* Buch.-Ham. ex Roxb. | Stemless date palm | T | Native | January–April and May–June | WB | Fleshy sweet pulp of fruit is eaten | Eaten raw | Medicinal | NT | Mondal (2019) |
| 52 | *Phoenix loureiroi* Kunth | Dwarf date palm | T | Native | October–December | BR; WB | Rich in sugar | Eaten raw | Medicinal, household brooms | LC | Mondal (2019) |
| 53 | *Phoenix paludosa* (L.) Roxb. | Hetal | T | Native | January–February and May–July | BR; WB | Rich in sugar | Eaten raw | Medicinal | NT | Mondal (2019) |
| 54 | *Phoenix rupicola* (T.) Anderson | Cliff date palm | T | Native | April–August and September–November | WB; BR | Fruit used | Eaten raw | Medicinal, ornamental | NT | Mondal (2019); Hosen et al. (2020) |
| 55 | *Phoenix sylvestris* (L.) Roxb. | Silver date palm/ Indian date | T | Native | May–June | BR; UP; WB | Rich in sugar | Eaten raw | Medicinal, molasses, Jaggery, toddy | LC | Banarjee et al. (2013); Paul (2013) |
| 56 | *Trachycarpus martianus* H.Wendl. | Martius' fan palm | T | Native | March–September | WB | Sweet in taste | Fruit and flowers are edible | Thatching | NT | Mondal (2019) |
| **Asclepiadaceae** | | | | | | | | | | | |
| 57 | *Cynanchum barbigerum* (Scheele) Shinners | Badmashia | C | Naturalized | - | UP | Nutrient-dense fruit | The young fruits are sweet and edible | - | NE | Ahirwar (2015) |
| 58 | *Pentanura khasiana* Kurz | Khasi Swallow-Root | C | Native | May–November | BR; WB | Sweet fruit consumed | Eaten raw | Fodder and Folk medicine | NE | Laha et al. (2018) |
| **Berberidaceae** | | | | | | | | | | | |
| 59 | *Berberis aristata* DC. | Indian Barberry | S | Native | March–June | BR; UP; WB | Sweet juicy fruits | Fruit eaten raw locally | Country liquer, dye and tannin | LC | Singh et al. (2001) |
| 60 | *Berberis asiatica* Roxb. Ex. DC. | Asian Barberry | S | Native | March–June | BR; UP; WB | Juicy and acid flavor | Fruit used to make the Indian raisins | Traditional medicine | LC | Singh et al. (2001) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bignoniaceae** | | | | | | | | | | | |
| 61 | *Crescentia cujete* L. | Ban Bael; calabash tree | T | Naturalized | July–November | WB | Fruit and Shell used | Young fruit is pickled | Medicinal and ornamental use | LC | Biswas et al. (2018) |
| 62 | *Oroxylum indicum* (L.) Kurz | Indian trumpet/ Broken bones | T | Native | January–June | BR; UP; WB | Whole fruit used as vegetable | Eaten raw, Vegetable | PBI; Medicinal, ornamental, wood, and dye | LC | Dwivedi (1993); Lim (2012) |
| **Bombacaceae** | | | | | | | | | | | |
| 63 | *Bombax ceiba* L. | Cotton tree/ Semul | T | Native | February–June | BR; UP; WB | Flower and fruit used | Eaten raw or cooked as a vegetable | Medicinal | LC | Bose et al. (2015) |
| 64 | *Durai zebethinus* L. | Durian | T | Naturalized | June–August | WB | Fruit used | Pulp and seeds eaten, jam and jelly gives energy | Medicine | VU | Paul (2013) |
| **Boraginaceae** | | | | | | | | | | | |
| 65 | *Cordia dichotoma* Forst. | Bhokar | T | Native | March–May and June–August | BR; UP; WB | Rich in amino acids and mineral | Vegetable and in preparation of chatnes. | | | |
| 66 | *Cordia myxa* L. | Assyrian plum | T | Native | July–August | BR; UP; WB | Rich in minerals and vitamins | Pickles, Fruits eaten | | | |
| 67 | *Ehretia acuminata* (DC.) R. Br. | Koda | T | Native | January–June | BR; UP; WB | Sweet and nutritious fruit | Fruit eaten raw | | | |
| 68 | *Ehretia laevis* Roxb. | Koss phang | T | Native | January–June | BR; UP; WB | Sweet fruits | Fruit eaten raw or used as medicine | | | |
| **Burseraceae** | | | | | | | | | | | |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 69 | *Garuga pinnata* Roxb. | Jum | T | Native | January–June | WB | Drupe fruit used | Fruit eaten raw | | | |
| 70 | *Garuga Floribunda* Decne. | | T | Native | January–June | WB | Nutritious fruit | Eaten raw | | | |
| 71 | *Protium serratum* Engl. | Niyar/ Gutgutiya | T | Native | March–July | BR; WB | Antioxidants | Sour fruits used in wine, and pickle | | | |
| **Cactaceae** | | | | | | | | | | | |
| 72 | *Opuntia aciculata* Griffiths | Nagphani | S | Naturalized | December–June | UP | Sweet fruits are collected | Eaten fresh fruits | | | |
| 73 | *Opuntia dillenii* Ker Gowl. | Prickly pear | S | Naturalized | March–December | UP | Sweet in taste | Eaten raw | | | |
| 74 | *Opuntia elatior* Mill. | Nagaphani | S | Naturalized | June–November | UP | Rich in nutrients | Eaten raw | | | |
| 75 | *Opuntia ficus-indica* (L.) Mill. | Nepal fig opuntia | S | Naturalized | March–December | BR; UP; WB | Nutritious fruits | Fresh fruits eaten raw | | | |
| **Caesalpiniaceae** | | | | | | | | | | | |
| 76 | *Cynometra iripa* Kostel. | Wrinkle Pod Mangrove | T | Native | November–March | WB | Fruits used | Eaten raw and cooked | | | |
| 77 | *Tamarindus indica* L. | Imli | T | Naturalized | January–April | BR; UP; WB | Sweet and sour rich in vitamins | Used in sauces, curries, chutneys, boiled or fried kernels eaten | | | |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cannabaceae** | | | | | | | | | | | |
| 78 | *Celtis australis* L. | Nettle tree | T | Native | April–July | UP | Ripen fruits used | Eaten raw | | | |
| 79 | *Celtis timorensis* Span. | Stinkwood | T | Native | May–April | WB | Nutritionally rich | Eaten raw | | | |
| **Capparaceae** | | | | | | | | | | | |
| 80 | *Capparis aphylla* Roth | Karira/Karil | S | Native | March–September | UP | Nutrient-dense fruit | Eaten raw or pickled | | | |
| 81 | *Capparis spinosa* L. | Caper bush/ Kalavari | S | Native | April–September | BR; WB | Nutritious fruits | Fruits are eaten raw | | | |
| 82 | *Capparis zeylanica* L. | Hurhure | S | Native | February–November | BR; UP; WB | Rich in sugars and vitamins | The unripe fruits are used as vegetables | | | |
| 83 | *Stixis suaveolens* (Roxb.) Pierre | Madhubilata/ Madhumalati | C | Native | February–January | BR; UP; WB | Rich in bio-active compounds | Ripe fruit is aromatic and sweetish | | | |
| **Celastraceae** | | | | | | | | | | | |
| 84 | *Celastrus paniculatus* Willd. | Mal-kangoni/ Climbing staff | C | Native | April–September | BR; UP; WB | Nutritious fruits | Fruits are edible | | | |
| 85 | *Gymnosporia senegalensis* (Lam.) Loes. | Confetti/ Red spike thorn | T | Native | June–October | BR | Flower and fruits | Used as vegetable | | | |
| **Clusiaceae** | | | | | | | | | | | |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 86 | *Garcinia acuminata* Planch. & Triana | Bacuri | T | Native | March–August | WB | Sour fruits | Eaten raw | | | |
| 87 | *Garcinia atroviridis* Griff. | Asam gelugur | T | Native | April–September | WB | Extremely sourish fruit | Fresh fruits are sliced, sun dried and used in curries | | | |
| 88 | *Garcinia brevirostris* Scheff. | - | T | Native | April–September | WB | Sourish fruit | Pickled | | | |
| 89 | *Garcinia cambogia* (Gaertn.) Desr. | Gambooge/ Malabar tamarind | T | Native | March–May and August–November | BR; WB | fruit used in traditional recipes | Used in cooking and seed yields fat a substitute of ghee | | | |
| 90 | *Garcinia cowa* Roxb. ex DC. | Kaophal | T | Native | March–August | BR; WB | Sourish fruit | Ripe fruits used | | | |
| 91 | *Garcinia indica* Roxb. | Kokum butter tree | T | Native | August–January | WB | Fruit in used | Used in juice, jelly and Pickle | | | |
| 92 | *Garcinia kydia* Roxb. | Mangosteen | T | Native | April to July | WB | Sour fruits are source of vitamins | Rind could be dried and stored | | | |
| 93 | *Garcinia paniculata* Roxb. | | T | Native | March–June | WB | Fruit eaten raw | Unripe fruits used to prepare pickles | | | |
| 94 | *Garcinia peduculata* Roxb. | *Sani* | T | Native | March–April | WB | Fruit eaten | Biggest fruit of this genus | | | |
| 95 | *Garcinia stipulate* T. Anderson | Sanakadan | T | Native | April to July | WB | Sourish fruit | Eaten raw | | | |
| 96 | *Garcinia xanthochymus* Hook.f. ex T.Anderson | False Mangosteen/ Mysore Gamboge | T | Native | March–May and August–November | WB | Nutraceutically rich and seeds yield 17% oil | Eaten raw or cooked, used in sherbets, jams, curries, vinegars | | | |
| **Combretaceae** | | | | | | | | | | | |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 97 | *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn. | Arjun | T | Native | June–September | BR; UP; WB | Fruits used | Seeds used | | | |
| 98 | *Terminalia bellirica* (Gaertn). Roxb. | Bahera | T | Native | March–August | BR; UP; WB | Fruit used | Food for several ethnic groups | | | |
| 99 | *Terminalia catappa* L. | Desi-Badam | T | Native | February–August | BR; UP; WB | Sweet seed used | Seeds are sweet and substitute for almond | | | |
| 100 | *Terminalia chebula* Retz. | Haritaki/ Black Myrobalan | T | Native | March–April | BR; UP; WB | Edible fruit and seeds | Seeds as snacks, edible oil, sour fruits for salads, fries,black salt | | | |
| 101 | *Terminalia citrina* (Gaertn.) Roxb. ex Flem. | Yellow Myrobalan | T | Native | March–June | BR; WB | Raw fruit is used | Fruit is confused with myrobalan | | | |
| **Connaraceae** | | | | | | | | | | | |
| 102 | *Rourea minor* Leenh. | (Kalavidhara, Vidhara) | S | Native | April–October | BR; UP; WB | Seed collected | Ripe seeds are edible | | | |
| **Cucurbitaceae** | | | | | | | | | | | |
| 103 | *Cucumis pubescens* Willd | Kachariya | H | Native | Year around | UP | Fruits are collected | Ripe fruits are eaten raw | | | |
| 104 | *Cucumis callosus* (Rottl)Cogn. | Ban kachariya | H | Native | July–October | UP | Nutrient-dense fruit | Ripe fruits are edible and used to make pickle | | | |
| 105 | *Coccinia grandis* (L.) Voigt. | Ivy gourd/ Telakucha | C | Native | June–August | BR; UP; WB | Nutrients and mineral rich | Vegetable and pickle | | | |
