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Neglected and Underused Fruit Species: Opportunities for Rural Income Generation

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Abstract

Humans have utilized wild plants as a food source since ancient times. Wild edible foods encompass fruits, leaves, flowers, and seeds from naturally growing trees and shrubs. Among these, wild fruits are gaining increased attention because of their high nutritional value, especially their vitamin and mineral contents. The staple diet of many Indians often lacks essential nutrients, yet India is rich in indigenous food plants with great potential to address nutritional deficiencies in vulnerable populations. Numerous underutilized wild edible fruits, though relatively unknown, hold significant promise in contributing to nutrition and livelihoods. To explore this potential, the present checklist compiles observations from the author alongside existing literature. Notable examples include Artocarpus lakoocha, Artocarpus heterophyllus, Aegle marmelos, Annona squamosa, Averrhoa carambola, Carissa carandus, Cordia dichotoma, Eugenia jambos, Feronia limonia, Ficus species, Grewia subinaequalis, Manilkara hexandra, Moringa olifera, Morus indica, Pithecellobium dulce, Schleichera oleosa, Spondias mangifera, Syzygium cumini, Tamarindus indica, and Ziziphus mauritiana. This paper documents 20 underutilized fruit species from 15 families, detailing their scientific names, family classifications, local names, availability periods, taste profiles, and uses. The findings emphasize the urgent need for further research to discover more wild edible fruits, which would enrich the diversity of available fruits. The current status of these fruit plants calls for intensified research and development efforts aimed at conservation, bioprospection, and sustainable use. Such initiatives could open new opportunities for scientific validation, public awareness, and economic improvement among ethnic communities.

Keywords: Wild edible fruits, Underutilized fruits, Indigenous food plants, Traditional knowledge, Sustainable utilization, Conservation, Biodiversity

Introduction

India is blessed with a rich diversity of indigenous food plants that hold immense potential to help address nutritional deficiencies, especially among vulnerable populations1. The country's diverse landscapes—ranging from forests and rivers to valleys and hills—along with its rich ethnic diversity, contribute to a vast array of plant resources. Indigenous communities rely on an assortment of wild and cultivated plants, including leaves, roots, rhizomes, tubers, flowers, fruits, and seeds, to meet their dietary and nutritional needs[2,3,4,5,6,7.]

Underutilized fruits are highly nutritious and serve as an important food source for ethnic groups living near forest areas, who depend on these local resources extensively[8,9,10.] The term "underutilized crops" refers to plant species traditionally used for food, fiber, fodder, oil, or medicinal purposes but not yet adopted by large-scale agriculture11. Many such plants thrive in extreme environments and threatened habitats, possessing valuable genetic traits that enable them to survive harsh conditions and offer nutritional and industrial benefits[11,12.] Properly utilizing these underutilized crops can enhance food security, nutrition, health, income, and environmental services[12], [13]. While some of these neglected crops continue to be used at local, national, or even international levels, their full potential remains untapped[13].

Historically, wild fruits played a crucial role in human culture, often collected for special occasions like weddings[14] or preserved for times of scarcity. Additionally, some indigenous fruit trees, though mostly undomesticated, are vital for rural livelihoods, as they can yield crops even during poor rainfall years, thereby

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bolstering food security in rural households[15]. In addition to being a source of food, many indigenous wild plants also provide medicine, fodder, fuelwood, craft materials, cash income, and building resources for rural communities [16, 17]. These plants contribute significantly to traditional diets, supplying ingredients used in beverages, local culinary preparations, oils, carbohydrates, and proteins. Similar to cultivated vegetables, wild fruits are rich in essential vitamins and minerals required for maintaining good health [18].

In many economically disadvantaged regions of the world, people depend heavily on wild fruits and vegetables to meet their nutritional needs and support food security. However, the consumption and utilization of these indigenous food resources have gradually declined, primarily due to lack of awareness and inadequate research about their nutritional value [19].