| 106 | *Hodgsonia macrocarpa* (Bl.) Cogn. | Lard Seed/ Theboulata | C | Native | February–November | WB | Edible oil | Seed roasted and edible oil produced | | | |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 107 | *Momordica dioica* Roxb. Ex Willd. | Kakro | H | Native | April–August | BR | Rich in sugar, fat and fiber | Used as vegetable | | | |
| **Dilleniaceae** | | | | | | | | | | | |
| 108 | *Dillenia indica* L. | Elephant Apple/Chulta | T | Native | July–August | BR; UP; WB | Unripe and ripe fruits | Chutney and pickle | Medicinal use (abdominal pains) | LC | Abdullah et al. (2020) |
| 109 | *Dillenia pentagyna* Roxb. | Agaii | T | Native | January–July | BR; UP; WB | Used locally | Fruit fried and used as vegetable | Folk medicine | NE | Prakash (2011) |
| **Dipterocarpaceae** | | | | | | | | | | | |
| 110 | *Shorea robusta* Roth | Sal | T | Native | January–June | BR; UP; WB | Fruit pulp and oil used | Pulp eaten and oil used in culinary | Medicinal, resin and wood | LC | Barooah and Ahmed (2014) |
| **Ehretiaceae** | | | | | | | | | | | |
| 111 | *Ehretia acuminate* Roxb. | Pandayan/ Koda | T | Native | March–May | BR; UP; WB | Sweet fruit | Ripe fruit is eaten, and unripe fruit is pickled | PBI, fast growing, birds and bee foraging | LC | Dwivedi (1993) |
| 112 | *Ehretia laevis* Roxb. | Dant-Rang/ Vadhvarni | T | Native | January–April | WB | Fruit used | Fruit is tasteless but is eaten | Ayurvedic and folk medicine use | DD | Barooah and Ahmed (2014) |
| **Elaeagnaceae** | | | | | | | | | | | |
| 113 | *Elaeagnus conferta* Roxb. | Wild olive | S | Native | February–March | BR; WB | Several good fatty acids, | Edible fruit | Medicinal | LC | Rymbai et al. (2016) |
| 114 | *Elaeagnus latifolia* L. | Bastard oleaster/ Soh-sang | S | Native | January–April | BR; WB | Several good fatty acids, | Eaten raw | Medicinal | LC | Rymbai et al. (2016) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 115 | *Elaeagnus pyriformis* L. | Thorny olive | S | Native | November –April | WB | Several good fatty acids, | Fruits are eaten raw or cooked | Medicinal, bee foraging, N fixing | LC | Singh et al. (2015) |
| 116 | *Elaeagnus umbellate* Tunb. | Japanese silvery | S | Native | March–April | BR; WB | Rich in nutrients | Fruit and seed used | Fruit as a digestive | LC | Singh et al. (2015) |
| **Elaeocarpaceae** | | | | | | | | | | | |
| 117 | *Elaeocarpus floribundus* Blume | Jalpai/ Indian olive | T | Native | April–May and August to October | WB | Rich in vitamins and minerals | Pickles and chutney prepared | Medicinal | LC | Abdullah et al. (2020) |
| 118 | *Elaeocarpus rugosus* Roxb. | - | T | Native | April–October | BR; WB | Nutritious fruits | Eaten raw | Construction and firewood | VU | Laha et al. (2018) |
| **Ephedraceae** | | | | | | | | | | | |
| 119 | *Ephedra gerardiana* Wallich ex C. A. Meyer | Asmania/ Ephedra | S | Native | April–July | BR; UP; WB | Seeds collected | Seeds are edible | Used as a stimulant and Ayurvedic medicine | VU | Singh et al. (2001) |
| **Ericaceae** | | | | | | | | | | | |
| 120 | *Gaultheria fragrantissima* Wall. | Eastern Teaberry | S | Naturalized | March–July | BR; WB | Nutritious fruits | Fruits used | Ornamental tree | NE | Singh and Asha (2017) |
| **Erythroxylaceae** | | | | | | | | | | | |
| 121 | *Erythroxylum monogynum* Roxb. | Bastard Sandal or Red cedar | T | Native | Year around | BR; WB | Small fruits | Eaten raw | Medicinal use | LC | Mallick et al. (2020) |
| **Euphorbiaceae** | | | | | | | | | | | |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 122 | *Baccaurea courtallensis* (Wight) Muell. Arg. | Moottipuli | T | Native | January–June | WB | Sweet fruits | Eaten raw | Medicinal value | NT | Barooah and Ahmed (2014) |
| 123 | *Baccaurea motleyana*Muell. Arg. | Rambai | T | Native | April | WB | The pulp is sweet to acid in taste | Eaten raw or cooked or made into jam or wine. | The tree is also used for shade and low-quality wood | LC | Barooah and Ahmed (2014) |
| 124 | *Baccaurea ramiflora* Lour. | Latka | T | Native | March–September | WB | Unripe and ripe fruits used | Consumed fresh locally | Medicinal (used for constipation) | LC | Rymbai et al. (2016) |
| 125 | *Mallotus roxburghianus* Mull. Arg. | Kabaney | T | Native | June–November | BR; WB | Nutritious fruits | Eaten raw | Folk medicine | NE | Singh et al. (2001) |
| **Fabaceae** | | | | | | | | | | | |
| 126 | *Acacia leucophloea* Willd. | Reonja | T | Native | April–November | BR; WB | Nutritious fruits | Pods used, Gum and pods used | Medicinal | LC | Mitra and Mukherjee (2009) |
| 127 | *Bauhinia acuminata* L. | Dwarf White Bauhinia | T | Native | April–August | UP; WB | Collected for local use | Culinary use | Folk medicine | LC | Barooah and Ahmed (2014) |
| 128 | *Bauhinia purpurea* L. | Kanchan | T | Native | January–June | WB | Tender fruits | Fruit and seeds | Medicinal, ornamental | LC | Barooah and Ahmed (2014) |
| 129 | *Bauhinia racemosa* Lam. | Bidi leaf tree | C | Native | February–May | BR; UP; WB | Tender fruits | Flower bud, fruit & seeds as vegetable and pickled | Medicinal and religious | LC | Dwivedi (1993) |
| 130 | *Bauhinia variegate* L. | Kartair | T | Native | February–May | BR; UP; WB | Fruit and seeds | Used as vegetable and roasted. | Medicinal and religious | LC | Barooah and Ahmed (2014) |
| 131 | *Butea buteiformis*(Voigt) Grierson | Bhujetro | T | Native | April–December | BR | Fruit used | Used as vegetable | - | LC | Singh et al. (2001) |
| 132 | *Crotolaria spectabilis* Roth. | Jhunjhuna | S | Native | November–January | BR; UP | Fruit collected | Dried fruit powder is a source of famine food | Folk medicine | NE | Ahirwar (2015) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 133 | *Dalbergia rimosa* Roxb. | Gajai Lota | S | Native | April–December | BR; WB | Seeds collected | Seeds are eaten as pulse by many of the plain tribes | PBI; medicinal use | LC | Dwivedi (1993) |
| 134 | *Entada rheedei* Spreng. | Gila | C | Native | April–July | WB | Seeds collected | Boiled seeds eaten as vegetable | Medicinal | NE | Saha et al. (2013) |
| 135 | *Paracalyx scariosus* (Roxb.) Ali | Ran ghevada | S | Native | January–May | BR | Fruit is acrid and bitter | Improves taste and appetizer | Medicinal use | NE | Singh et al. (2001) |
| 136 | *Pithecellobium dulce* (Roxb.) Benth. | Jungle Jilebi | T | Naturalized | Jan– March | BR; UP; WB | Rich in nutrients | Eaten raw and used in culinary | Ornamental and leguminous | LC | Dwivedi (1993) |
| 137 | *Rhynchosia bracteata* Baker | Jungle sem | C | Native | June–January | BR | Nutritious seeds | Used as a pulse | Medicinal use | NE | Singh et al. (2001) |
| 138 | *Rhynchosia cana* (Willd.) DC. | Snoutbean | C | Native | June–January | BR | Nutritious seeds | Used as a pulse | Medicinal use | NE | Singh et al. (2001) |
| **Fagaceae** | | | | | | | | | | | |
| 139 | *Castanopsis armata* Roxb. | Chinquapin/ chinkapin | T | Native | May–November | WB | Fruit and seeds used | Seeds are roasted or boiled. | Medicinal use | NE | Bhutia et al. (2018) |
| 140 | *Castanopsis indica* (J. Roxb. ex Lindl.) A. DC. | Kathbadam | T | Native | June–November | WB | Nuts are nutritious | Nuts are eaten | PBI; Medicinal use | LC | Saha et al. (2013) |
| 141 | *Castanopsis hystrix* A.DC. | Patlekatus | T | Native | May–June and October–September | BR; UP; WB | Nutritious nuts used | Nuts boiled, perched or roasted | Folk medicine | NE | Bhutia et al. (2018) |
| **Flacourtiaceae** | | | | | | | | | | | |
| 142 | *Casearia tomentosa* Roxb. | Chilla | T | Native | January–May | BR; UP; WB | Fruits are nutritious | Ripe fruit occasionally eaten | Medicinal use | LC | Abdullah et al. (2020) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 143 | *Flacourtia jangomas* (Lour.) Raeusch. | Indian coffee plum/ Panial | T | Native | April–May and August–September | WB | Sweet and tasty | Gently pressed fruits eaten raw and used in jam | Medicinal use (liver problems) | LC | Singh et al. (2015) |
| 144 | *Flacourtia ramontchi* L'Herit. | Kanker/ Katai | T | Native | November–April | UP | Nutrient-dense fruit | Ripe fruits of this plant are edible | Folk medicine | LC | Ahirwar (2015) |
| **Ebenaceae** | | | | | | | | | | | |
| 145 | *Diospyros discolor* Willd. | Velvet apple/ kamagong | T | Native | May–August | BR; UP; WB | Sourish fruit | Pulp is used | Hard and durable wood | VU | Paul (2013) |
| 146 | *Diospyros ferrea* (Willd.) Bakh | Black ebony | S | Native | April–August | BR; WB | Nutritious fruits | Pulp of ripe fruits | Folk medicine | EN | Barooah and Ahmed (2014) |
| 147 | *Diospyros kaki* Thunb. | Kaki/Asian Persimmon | T | Native | April–August | BR; WB | Sourish fruit | Pulp is eaten locally | Folk medicine | LC | Barooah and Ahmed (2014) |
| 148 | *Diospyros lanceifolia* Roxb. | Malayan Ebony | T | Native | April–February | BR; WB | fragrant flowers and fruits used | Fruits used locally | Hard and durable wood, seeds are ichthyotoxic | LC | Sarkar (2021) |
| 149 | *Diospyros lotus* L. | Date-plum | T | Native | April–September | WB | Nutrient-dense fruits used | Fruits used locally | Folk medicine | NE | Sarkar (2021) |
| 150 | *Diospyros malabarica* (Desr.) Kostel. | Malabar ebony | T | Native | April and June–September | UP; WB | Both ripe and unripe fruits | Raw fruits are used | Uses in Ayurveda, dye and guitar manufacturing | EN | Abdullah et al. (2020) |
| 151 | *Diospyros melanoxylon* Roxb. | Tendu | T | Native | During summer | BR; UP; WB | Rich in phenols and fibre. | Fruits pulp is used | PBI; Folk medicine | NT | Kaur and Fatima (2018) |
| 152 | *Diospyros montana* Roxb. | Mottled ebony | T | Native | April– May and June–August | UP; WB | Nutritious fruits | Eaten fresh, sold in the local market, | Wood used, folk medicine, Bidi making | LC | Kaur and Fatima (2018) |
| 153 | *Diospyros rammiflora* Roxb. | Uri Gab | T | Native | April–June | BR; WB | Ripe fruits | Ripe fruit rarely eaten. | Medicine | LC | Abdullah et al. (2020) |

**Supplementary Table.** (Continued.)

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| **Hippocrateaceae** | | | | | | | | | | | |
| 154 | *Salacia chinensis* L. | Lolly berry | S | Native | February–October | WB | Ripe fruit used | Pulp is eaten | Folk medicine | NE | Singh et al (2001) |
| **Icacinaceae** | | | | | | | | | | | |
| 155 | *Natsiatum herpeticum* Buch. | Climbing Rough-Leaf | T | Native | December–February | WB | Fruits are used | Eaten raw or cooked with fish | - | NT | Bose et al. (2015) |
| **Lamiaceae** | | | | | | | | | | | |
| 156 | *Callicarpa arborea* Roxb. | Khunia | T | Native | May–August | WB | Beautyberry fruits used | Eaten raw | PBI; medicinal and livestock feed | LC | Bose et al. (2015) |
| 157 | *Callicarpa macrophylla Vahl* | Beauty Berry/ Perfumed Cherry | T | Native | September–December | UP | Wild fruits are collected for local use | Nutrimental fruits used | Medicinal (Tumor and diabetes) | NE | Mall and Tripathi (2017) |
| 158 | *Gmelina arborea* Roxb. Ex Sm. | Gamari | T | Native | February–July | WB | Fruit is used locally | Pulp of the fruit used | PBI; medicinal | LC | Bose et al. (2015) |
| **Lardizabalaceae** | | | | | | | | | | | |
| 159 | *Holboelllia latifolia* Wall. | Broad Leaved Sausage Vine | C | Native | February–October | BR; UP; WB | Nutritious fruit | Fruit eaten raw | Folk medicine | LC | Singh and Asha (2017) |
| **Lauraceae** | | | | | | | | | | | |
| 160 | *Beilschmiedia dalzellii* (Meisn.) Kosterm. | Umber | T | Native | March–August | BR; WB | Nutritious fruits | Ripe fruit eaten | Medicine | NE | Singh et al. (2001) |

**Supplementary Table.** (Continued.)

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| **Lecythidaceae** | | | | | | | | | | | |
| 161 | *Careya arborea* Roxb. | Paik | T | Native | March–June | BR; UP; WB | Nutritious fruits | Eaten fresh | PBI; Medicinal | VU | Bose et al. (2015) |
| 162 | *Couroupita guianensis* Aubl. | Cannonball tree | T | Naturalized | November–June | BR; UP; WB | Fruits rarely used | Used locally and used as animal feed | Folk medicine, cultural and religious worth | LC | Barooah and Ahmed (2014) |
| **Linaceae** | | | | | | | | | | | |
| 163 | *Hugonia mystax* L. | Climbing Flax | C | Native | May–October | BR; UP; WB | Nutritionally rich | Fruits eaten raw | Medicine | VU | Anand and Deborah (2017) |
| **Malphigiaceae** | | | | | | | | | | | |
| 163 | *Malphigia punicifolia* L. | West Indian Cherry | S | Naturalized | April–November | WB | Rich sources of vit C | Eaten raw | Medicine use | VU | Paul (2013) |
| **Malvaceae** | | | | | | | | | | | |
| 165 | *Abelmoschus crinitus* Wall. | Ban Bhindi | S | Native | July–December | BR; UP; WB | Nutrient-dense fruits | Fruits are used as a vegetable | Folk medicine | NE | Ahirwar (2015) |
| 166 | *Grewia abutilifolia* W. Vent ex Juss. | Mallow leaved crossberry | T | Native | March–September | BR; UP; WB | Sweet fruits | Consumed by tribals | Used for weight gain, Diarrhea | LC | Deshmukh and Waghmode (2011) |
| 167 | *Grewia asiatica* L. | Phalsa/ Falsa | T | Native | April–September | BR; UP; WB | Sweet and sour acidic fruit | Pickles, beverages, sherbet and squash | Used as an astringent and cooling agent | LC | Banarjee et al. (2013); Paul (2013) |
| 168 | Grewia flavescens Juss. | Donkey berry | T | Native | April–September | BR; UP; WB | Rich source of iron | Eaten raw | Medicinal use | LC | Kumar (2016) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 169 | *Grewia tenax* (Forssk.) Fiori. | White-crossberry | T | Native | March–September | BR; UP; WB | Sweet fruits | Rich in Iron | Medicinal use | LC | Kumar (2016) |
| 170 | *Grewia villosa* Wild. | Hairy-crossberry | T | Native | March–September | BR; UP; WB | Rich in minerals | Eaten raw | Medicinal use | LC | Kumar (2016) |
| 171 | *Hibiscus hispidissimus* Griff. | Mupparacham | S | Naturalized | September–March | BR; WB | Niacin, vit C, Ca and Fe | Used after cooking | anti inflammatory, anthelmintic and used to treat liver | NE | Ajesh et al. (2012) |
| 172 | *Malvaviscus arboreus* Cav. | Lankajoba | H | Naturalized | April–September | WB | Nutritious fruits | Consumed locally | Folk medicine | LC | Bose et al. (2015) |
| **Melastomataceae** | | | | | | | | | | | |
| 173 | *Melastoma malabaricum* L. | Malabar melastome | T | Native | February–November | BR; UP; WB | Rich in carbohydrate | Sweet fruits eaten raw, used in festivals | Medicinal (Diarrhea) and phytoremediation | NE | Biswas et al. (2018) |
| 174 | *Memecylon celastrinum* Kurz; | - | T | Native | May–August | WB | Nutritious fruits | Consumed locally | Firewood, Tool handle | NE | Singh et al. (2015) |
| 175 | *Memecylon edule* Roxb. | Delekair/ Miat | T | Native | April–July | BR; UP; WB | Nutritious fruit | Ripe fruit is eaten | Construction and fruits for wildlife feed | EN | Karthigeyan et al. (2016) |
| 176 | *Memecylon grande* Retz. | Palluvirisa | T | Native | April–November | BR; UP; WB | Rich in minerals | Eaten raw | Folk medicine | VU | Karthigeyan et al. (2016) |
| 177 | *Memecylon lushingtonii* Gamble | - | T | Native | May–July | BR; UP; WB | Rich in nutrients | Eaten raw | Medicine | EN | Karthigeyan et al. (2016) |
| 178 | *Memecylon ovatum* Sm. | Bayan | T | Native | March–November | BR; WB | Fruit collected | Fruits eaten | - | LC | Karthigeyan et al. (2016) |
| 179 | *Memecylon umbellatum* Burm. | Ironwood tree | T | Native | April–November | WB | Fruits collected | Eaten raw | Medicine | EN | Karthigeyan et al. (2016) |