Material and Method: During 2023-24, multiple field visits were conducted across various village and forest areas in western U.P. during different seasons. Live plant specimens were collected, discussions held with local vegetable vendors and villagers to identify wild edible fruits and gather traditional knowledge. A questionnaire was designed to collect data on local names, availability periods, taste, and food uses. The plants were identified through interactions with locals and verified against scientific literature[20,21]. Interviews with knowledgeable informants, mostly elderly residents, provided detailed information on local names, edible parts, habitat, fruiting periods, and usage. Personal interviews and group discussions helped validate this information through crosschecking. Additionally, collecting voucher specimens and cross-referencing data from various sources ensured the accuracy of the recorded folk names and usage details[22].

Result and Discussion: A review of Table 1 shows the presence of several neglected and underutilized fruit-bearing tree species in North India, including *Artocarpus lakoocha*, *Artocarpus heterophyllus*, *Aegle marmelos*, *Annona squamosa*, *Averrhoa carambola*, *Carissa carandas*, *Cordia dichotoma*, *Eugenia jambos*, *Feronia limonia*, *Ficus* species, *Grewia subinaequalis*, *Manilkara hexandra*, *Moringa oleifera*, *Morus indica*, *Pithecellobium dulce*, *Schleichera oleosa*, *Spondias mangifera*, *Syzygium cumini*, *Tamarindus indica*, and *Ziziphus mauritiana*. According to (12), when these underutilized food crops are effectively promoted and utilized, they can significantly contribute to enhancing food security, nutritional well-being, household income, health benefits, and various ecological services.

S. No	Botanical Name	Common Name	Family	Flowering and Fruiting*	Edible Uses	Nutrient value	Medicinal / Ethnobotanical Uses
1	Artocarpus lakoocha Roxb.	Barhal	Moraceae	Fl: Feb-March Fr: July-August	Fruits are yellow and edible and also used for making pickles.	Vitamin C, fiber, antioxidants.	Fruit pulp used for digestive disorders; bark used in jaundice.
2	Artocarpus	Kathal	Moraceae	Fl: Feb-March Fr:	It is commonly referred to as “the poor	Vitamin A, C, protein-rich seeds.	Seeds used to treat diarrhea; leaves used

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	heterophyllus Lam. .			July-August	man's food. Seed roasted andused as vegetable. Raw fruits are eaten after cooking. Ripen fruits are eaten.		in skin ailments.
3	Aegle marmelos, Corr.	Bael	Rutaceae	Fl: May-June Fr: Dec-May	Fruit yield mucilage and pectin,used as a sherbet.	Vitamin C, β-carotene, calcium.	Highly valued for constipation, ulcer, and intestinal health.
4	Averrhoa carambola Linn.	Amrakh	Averrhoaceae	Flowering continues throughout the year and fruit is available most of the year.	Fruits are rich source of vitamin C.The fruits contain minerals like K,Ca, Mg and P. Unripe fruits are used for jelly and pickles	Vitamin C, potassium, magnesium.	Used traditionally to treat fever, scurvy & digestive issues
5	Annona squamosa L.	Sitaphal/ Sharifa	Annonaceae	Fl: April-May Fr: July-August	The conical shape fruit is very sweet and eaten fresh or can be used for milkshakes, ice- creams and even sherbets.	Vitamin C, B6, natural sugars.	Leaves used for diabetes, seeds used insecticidally.
6	Carissa carandas Linn.	Karounda	Apocynaceae	Fl: April-June Fr: Winter season	Berries are sweet and eaten raw and made in to pickle. Unripe	Vitamin C, iron.	Used as blood purifier and for anemia.