**Supplementary Table.** (Continued.)

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| **Meliaceae** | | | | | | | | | | | |
| 180 | *Aglaia elaeagnoidea* (A. Juss.) Benth. | Yerra aduga | T | Native | November–December and June–July | BR; WB | Fruits acidic in taste | Fruits eaten | PBI; Medicinal, making furniture, instruments and ornamental | LC | Mahapatra and Panda (2009) |
| 181 | *Aglaia edulis* (Roxb.) Wall. | Aglaia | T | Native | May–June | WB | Fruits eaten | Fruits are used | PBI; Medicinal, making furniture, instruments and ornamental | NT | Jeeva (2009) |
| 182 | *Aphanamixis polystachya* (wall) Parker | Pithraj | T | Native | March–May | BR; UP; WB | Edible sweet fruits | Fruits eaten raw | PBI; Ayurveda and folk medicine | LC | Singh et al. (2015) |
| 183 | *Dysoxylum binectariferum* Hook. f. ex Bedd. | Kempu Devadaru/ Karakil | T | Native | February and December | BR; WB | Pulp rich in sugars, fat, minerals and vit C | Seeds are like chestnuts after roasting. | Ayurveda, folk medicine and immune modulatory | EN | Barooah and Ahmed (2014) |
| **Menispermaceae** | | | | | | | | | | | |
| 184 | *Haematocarpus validus* (Miers.) Bakh. f. ex Forman | Blood fruit/ Raktogota/ Agnigola | C | Native | April–August | WB | Rich in vit C | Ripe fruits eaten raw, coloring agent, culinary use | Medicinal use (anemia) | VU | Abdullah et al. (2020) |
| 185 | *Tinospora cordifolia*(Willd.) Miers | Guduchi/ Giloy | C | Native | May–October | BR; UP; WB | Rich in nutrients and minerals | Fruit eaten | Nutraceutical and medicinal use | NE | Bose et al. (2015) |
| 186 | *Tinospora sinensis* (Lour.) Merr. | Malabar Gulbel | C | Native | May–October | BR; UP; WB | Rich in nutrients | Fruit eaten | Immunomodulatory and medicinal use | VU | Bose et al. (2015) |
| **Moraceae** | | | | | | | | | | | |
| 187 | *Artocarpaus altilis* (Park) Fosb. | Bread fruit | T | Naturalized | March–June | WB | Rich in Ca, beta carotene | Eaten raw | Medicinal | NE | Paul (2013) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 188 | *Artocarpus chama* Roxb. | Chapalish/ Cham | T | Native | March–April and May–June | WB | Rich sources of vits A and C | Fruit is eaten raw, and seeds eaten roasted form | Medicinal value (Diabetes and anti-arthritis) | NE | Biswas et al. (2018); Abdullah et al. (2020) |
| 189 | *Artocarpus hirsutus* Lam. | Wild jack | T | Native | December–March | WB | Rich in vitamins and minerals | Eaten raw | Medicinal value | LC | Biswas et al. (2018) |
| 190 | *Artocarpus lacucha* Buch.-Ham. | Monkey Jack/ Barhar | T | Native | March–April and May–June | BR; WB | Rich in minerals and vitamins | Pickle, curries, chutney, and dried fruits | PBI; Medicinal and fodder use | LC | Paul (2013); Abdullah et al. (2020) |
| 191 | *Ficus auriculata* Lour. | Elephant ear fig | T | Native | March–April | BR; UP; WB | Fruits used | Green fruits as vegetable and ripen are sweeter | PBI; Diuretic, laxative and digestive | LC | Singh et al. (2015) |
| 192 | *Ficus benghalensis* L. | Banyan | T | Native | January–July | BR; UP; WB | Nutritionally rich | Raw fruits eaten | Medicinal (respiratory and skin disorders | LC | Bose et al. (2015) |
| 193 | *Ficus benjamina* L. | Bargad | T | Native | December–July | BR; UP; WB | Rich in minerals | Eaten raw or cooked | Folk medicine | LC | Bose et al. (2015) |
| 194 | *Ficus hirta* Vahl | Hairy fig | T | Native | November–April | WB | Ripen sweet fruits | Eaten raw or used as vegetable | A keystone species, medicine, pollination | NE | Anand and Deborah (2017) |
| 195 | *Ficus hispida* L. | Hairy fig/ Kuchuli | T | Native | May–August | BR; UP; WB | Fruit eaten | Culinary use | Medicinal use | LC | Banarjee et al. (2013) |
| 196 | *Ficus nemoralis* Wall. Ex Miquel | Dieng-surme | T | Native | December–February | BR; UP; WB | Sweet fruits eaten | Fruit used | Medicinal use | LC | Anand and Deborah (2017) |
| 197 | *Ficus palmata* Forssk. | Panjab fig/ Bedu | T | Native | June–July | BR; UP; WB | Fruits eaten | Fruit used in foothills of Himalayas | Medicinal, prevent stress | NE | Tomar et al. (2015) |
| 198 | *Ficus racemosa* L. | Cluster fig/ Red river fig | T | Native | March–May | BR; UP; WB | Unripe and ripe fruits | Vegetable, stir-fries, and curries | Medicinal (diarrhea, dysentery) | LC | Paul (2013); Abdullah et al. (2020) |
| 199 | *Ficus religiosa* L. | Aswatha | T | Native | February–June | BR; UP; WB | Rich in nutrients and minerals | Raw fruits eaten | Medicinal (respiratory and skin disorders | LC | Bose et al. (2015) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | *Ficus semicordata* Buch. Ex. Smith | Drooping fig/ Khunia | T | Native | January–December | BR; UP; WB | Rich in nutrients | Raw fruits eaten | Medicinal, food for wildlife, fuelwood | LC | Anand and Deborah (2017) |
| 201 | *Ficus septica* Burm. F. | Hauili | T | Native | January–June | BR; UP; WB | Nutrient rich fruits | Eaten raw | Folk medicine | LC | Paul (2013) |
| 202 | *Ficus sur* L. | Broom cluster fig | T | Native | September–March | WB | Nutrient-dense fruit | Eaten fresh or dried | Folk medicine | LC | Chaudhary et al. (2012) |
| 203 | *Ficus virence*Aiton | Chakkila | T | Native | January–March | BR; UP; WB | Ripe fruits used | Vegetable use | Medicinal | LC | Abdullah et al. (2020) |
| 204 | *Maclura cochinchinensis* (L.) Corner | Dammar | S | Native | April–August | WB | Fruit collected | Ripe fruit | Folk medicine | LC | Singh et al. (2001) |
| 205 | *Morus alba* L. | Mulberry | T | Native | February–June | BR; UP; WB | Sweet and sour fruits | Jam, fodder and green leaf manure | Medicinal | LC | Paul (2013) |
| 206 | *Morus australis* Poir. | Chinese mulberry | T | Naturalized | May–August | BR; WB | Nutrient-dense fruit | Eaten raw, Jam and fodder | Folk medicine | NE | Bose et al. (2015) |
| 207 | *Morus papyrifera* L. | Paper mulberry | T | Native | February–June | BR; UP; WB | Sweet and sour fruits | Jam and fodder | Medicinal | LC | Paul (2013) |
| 208 | *Morus laevigata* Wall. | Himalayan mulberry | T | Native | April–June | BR; UP; WB | Edible sweet and sour fruits | Raw fruits eaten | Medicinal | LC | Bhutia et al. (2018) |
| 209 | *Streblus asper* Lour. | Sheora | T | Native | April–May | WB | Nutrient-dense fruit | Fruits and seeds | Medicinal | LC | Mitra and Mukherjee (2009) |
| 210 | *Streblus taxoides* (Roth) Kurz | Jhumpuri | S | Native | March–May | BR | Nutrient-dense fruit | Fruits as vegetables | Folk medicine | NE | Mahapatra et al. (2012) |
| **Muntingiaceae** | | | | | | | | | | | |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 211 | *Muntingia calabura*L. | Singapore cherry | T | Naturalized | June–December | WB | Nutritious juicy fruit | Eaten raw and wildlife feed | Medicinal, timber and fuel use | LC | Anand and Deborah (2017) |
| **Musaceae** | | | | | | | | | | | |
| 212 | *Musa balbisiana* Colla | Kala | H | Native | April–August | WB | Nutrient-dense fruit | Eaten raw and processed foods | Folk medicine | LC | Bose et al. (2015) |
| **Myricaceae** | | | | | | | | | | | |
| 213 | *Myrica esculenta* Buch. -Ham. | Box myrtle/ Bayberry | T | Native | May– April | BR; UP | Eaten raw, delicious taste | Used in preparing refreshing drinks, jam, jelly | Medicine | NT | Bose et al. (2015) |
| **Myristicaceae** | | | | | | | | | | | |
| 214 | *Horsfieldia kingii* (Hook f.) Warburg | Wild nutmeg | T | Native | February–May | WB | Fruit and seed are edible | Used as a substitute for betel nut | Medicinal (Piles) use | EN | Mallick (2020) |
| 215 | *Semecarpus kurgii* Engl. | Marking nut | T | Native | February–March | WB | Accessory fruit is sweet | Ripen edible fruit | Medicinal | NE | Mallick (2020) |
| **Myrsinaceae** | | | | | | | | | | | |
| 216 | *Ardisia floribunda* Wall. | Coralberry | T | Native | June–February | BR; UP; WB | Nutrient-dense fruit | Eaten raw | Folk medicine | VU | Jeeva (2009) |
| 217 | *Ardisia pardalina* Mez. | Marlberry | T | Native | June–December | BR; UP; WB | Rich in nutrients | Eaten raw | Folk medicine | LC | Jeeva (2009) |
| 218 | *Embelia undulata*(Wall.) Mez | Vidanga | S | Native | June–November | BR; WB | Fruit used | The ripe fruits are eaten | PBI; medicine | NE | Barooah and Ahmed (2014) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **Myrtaceae** | | | | | | | | | | | |
| 219 | *Eugenia roxburghii* DC. | Sagadabatua | T | Native | April–May | BR; WB | Nutritive fruits | Fruit edible | wood | LC | Mahapatra et al. (2012) |
| 220 | *Rhodomyrtus tomentosa* (Alton) Hassk | Koratta | S | Native | January–June | BR; WB | Nutrient-dense fruit | Eaten raw | Medicinal use | LC | Barooah and Ahmed (2014) |
| 221 | *Syzygium aqueum* (Burm.f.) Alston | Watery rose apple | T | Native | January–October | BR; WB | Nutrient-dense fruit | Eaten raw, salads, pickles | Folk medicine | LC | Singh et al. (2001) |
| 222 | *Syzygium cuminii* L. Skeels | Jamun | T | Native | January–May | BR; UP; WB | Fruit rich in Iodine | Fruit and seed | Seed in diabetes and sacred fruits of the Hindus | LC | Paul (2013) |
| 223 | *Syzygium claviforum* (Roxb.) Wall. | Harejamun | T | Native | January–March and March–May | WB | Rich in pectin, Ca, K and Mg | Making juice, jellies | Timber, fuel, cattle food, and dye | LC | Chora et al. (2015) |
| 224 | *Syzygium balsameum* (Wight) Wall. Ex Walp. | - | T | Native | January–May | WB | Nutrient-dense fruit | Fruit is edible | Medicinal use | NE | Chora et al. (2015) |
| 225 | *Syzygium caryophyllatum* (L.) Alston, Handb. | South Indian Plum | T | Native | February–July | BR; WB | Fruit used | Fruit eaten | Folk medicine for diabetes | EN | Singh et al. (2001) |
| 226 | *Syzygium formosum* (Wall.) Masam. | Roseapple | T | Native | January–April | WB | Berry fruit and flowers used | Eaten raw or cooked | Folk medicine | LC | Chora et al. (2015) |
| 227 | *Syzygium fruticosum* DC. | Ban jam | T | Native | January–April | BR; WB | Fruit used | Ripe fruit occasionally eaten. | Medicinal | LC | Abdullah et al. (2020) |
| 228 | Syzygium *glaucissimum* Rathakr. &N.C.Nair | - | T | Native | January–May | BR | Nutrient-dense fruit | Fruit is edible | Medicinal use | NE | Singh et al. (2001) |
| 229 | *Syzygium jambos* (L.) Alston. | Malabar Plum/ Mountain Apple | T | Native | Usually, summer months | BR; WB | Rich in minerals vits B and C | Making preserves, jellies and sweet | Folk medicine, ornamental and charcoal making | LC | Ahirwar (2015) |