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					fruits are used as vegetable and ripe eaten as such.		
7	Cordia dichotoma Forster f.	Lasoora	Boraginaceae	Fl: Mar-April Fr: July- Aug	Ripe fruits are eaten as raw and also used for making pickles.	Carbohydrates, calcium.	Fruit used for sore throat and cough.
8	Eugenia jambos L.	Gulab Jamun	Myrtaceae	Fl: Feb – April Fr: June -July	The fruits are mainly eaten fresh by children but can also be made into jam if lemon juice is added.	Vitamin A, C; essential oils.	Leaves used as antimicrobial ; fruit cooling & digestive.
9	Feronia limonia Linn.	Kaitha	Rutaceae	Fl: February - March, Fr: October - March	The sticky pulp, is eaten raw with or without sugar, or is blended with coconut milk and palm-sugar syrup and drunk as a beverage, or frozen as an ice cream. It is also used in chutneys and for making jelly and jam.	Calcium, iron, Vitamin C	Used in treating diarrhea, dysentery, and ulcers.
10	Grewia subinaequalis Lin.	Phalsa	Tiliaceae	Fl: Feb-March Fr: May - June.	Phalsa is eaten as a desert fruit. It is largely used to make sherbets and extensively employed in the	Vitamin C; anthocyanins	Used for heatstroke, inflammation & cooling

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					manufacture of soft drinks.		
11	Ficus roxburghii Wall.	Gular	Moraceae	Fl: March-April Fr: June-July	Unripe fruits are used as vegetable. Ripe fruits are eaten as raw.	Protein, calcium, antioxidants.	Latex used for wound healing; fruit strengthens digestion
12	Manilkara hexandra (Roxb.)	Khirani	Sapotaceae	Fl: Dec-Apr. Fr: April	The ripe fruit are fleshy and sweet.	Vitamin C, sugars, fiber.	Boosts energy; used for mouth ulcers
13	Morus indica (L.)	Mulberry / Tut	Moraceae	Fl: Jan - Feb Fr: March-May.	Ripe fruits are eaten.	Iron, Vitamin C, antioxidants.	Strengthens blood & hemoglobin levels.
14	Moringa oleifera Lam.	Sahjana	Moringaceae	Fl: Feb-March Fr: June-July	Leaf, flower, capsule is used as vegetable.	Rich in protein, calcium, Vitamin A, C.	Strong anti-inflammatory, anti-diabetic & immune boosting plant.
15	Pithecolobium dulce Roxb.	Jungle Jalebi	Fabaceae	Fl: July – Sep Fr: Nov-Jan	The pods are used as food. The seed and pulp are made into a sweet drink and eaten roasted or fresh.	Vitamin B-complex, phosphorus.	Used for stomach discomfort; pulp cooling & refreshing.
16	Syzizium cumini (L). Skeel.	Jamun	Myrtaceae	Fl: Mar-May Fr: June-July	Fruits eaten as a raw. Pulp juicy, used for making jams, jellies etc.	Iron, Vitamin C, anthocyanins.	Seeds widely used to regulate blood sugar levels.

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17	Spondias mangifera Kurz.	Amara	Anacardiaceae	Fl: Feb-March Fr:Sept-Nov	Pleasant tasting acidic fruit about the size of an apple with a pineapple-mango like flavor and crunchy texture. Fruit has an excellent flavor.	Vitamin C, fiber & organic acids.	Fruit aids digestion and appetite.
18	Scleichera oleosa (Lou.) Oken	Kusum	Sapindaceae	Fl: March –April Fr: July-Aug	The fruit is edible and the seeds yield oil (Macassar oil) of some value.	Vitamin C, potassium; oil-rich seeds.	Oil used in skin & hair care; fruit cooling tonic.
19	Tamarindus indica L.	Imli	Caesalpiniaceae	Fl: Apr.-Jun., Fr: Dec.-Mar.	Ripen and raw fruits are eaten. Leaves and flowers are cooked as vegetables; Seeds are eaten in raw and roasted.	Vitamin B-complex, potassium, iron	Used for digestion, acidity relief, and as a natural laxative
20	Ziziphus rugosa Lam.	Ber	Rhamnaceae	Fl: July – Nov Fr: March - April	Fruit is a rich source of Vitamins. Ripe fruit is consumed as popular dessert and processed for various value-added products such as murabba, candy, sharbat, squash.	Vitamin C, calcium, sugars Used traditionally to treat fever, scurvy & digestive issues	Used as tonic for weakness and improves immunity