**Supplementary Table.** (Continued.)

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 230 | *Syzygium kurzii* (Duthie) N.P.Balakr. | - | T | Native | March–July | WB | Fruit used | Ripe fruits are eaten | Wood as a fuel | NE | Chora et al. (2015) |
| 231 | *Syzygium nervosum* A.Cunn. Ex DC. | Rai juman | T | Native | March–July | WB | Fruit used | Fruit eaten | Folk medicine for diabetes | LC | Chora et al. (2015) |
| 232 | *Syzygium oblatum* (Roxb.) Wall. Ex Steud. | Bunga Dakwat/ Jambu Hutan | T | Native | March–June | WB | Fruit used | Fruit eaten | Folk medicine | LC | Chora et al. (2015) |
| 233 | *Syzygium polypetalum* (Wall.) Merrill & L.M. Perry | Indian bay leaf | T | Native | March–August | WB | Nutrient-dense fruit | Fruit is edible | Medicinal use | LC | Chora et al. (2015) |
| 234 | *Syzygium praecox* (Roxb.) Rathakr. &N.C.Nair | Malabar plum | T | Native | March–June | WB | Nutritional fruits | Fruit is edible | Medicinal use | NE | Chora et al. (2015) |
| 235 | *Syzygium ramosii* (Blume) N.P.Balakr. | - | T | Native | January–July | WB | Fruit used | Edible fruit | - | EN | Chora et al. (2015) |
| 236 | *Syzygium salicifolium* (Wight) J.Graham | Vellamanchi | T | Native | January–May | BR; UP; WB | Nutritive fruits | Fruit edible | Folk medicine | LC | Singh et al. (2001); Ahirwar (2015) |
| 237 | *Syzygium samarangense*(Blume) Merr. & L.M.Perry | Jamrul/ wax apple/ water apple | T | Native | January–March and May–September | BR; WB | Rich in Ca, P, K, Mg, vit C | Eaten raw, salads, pickles | Jambu dweep (India's ancient name) comes from this fruit. | LC | Singh et al. (2001); Biswas et al. (2018) |
| 238 | *Syzygium schmidii* Rathakr. & N.C. Nair | Jambu | T | Native | March–August | WB | Fruit used | Fruit eaten | Folk medicine | NE | Chora et al. (2015) |
| 239 | *Syzygium tetragonum* (Wight) Wall. ex Walp | - | T | Native | January–June | WB | Fruit used | Edible fruit | - | NE | Chora et al. (2015) |
| 240 | *Syzygium toddalioides* (Wight) Walp. | - | T | Native | January–June | WB | Fruit used | Edible fruit | Medicinal use | NE | Chora et al. (2015) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 241 | *Syzygium venosum* DC | - | T | Native | January–July | WB | Fruit used | Edible fruit | - | NE | Chora et al. (2015) |
| **Nelumbonaceae** | | | | | | | | | | | |
| 242 | *Nelumbo nucifera* Gaertn | Lotus/ Kamal | H | Native | April–September | BR; UP; WB | Fruits collected | Seeds eaten raw or roasted | Medicinal use | DD | Bose et al. (2015) |
| **Nymphaeaceae** | | | | | | | | | | | |
| 243 | *Nymphaea nouchali* Burm. f. | Blue lotus/ blue water lily | H | Native | August–October | BR; UP; WB | Fruits collected | Seeds eaten raw or roasted | Medicinal use | LC | Prakash (2011) |
| **Oleaceae** | | | | | | | | | | | |
| 244 | *Chionanthus ramiflorus* Roxb. | Northern olive | T | Native | February–April | BR | Nutrient-dense fruits | Fruit used as a pickle like olives | Folk medicine | DD | Singh et al. (2001) |
| 245 | *Olea ferruginea* Royle | Indian olive | T | Native | January–March | BR; WB | Fruit eaten | Fruit as digestive | Medicinal | NT | Singh et al. (2015) |
| **Opiliaceae** | | | | | | | | | | | |
| 246 | *Opilia amantacea* Roxb. | Opilia | S | Native | February–April | BR; WB | Fruit eaten | Fruit eaten raw | Medicinal | NE | Mallick et al. (2020) |
| **Oxalidaceae** | | | | | | | | | | | |
| 247 | *Averrhoa bilimbi* L. | Bilimbi | T | Naturalized | January–May | WB | Sour and extremely acidic fruit | Pickle, squash, vegetable | PBI; medicinal | LC | Banarjee et al. (2013) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 248 | *Averrhoa carambola* L. | Kam-ranga | T | Naturalized | January–May | BR; UP; WB | Fruit is sour and acidic | Pickle, squash, souring agent | PBI; medicinal (Used for chickenpox) | LC | Banarjee et al (2013) |
| **Pandanaceae** | | | | | | | | | | | |
| 249 | *Pandanus odorifer* (Forssk.) Kuntze | Fragrant screw-pine | T | Native | July – September | WB | An oily and nutty seed | Eaten raw or cooked | Medicinal and oil extracted | LC | Barooah and Ahmed (2014) |
| 250 | *Pandanus andamanensium* Kurz | Keora | T | Native | July – September | WB | Fruits are protein rich | Fruits are eaten cooked | Medicine use | LC | Barooah and Ahmed (2014) |
| 251 | *Pandanus sikkimensis* H. St. John. | Sikkim screw-pine | T | Native | June – August | WB | Nutrient-dense fruit | Fruits are eaten cooked | Folk medicine | NE | Barooah and Ahmed (2014) |
| **Papaveraceae** | | | | | | | | | | | |
| 252 | *Fumaria indica* Pugsley | Bandhania | H | Native | February–April | BR; UP; WB | Nutritive fruits | Eaten raw | Medicinal use | NE | Mitra and Mukherjee (2009) |
| **Papilionaceae** | | | | | | | | | | | |
| 253 | *Erythrina variegata* L. | Tiger's claw/ Indian coral | T | Native | September–April | WB | Nutrient-dense fruits | Eaten raw or cooked | Medicinal use | LC | Shivprasad et al. (2016) |
| 254 | *Galactia tenuiflora* Wight&Arn.var. | *Banakaolata* | T | Native | September–October | BR | Fruits used | Unripe legumes used as vegetable | Folk medicine | LC | Bhagat et al. (2016) |
| **Phyllanthaceae** | | | | | | | | | | | |
| 255 | *Antidesma acidum* Retz. | Sour currant shrub | T | Native | April–August | BR; UP; WB | Edible fruit | Fruit is eaten | Medicinal | NE | Jeeva (2009); Prakash (2011) |

**Supplementary Table.** (Continued.)

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 256 | *Antidesma bunius* Spreng. | Bignay | T | Native | April–August | UP; WB | Edible fruit | Fruit is eaten by locals | Medicinal | NE | Jeeva (2009) |
| 257 | *Antidesma ghaesembilla* Gaertn. | Khudijam | T | Native | June–December | BR; UP; WB | Nutrient-dense fruit | Eaten raw | Fruit used for headaches and fevers | LC | Mahapatra and Panda 2009 |
| 258 | *Bischofia javanica* Blume | Kainjal | T | Native | April–August | BR; UP; WB | Eaten raw | Consumed locally | PBI; Medicinal use | LC | Mitra and Mukherjee (2009) |
| 259 | *Bridelia retusa* (L.) A. Juss | Kasai datun | T | Native | May–August | BR; UP; WB | Nutrient-dense fruit | Earen locally | PBI; Medicinal use | LC | Kumar (2016) |
| 260 | *Bridelia scadens* (Roxb.) Wild | Asan | T | Native | May–August | BR; WB | Nutritive fruits | Eaten raw | Stem bark paste for skin diseases | LC | Prakash (2011) |
| 261 | *Bridelia tomentosa* Blume | Pop-Gun Seed/ Kenidai | T | Native | April–July | BR; WB | Eaten raw | Rich in protein content | PBI; Medicinal use | NE | Mitra and Mukherjee (2009) |
| 262 | *Phyllanthus acidus* (L.) Skeels | Malay gooseberry | T | Native | February–March | BR; WB | Rich in vit C | It tastes sour and tart, used in pickle | Folklore | LC | Singh et al. (2015) |
| 263 | *Phyllanthus emblica* L. | Amla/ Aonla | T | Native | February–March | BR; WB | Rich in vit C | Used in pickle, culinary | Folk medicine | LC | Paul (2013); Abdullah et al. (2020) |
| 264 | *Phyllanthus reticulatus* Poir. | Sikti | S | Native | September–October | WB | Nutritive fruits | Consumed locally | Folk medicine | LC | Bose et al. (2015) |
| 265 | *Securinega virosa* (Rixb.ex Willd.) Baill. | Chitki | S | Native | March–September | BR; UP; WB | Eaten raw | Fruits consumed as raw in forest areas | PBI; Ayurvedic medicine and feed for wildlife | LC | Deshmukh and Waghmode (2011) |
| **Passifloraceae** | | | | | | | | | | | |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 266 | *Plassiflora edulis* Sims | Latabel/ Passion Fruit | C | Naturalized | July–December | WB | Vitamin and iron source | Eaten raw | Folk medicine | NE | Paul (2013) |
| 267 | *Passiflora foetida* L. | Passion fruit | C | Naturalized | July–December | BR; UP; WB | Rich in minerals and fatty acids | Eaten raw fruits and prepare juice, desserts etc | Folk medicine to itching and coughs | NE | Ajesh et al. (2012) |
| 268 | *Passiflora leschenaultia* D.C. | Seemavellari/ nil | C | Naturalized | March–May | BR; WB | Rich in Fibers and vitamins | Eaten raw as well as prepare juice | Medicine | NE | Ajesh et al. (2012) |
| 269 | *Passiflora ligularis* Juss. | Passion fruit/ Sweet grandilla | C | Naturalized | December–May | BR; UP; WB | Rich in Fibers and vitamins | Eaten raw or mixed with yogurts dessert and juice | Medicine and Ayurveda | NE | Ajesh et al. (2012) |
| **Rhamnaceae** | | | | | | | | | | | |
| 270 | *Rhamnus pentapomica* R. N. Parker | - | T | Native | March–April | BR; UP; WB | Nutritious fruit | Fruit is sweet and eaten | Medicinal use | NE | Singh et al. (2001) |
| 271 | *Rhamnus napalensis* (Wall.) Lawson | Biringa/ Biringuti | T | Native | March–June | BR; UP; WB | Rich in nutrients | Eaten raw | Folk medicine | LC | Singh et al. (2001) |
| 272 | *Rhamnus procumbens* | Creeping Buckthorn | T | Native | March–April | UP | Nutritious fruit | Fruit is sweet and eaten | Medicinal use | LC | Singh et al. (2001) |
| 273 | *Ziziphus nummularia* (Burm.f.) Wight & Arn. | Wild jujube | S | Native | March–December | BR | Sweet, and acidic | Eaten raw, pickled, dried, or used for confectionery | PBI; Microhabitat builder, control soil erosion | NE | Kumar (2016) |
| 274 | *Ziziphus oenoplia* (L.) Mill. | Kantai koli | S | Native | April–May | BR; WB | Acidic taste | Eaten raw | PBI | LC | Mahapatra et al. (2012); Abdullah et al. (2020) |
| 275 | *Ziziphus rugosa* Lam. | Tin koli | S | Native | April–May | BR; WB | Sweet and acidic taste | Used in culinary | PBI; medicinal use | NE | Mahapatra et al. (2012) |
| **Rhizophoraceae** | | | | | | | | | | | |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 276 | *Aegiceras corniculatum* (L.) Blanco | Black mangrove | T | Native | April–August | WB | Sweet red fruits | Eaten raw | Medicinal use | LC | Hosen et al. (2020) |
| 277 | *Avicennia officinalis* L. | Indian mangrove | T | Native | April–May | WB | Rich in nutrients | Eaten raw | Folk medicine | LC | Hosen et al. (2020) |
| 278 | *Bruguiera gymnorrhiza* (L.) Lam., Tabl. | Oriental mangrove | T | Native | Year around | WB | Nutritious fruit | Eaten raw | Folk medicine | LC | Hosen et al. (2020) |
| 279 | *Carallia brachiata* (Lour.) Merr. | Daini Jam/ Phanashi | T | Native | October–April | WB | Fruit and seeds | The seed oil is substitute for ghee | Ethnomedicinal | VU | Barooah and Ahmed (2014) |
| 280 | *Ceriops decandra* (Griff.) Ding Hou | Decandra mangrove | T | Native | Year around | BR; WB | Conical fruits | Eaten as a vegetabe | Medicinal use | NT | Hosen et al. (2020) |
| 281 | *Ceriops tagal* (Pers.) C.B.Rob. | Spurred mangrove | T | Native | September–February | BR; WB | Fruits are nutritious | Fruit is boiled and cooked | Medicinal | LC | Dwivedi (1993) |
| 282 | *Rhizophora apiculata* Bl. | Garjan | T | Native | April–September | WB | Nutritious fruit | Eaten raw | Folk medicine | LC | Dwivedi (1993) |
| 283 | *Rhizophora stylosa* Griff. | Spotted/ red mangrove | T | Native | May to September | WB | Fruits are nutritious | Fruit eaten | Medicinal | LC | Hosen et al. (2020) |
| 284 | *Rhizophora mucronata* Poir. | Asiatic mangrove | T | Native | April–September | WB | Fruits are used | Fruit is cooked | Folk medicine | LC | Hosen et al. (2020) |
| 285 | *Xylocarpus mekongensis* Pierre | Nyireh batu | T | Native | April–September | WB | Fruits are nutritious | Fruit is cooked | Medicinal | LC | Hosen et al. (2020) |
| **Rosaceae** | | | | | | | | | | | |
| 286 | *Docynia indica* (Wall.) Decne | Coiled Yam | T | Native | February–November | WB | Fruits collected | Eaten raw | Medicinal | NE | Rymbai et al. (2016) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 287 | *Eriobotrya japonica* Lindl. | Loquat Japanese Plum | T | Native | May to September | WB | Fruits are used | Eaten fresh, good taste | Folk medicine | NE | Paul (2013) |
| 288 | *Fragaria indica* Andrews | Wild strawberry | H | Native | March–April | BR; UP; WB | Sweet fruit eaten | Eaten, jam, jelly and gives energy | Eaten by mammals and birds | LC | Singh et al. (2001) |
| 289 | *Fragaria vesca* L. | Pahari rasbhari | H | Native | March–April | BR; UP; WB | Sweet fruit | Ripe fruit is eaten or used as jam | Eaten by mammals | LC | Singh et al. (2001); Singh et al. (2015) |
| 290 | *Prunus cerasoides* D. Don | Himalayan wild cherry | T | Native | April–November | BR; WB | Fruits are nutritious | Fruit eaten | Dye, walking sticks and ornamental tree | LC | Jeeva (2009) |
| 291 | *Prunus domestica* L.Hook. | Europian plum | T | Native | April–November | WB | Acidic and sweet in taste | Jam, jelly and wine | PBI; medicinal | DD | Singh et al. (2015) |
| 292 | *Prunus nepalensis* Hook. | Khasi cherry/ Sohiong | T | Native | October–September | BR; UP; WB | Rich in vitamins | Wine making and eaten raw | PBI; medicinal | LC | Rymbai et al. (2016) |
| 293 | *Pyracantha crenulata* M.Roem. | Ghingaroo | S | Native | July–September | BR; UP; WB | Red sweetish fruits | Eaten raw by rural community | Medicinal use | NE | Bose et al. (2015) |
| 294 | *Pyrus pashia* Hamilton Ex D. Don | Wild Himalayan pear | T | Native | February–December | BR; UP; WB | Source of natural antioxidants | Fruit eaten | PBI; Fuel, fodder, fencing and control erosion | LC | Rymbai et al. (2016) |
| 295 | *Rubus birmanicus* Hook. f. | Dewberries | S | Native | October–March | WB | Fruits are nutritious | Fruit eaten | Medicine | NE | Laha et al. (2018) |
| 296 | *Rubus indicus*Thunb. | Chemullu | S | Native | October–March | WB | Fruits are nutritious | Fruit eaten | Medicine | NE | Ajesh et al. (2012) |
| 297 | *Rubus ellipticus* Sm. | Yellow Raspberry | S | Native | December–January | WB | Fruits are sweet | Fresh fruit eaten raw | Ornamental and medicinal use | LC | Paul (2013) |
| 298 | *Machilus edulis* King ex Hook.f. | - | T | Native | February–August | WB | Fruits are nutritious | Fruit eaten | Medicine | NE | Bhutia et al. (2008) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rubiaceae** | | | | | | | | | | | |
| 299 | *Neolamarckia cadamba* (Roxb.) Bosser | Burflower-tree/ laran | T | Native | June–October | BR; WB | Ripen fruits used | Fruits are eaten raw | Medicine and Ayurveda | NE | Mallick et al. (2020) |