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21	*Dillenia indica* L.	Chalta / Elephant Apple	Dilleniaceae	Fl: Apr–Jun; Fr: Oct–Jan	Used for preparing chutney, curries, jelly, jam	Rich in Vitamin C, antioxidants & organic acids.	Used in digestive disorders, improves appetite, anti-inflammatory
22	*Flacourtia indica* (Burm.f.) Merr.	Kakronda / Indian Plum	Salicaceae	Fl: Feb–Mar; Fr: Jun–Jul	Eaten fresh; sometimes dried or pickled.	Contains Vitamin C, iron & carotenoids.	Known for antimicrobial and blood-purifying effects.
23	*Baccaurea ramiflora* Lour.	Leteku	Phyllanthaceae	Fl: Mar–Apr; Fr: Jun–Aug	Consumed fresh; used in refreshing drinks.	High in Vitamin C, potassium & dietary fiber.	Useful for cooling, treating dehydration, mild laxative effects.
24	*Elaeagnus latifolia* Linn.	Soh-Phie	Elaeagnaceae	Fl: Jan–Mar; Fr: Mar–May	Eaten raw or made into chutney and pickles.	Rich in iron, Vitamin C & protein.	Used for anemia, bone strength & immunity boosting.
25	*Phoenix sylvestris* (L.) Roxb.	Wild Date Palm / Khajur	Arecaceae	Fl: Dec–Jan; Fr: Apr–Jun	Fruits eaten raw; sap used to make jaggery.	High in natural sugars, minerals & B-vitamins.	Provides quick energy, used traditionally as a tonic
26	*Ziziphus oenoplia* (L.) Mill.	Small Wild Ber	Rhamnaceae	Fl: Aug–Oct; Fr: Nov–Jan	Fruits eaten fresh or dried.	Contains Vitamin C, calcium & antioxidants	Used in blood purification, anti-diabetic traditional remedies.
27	*Garcinia pedunculata* Roxb.	Bor-Thekera	Clusiaceae	Fl: Apr–May; Fr: Sep–Dec	Used in curries, beverages, pickle.	Rich in hydroxycitric acid (HCA), Vitamin C.	Used for weight management, acidity, liver health.

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28	*Carissa spinarum* L.	Jungli Karonda	Apocynaceae	Fl: Feb–Apr; Fr: Jun–Sep	Fresh fruits or processed into pickles.	Vitamin C, Iron, flavonoids.	Used for digestion, enhancing appetite & healing wounds.

Table 1

Several researchers have contributed to the study of wild edible fruits, including Bist and Sharma, Mengistu and Hager, Nitzela et al., Rashid et al., Sankaram et al., Upadhye et al., Wehmer, Tomar and Kumar, and Tomar et al. Building upon this foundation, the present study aims to document various underutilized fruits by detailing their botanical names, family classification, common names, flowering and fruiting periods, as well as their edible uses.

This study brings attention to the valuable diversity of underutilized wild edible fruit plants found across western U.P.. These fruits are not only a part of the natural ecosystem but also hold great significance in the daily diets and traditional health practices of rural and tribal communities. Rich in vitamins, minerals, antioxidants and other beneficial nutrients, these fruits can play an essential role in improving nutrition and food security, particularly for communities that are nutritionally vulnerable.

Yet, many of these fruit species remain overlooked due to limited awareness, insufficient scientific research, and the gradual loss of traditional knowledge. As a result, their true potential is not fully realized. There is a clear need to promote systematic research, conservation measures, sustainable harvesting and value-added product development to enhance their use. Encouraging local cultivation, small-scale processing and market opportunities can improve rural livelihoods while also supporting biodiversity conservation.

In summary, increasing awareness and recognizing the nutritional, cultural and economic importance of these underutilized fruits can help enrich the food basket, strengthen community health, and contribute to sustainable development. Their preservation and promotion represent a meaningful step toward empowering local communities and protecting biological diversity for future generations.

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