| 300 | *Canthium coromandelicum* Brum.F. | Coromandal boxwood | H | Native | July–August | BR; WB | Rich in nutrients and minerals | Eaten raw | Medicine | NE | Ajesh et al. (2012) |
| 301 | *Canthium dicoccum* (Gaertn.) Merr. | Ceylon box wood/ Malakafe | S | Native | May–June | BR; WB | Nutrient-dense fruits | Ripe fruits are edible | Folk medicine | VU | Shivprasad et al. (2016) |
| 302 | *Catunaregam spinosa* Thunb. Tirveng. | Gela, Gelphal | T | Native | January–August | BR; WB | Rich in Ca, P, Mg and vitamins | high food energy (126–336 g cal) | Act as astringent used in diarrhea and dysentery | NE | Shivprasad et al. (2016) |
| 303 | *Gardinia campanulata* Roxb. | Bitmora/ Boilem | T | Native | November–December | BR; UP; WB | Fruit eaten | Fruit used as food and medicine | Medicinal, diabetes and skin diseases | NE | Singh et al. (2001); Singh et al. (2015) |
| 304 | *Gardenia gummifera* L. f. | Cumbi-gum | T | Native | January–August | BR; WB | Nutrient-dense fruits | Ripe fruits are edible | Folk medicine | LC | Mallick et al. (2020) |
| 305 | *Gardenia latifolia* Ait. | Papra | T | Native | April–July | BR; WB | Nutrient-dense fruits | Ripe fruits are Eaten | PBI; Medicinal | NE | Kumar (2016) |
| 306 | *Gardenia uliginosa* Retz. | Pedar/ Pindar | T | Native | April–August | UP | Fruits collected | Unripe fruit boiled and roasted | Used in Ayurveda medicine | NE | Prakash (2011) |
| 307 | *Hedyotis scandens* Roxb. | Dhupjhora | C | Native | March–December | BR; WB | Nutrient-dense fruit | Eaten raw or cooked | Folk medicine | NE | Saha et al. (2013) |
| 308 | *Ixora pavetta* Andr. | Katagandhal/ Torch tree | T | Native | January–April | BR; UP; WB | Nutrient-dense fruit | Fruits are eaten | PBI; Fuel wood, construction and religious | NE | Singh et al. (2001) |
| 309 | *Ixora coccinea* L. | Chethi/Flame of the woods | S | Native | Throughout the year | BR; UP; WB | Rich in minerals and pigments | Eaten raw | Ayurveda, and in various folk medicines | NE | Ajesh et al. (2012) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 310 | *Meyna spinosa* Roxb. Ex Link. | Meyna | T | Native | March–May | BR; UP; WB | Rich in minerals and vitamins | Fruits and seeds used as vegetables | PBI; Biodiesel, Medicinal use | NE | Singh et al. (2015) |
| 311 | *Morinda angustifolia* Roxb. | Haldikath | S | Native | January–August | BR; WB | Nutrient-dense fruit | Fruits are used in beverages | Medicinal | NE | Saha et al. (2013) |
| 312 | *Morinda pubescens* Sm. | Bhurtandi | S | Native | Year around | WB | Rich in nutrients and vitamins | Fruits are edible | Medicinal (cancer and alzheimer's) | NE | Anand and Deborah (2017) |
| 313 | *Morinda tinctoria* Roxb. | Aachhu/ Aal | T | Native | February–October | BR; WB | Rich in vit C | Ripe fruits are edible | Medicinal | NE | Mahapatra et al. (2012) |
| 314 | *Neonauclea purpurea* (Roxb.) Merr. | Purple Neo-Cheesewood | T | Native | March–September | BR; UP; WB | Nutrient-dense fruit | Fruits cooked occasionally | House posts, firewood and rice stirrer | NE | Laha et al. (2018) |
| **Rutaceae** | | | | | | | | | | | |
| 315 | *Aegle marmelos* L Corr. Serr. | Bael/ Stone apple | T | Native | March–April | BR; UP; WB | Fruit pulp | Pulp eaten, jam, jelly and sharbat | Medicine and Sacred tree | LC | Paul (2013) |
| 316 | *Atalantia monophylla* (Roxb.) A. DC. | *Narguni/ Katha Naranga* | T | Native | October–May | BR; WB | Fruts acidic in taste | Berries are pickled. | PBI; Medicinal (Oil used in paralysis) | NE | Mahapatra and Panda (2009) |
| 317 | *Citrus grandis* (L.) Osbeck | Jambura | T | Native | January–May | BR; UP; WB | Fruits eaten | Ripe fruits edible | Medicinal (fever) | LC | Singh et al. (2015); Abdullah et al. (2020) |
| 318 | *Citrus hystrix* DC. | Kaffir lime/ Porcupine orange | T | Native | January–June | BR; UP; WB | Sourish fruit | Unripe fruits are eaten raw | Medicinal | NT | Barooah and Ahmed (2014) |
| 319 | *Citrus jambhiri* Lush. | Tha rock pad/ Jamir | T | Native | January–May | BR; UP; WB | Rich in vitamins | Fruit occasionally eaten | Medicinal | LC | Abdullah et al. (2020) |
| 320 | *Citrus macroptera* Montrouz. | Satkora/ hatkhora | T | Native | September–November | WB | Fruit juice is used | Eaten as a vegetable, pickles. Sun-dried | Perfume, medicine (kidney stone) | NE | Singh et al. (2015); Biswas et al. (2018) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 321 | *Glycosmis mauritiana* (Lam.) Tanaka | Gin Berry or Orangeberry | S | Native | October–May | WB | Sweet fruits | Eaten raw | Folk medicine | LC | Prakash (2011) |
| 322 | *Glycosmis pentaphylla* (Retz.) DC | Aastani/ Lata kasi | S | Native | September–April | BR; WB | Rich in nutrients | Ripe berries eaten raw by tribals and villagers | Medicinal, liver problem and hair loss | LC | Mahapatra et al. (2012) |
| 323 | *Limonia acidissima* L. | Wood apple | T | Native | September–October | BR; UP; WB | Fatty acids, vitamins and minerals | Sweet and sour jams, pickle, Chutney | Religious, Medicinal and insecticide use | NT | Paul (2013) |
| 324 | *Murraya exotica* L. | Orange jasmine | T | Native | May–October | BR; WB | Fruits are rarely used | Culinary uses | Medicinal use for bleeding and pain | NE | Barooah and Ahmed (2014) |
| 325 | *Toddalia asiatica* (L.) Lam | Junglilebu | C | Native | September–December | BR; WB | Rich in vit C | Edible fruits flavour resembles like orange | PBI; Medicinal, ornamental, Bonsai | NE | Mahapatra et al. (2012) |
| 326 | *Zanthoxylum acanthopodium* DC. | Andaliman | T | Native | May–October | WB | Nutrient-dense fruits | Fruits are used for pickles | Folk medicine | LC | Mahapatra et al. (2012) |
| 327 | *Zanthoxylum rhetsa* DC. | Timbur | T | Native | June–October | WB | Nutrient-dense fruits | Pickles made from fruits | Folk medicine | LC | Mahapatra et al. (2012) |
| **Sabiaceae** | | | | | | | | | | | |
| 328 | *Meliosma pinnata* (Roxb.) Maxim. | Barbulata | T | Native | May–August | BR; UP; WB | Fruit used | Edible fruits | Fuel, vegetable and fodder | NE | Laha et al. (2018) |
| **Sapindaceae** | | | | | | | | | | | |
| 329 | *Cardiospermum halicacabum* L. | Lataphatkari | H | Native | May–August | WB | Fruits are used | Human and animal feed | Snake bite | LC | Mitra and Mukherjee (2009) |
| 330 | *Euphoria longan* Steud. | Ash phal | T | Native | June–September | WB | Fruit eaten | Relaxation and stomachic from fresh fruit | PBI; Medicinal | NT | Banarjee et al. (2013); Singh et al. (2015) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 331 | *Lepisanthes senegalensis (Poir.) Leenh., Blumea* | Achatta/ Kaphul | T | Naturalized | November–April | WB | Fruits and seeds | Eaten raw and cooked | Medicinal | NE | Jeeva (2009); Dwivedi (1993) |
| 332 | *Lepisanthes rubiginosa* (Roxb.) Leenhouts | Ritha | T | Naturalized | October–May | BR; UP; WB | Fruits and seeds | Roasted seeds used | Medicinal | LC | Dwivedi (1993); Prakash (2011) |
| 333 | *Schleichera oleosa* (Lou) Oken | Kusum | T | Native | March–August | BR; UP; WB | Protein, fibre and mineral rich | Fruits used locally | Folk medicine | LC | Tomar et al. (2015) |
| **Sapotaceae** | | | | | | | | | | | |
| 334 | *Diploknema butyracea* (Roxb.) H.J.Lam | Indian Butter/ Phalwara | T | Native | July–December | BR; WB | Fruit edible and yielding useful oil | Fruits and Seed, Edible oil | Medicinal | LC | Singh et al. (2001) |
| 335 | *Madhuca latifolia* (Roxb.) Cheval. | Mahua | T | Native | March–August | BR; UP; WB | Source of protein and minerals | Fruits are eaten raw and extract oil, alcoholic beverage. | Medicinal, Used in production of Tasar Silk | CR | Ajesh et al. (2012); Banarjee et al. (2013) |
| 336 | *Manilkara hexandra* (Roxb.) Dubard | Khirni | T | Native | November–June | BR; UP; WB | Minerals, protein and vitamin rich | Sweet fruits eaten raw or after drying, seeds for cooking. | Rootstock for sapota and medicinal use | NE | Tomar et al. (2015); Ahirwar (2015) |
| 337 | *Mimusops elengi* L. | Molsari/ Bakul/ Bullet wood | T | Native | April–May | BR; UP; WB | Sweet fruit rich calcium content. | Eaten raw or used in pickles and fruit preservatives | Ayurvedic, red color wood is strong and tough | LC | Paul (2013) |
| 338 | *Xantolis tomentosa* (Roxb.) Raf. | Hairy xantolis | T | Native | August–February | WB | Nutrient-dense fruits | Unripe fruits are made into pickles | Folk medicine | NE | Mahapatra and Panda (2009) |
| **Smilacaceae** | | | | | | | | | | | |
| 339 | *Smilax macrophylla* Willd. | Ramdatan | C | Native | April–September | WB | Nutrient-dense fruits | Fruits are used | Folk medicine | NE | Barooah and Ahmed (2014) |
| 340 | *Smilax zeylanica* L. | Kukurdaine | C | Native | April–September | WB | Nutrient-dense fruits | Fruits are used | Folk medicine | VU | Barooah and Ahmed (2014) |

**Supplementary Table.** (Continued.)

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| **Solanaceae** | | | | | | | | | | | |
| 341 | *Nicandra physalodes (L.) Gaertner.* | Ommathan/ Apple of Peru | H | Naturalized | October–February | UP; WB | Rich in carotenoids, vitamins | Fruits are edible after boiling and used to cure fever | Folk medicine, Insecticide | NE | Ajesh et al. (2012) |
| 342 | *Physalis minima* L. | Groundcherry | H | Native | Throughout the year | BR; UP; WB | Sweet fruits | Eaten raw, cooked, jams or jellies. | Medicinal use | LC | Biswas et al. (2018); Prakash (2011) |
| 343 | *Solanum americanum* Mill. | Kalabegun | H | Naturalized | Year around | BR; UP; WB | Nutrient-dense fruits | Fruits are used | Folk medicine | LC | Saha et al. (2013) |
| 344 | *Solanum betaceum* Cav. | Tamarillo | T | Naturalized | September–December | WB | Rich in vitamins and minerals | Pectin as a food additive and gelling agent | PBI; Medicinal | NT | Bandyopadhyay and Mukherjee (2009) |
| 345 | *Solanum indicum* L. | Jangli bhata | S | Native | June–March | BR; UP; WB | Nutrient-dense fruit | Eaten as vegetable | Medicinal use | NE | Barooah and Ahmed (2014) |
| 346 | *Solanum khasianum* C.B. Clarke | Kantikari | H | Native | June–December | BR; UP; WB | Nutrient-dense fruits | Eaten raw | Folk medicine | LC | Bose et al. (2015) |
| 347 | *Solanum nigrum* L. | Black nightshade | H | Native | June–December | BR; UP; WB | Nutrient-dense fruits | Jam making or eaten raw | Folk medicine | NE | Bose et al. (2015) |
| 348 | *Solanum surattense* Burm. f. | Kanta Begun | H | Native | December–September | BR; UP; WB | Nutrient-dense fruits | Eaten raw | Folk medicine | NE | Bose et al. (2015) |
| 349 | *Solanum torvum* Sw. | Turkey berry | S | Naturalized | February–November | BR; WB | Fruits are nutritious | Fruits used to make chutney | Medicinal | NE | Mahapatra et al. (2012) |
| **Sonneratiaceae** | | | | | | | | | | | |
| 350 | *Sonneratia apetala* Buch-Ham | Mangrove Apple/ Keora | T | Native | April–August | WB | Sour fruit | Used as chutney | Medicinal use | LC | Paul (2013) |

**Supplementary Table.** (Continued.)

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| 351 | *Sonneratia caseolaris* (L.) Engl. | Blatti | T | Native | April–August | WB | Fruits used | Used as chutney | Medicinal use | LC | Hosen et al. (2020) |
| **Sterculiaceae** | | | | | | | | | | | |
| 352 | *Firmiana colorata* (Roxb.) R. Br. | Bodula/ Samari | T | Native | January–June | WB | Nutrient-dense fruit | Eaten raw or roasted | Folk medicine | NE | Barooah and Ahmed (2014) |
| 353 | *Heritiera fomes* Banks | Sunder | T | Native | April–August | WB | Seed | Eaten raw and cooked | Medicinal and Boatbuilding | EN | Mallick et al. (2020) |
| 354 | *Heritiera littoralis* Aiton | Sundari | T | Native | April–August | WB | Seed | Eaten raw and cooked | Folk medicine | LC | Dwivedi (1993) |
| 355 | *Sterculia foetida* L. | Jangli Badam/ Wild Indian Nut | T | Native | April–February | BR; UP; WB | Fruit collected | Eaten as vegetable | Seed oil as medicine and bark for rope. | NE | Paul (2013) |
| 356 | *Sterculia guttata* Roxb. | Hirik | T | Native | September–March | BR; UP; WB | Fruit and seeds used | The roasted seeds are eaten | Folk medicine and Siddha | NE | Barooah and Ahmed (2014) |
| 357 | *Sterculia villosa* Roxb. | elephant rope tree/ Udal | T | Native | December–March | BR; UP; WB | Seeds and gum used | Seeds eaten raw or after roasting | Folk medicine | NE | Prakash (2011) |
| **Styraceae** | | | | | | | | | | | |
| 358 | *Bruinsmia polysperma* (C. B. Cl.) Steenis | Storax/ Snowbell | T | Native | August–December | BR; WB | Fruits are collected | Eaten raw | Construction, firewood and folk medicine | VU | Laha et al. (2018) |
| **Symplocaceae** | | | | | | | | | | | |
| 359 | *Symplocos racemosa* Roxb. | Lodh tree | T | Native | December–February | BR; WB | Fruits used | Eaten raw | Firewood, dye and medicine | VU | Laha et al. (2018) |

**Supplementary Table.** (Continued.)

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| **Trapaceae** | | | | | | | | | | | |
| 360 | *Trapa natans* L. | Singhara | H | Native | September–May | BR; UP; WB | Fruits used | Eaten raw, boiled or cooked | Folk medicine, ayurveda | LC | Mall and Tripathi (2017) |
| **Ulmaceae** | | | | | | | | | | | |
| 361 | *Holoptelea integrifolia* Planch. | Indian elm/ Challa | T | Native | January–April | BR; UP; WB | Nutrient-dense fruits | Eaten raw | Folk medicine | NE | Dwivedi (1993); Ahirwar (2015) |
| **Urticaceae** | | | | | | | | | | | |
| 362 | *Debregeasia longifolia*(Burm.f.) Wedd. | Sansaru/ Wild rhea | T | Native | July–February | BR; UP; WB | Sweet fruits are eaten | Ripe fruits are eaten fresh | medicinal | LC | Ajesh et al. (2012) |
| **Vacciniaceae** | | | | | | | | | | | |
| 363 | *Vaccinium sprengelii* (G.Don) Sleum. | Mao khao | S | Native | May–October | BR; WB | Fruits collected | Eaten raw or cooked | Medicinal use in cancer | NE | Singh et al. (2001) |
| **Vitaceae** | | | | | | | | | | | |
| 364 | *Ampelocissus barbata* (Wall.) Planch. | Gorumara | C | Native | July–October | BR; UP; WB | Fruits are nutritious | Eaten raw | Medicinal use | NE | Bandyopadhyay and Mukherjee (2009) |
| 365 | *Ampelocissus latifolia* (Roxb.) Planch. | Icewar | C | Native | July–October | BR; UP; WB | Fruits are nutritious | Eaten raw | Medicinal use | NE | Bandyopadhyay and Mukherjee (2009) |
| 366 | *Cissus spectabilis* Planch. | Kattumunthiri | C | Native | June–November | WB | Sweet and acidic fruits are eaten | Eaten raw | Medicinal use | EN | Barooah and Ahmed (2014) |

**Supplementary Table.** (Continued.)

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 367 | *Leea alata* Edgew. | Bon-chalita/ Kukurjihba | T | Native | August–March | BR | Fruits used | Eaten raw | Folk medicine | NE | Singh et al. (2001) |
| 368 | *Leea indica* (Burm. f.) Merr. | Kukur-jhiwa | T | Native | August–March | WB | Fruits used | Eaten raw | Folk medicine | LC | Bose et al. (2015) |
| 369 | *Tetrastigma alcicorne* Haines | - | C | Native | November–May | BR; UP; WB | Fruits used | Eaten raw | Ethnomedicinal | NE | Barooah and Ahmed (2014) |
| 370 | *Tetrastigma bracteolatum* (Wall.) Planch. | Nal-tenga | C | Native | August–October | BR; WB | Fruits | Eaten raw | Ethnomedicinal | NE | Barooah and Ahmed (2014) |
| 371 | *Tetrastigma lanceolarium* (Roxb.) Planch. | Bherseri | C | Native | February–August | BR; WB | Fruits used | Ripe fruit is eaten or cooked with fish by Mishings | Ethnomedicinal | NE | Mallick et al. (2020) |

T: tree; S: shrub; H: herb; C: climber; BR: Bihar; UP: Uttar Pradesh; WB: West Bengal; NE: not evaluated; DD: data deficient; LC: least concern; NT: near threatened; VU: vulnerable; EN: endangered; CR: critically endangered; EW: extinct in the wild.