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## Potential of underutilized, neglected or untrapped vegetables

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**Abstract**

Underutilized crops are lesser-known plant species in terms of marketing and research, but well known to adapted by marginal and stress or unfavorable conditions. Their indigenous potential and Ethnobotanical data are well known to people, whereas, commercial importance and market value is unknown to the public. Although, Underutilized crops are the options for scaling-up neglected crops for large-scale agriculture appear to be increasingly exhausted, many species have the potential to contribute to food security, nutrition, dietary and culinary diversification, health and income generation. These UUC's are multifold food crops as the treasures for the future India have greater potential for food and security, income generation and environmental services. These underutilized horticultural crops consumption in locally and the local people are aware about their nutritional and medicinal properties. Moreover, these are cheap and readily source for available. As the horticultural crops are contributing 3.14% of the total geographical area of the region. The region is one of the richest reservoirs of genetic variability and diversity of different horticultural crops, which exist in plant types, morphological and physiological variations, reactions to diseases and pests, adaptability and distribution.

**Keywords:** Underutilized, neglected, untapped

**Introduction**

The productivity of crops like maize, wheat, rice and other dominant food crops of today resulted in replacement of numerous other crops. Today, our food security is depended on less than ten crops. The impact of narrowing down of species base at food security level is likely to be felt most by the rural and hill people as they have restricted livelihood opportunities. The underutilized crops of today were the major crops in the past.

**Table 1:** Important underutilized and neglected crop species

Crop group	Crop name
Pulses	Sword bean ( <i>Canavalia</i> spp.) hyacinth bean ( <i>Lablab purpureus</i> ), grass pea ( <i>Lathyrus sativus</i> ), horse gram ( <i>Macrotyloma uniflorum</i> ); velvet bean ( <i>Mucuna</i> spp.), winged bean ( <i>Psophocarpus tetragonolobus</i> ), faba bean ( <i>Vicia faba</i> ), moth bean ( <i>Vigna aconitifolia</i> ), adzuki bean ( <i>Vigna angularis</i> ), rice bean ( <i>Vigna umbellata</i> )
Root and tuber	Elephant foot yam ( <i>Amorphophallus paeoniifolius</i> ), taro ( <i>Colocasia esculenta</i> ), yams ( <i>Dioscorea</i> spp.), <i>Vigna vexillata</i>
Vegetables	Cucubitaceae ( <i>Benincasa</i> , <i>Luffa momordica</i> <i>Trichosanthes</i> spp.) aibika ( <i>Abelmoschus manihot</i> ), leafy amaranth ( <i>Amaranthus</i> spp.), Brassica spp., Kangkong ( <i>Ipomoea aquatica</i> )
Fruits and nuts	Jack fruit ( <i>Artocarpus heterophyllus</i> ), bread fruit ( <i>A. allitis</i> ), carambola ( <i>Averrhoa carambola</i> ), longan ( <i>Dimocarpus longan</i> ), pillinut ( <i>Canarium ovatum</i> ), durio ( <i>Durian zibethinus</i> ), Indian gooseberry ( <i>Emblica officinalis</i> ), mangosteen ( <i>Garcinia mangostena</i> ), duku ( <i>Lansium domesticum</i> ), Litchi ( <i>Litchi chinensis</i> ), <i>Manilkara</i> spp., rambuttan ( <i>Nephelium lappaceum</i> ),

Many underutilized crops are attaining attention in recent years because of they have high nutritional value. Realizing the nutritional values of these grains, they are now considered as nutri-cereals (Nutritious grains). The under-utilized crop species which are rich in micro-nutrients and vitamins can contribute effectively to make the diets more balanced and can hence play an important role in combating silent hunger. Attention has now been focussed on the under-utilized crops from resource management, agricultural diversification, self-sufficiency, economic gains, germplasm augmentation and conservation and nutritional security points. Value added products developing for increasing the farmers' income is the other notable features related to production, research and extension of under-utilized crops.

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The present paper provides an account of under-utilized crops viz., minor cucurbits, and minor pulses (Jack bean and Adzuki bean).

### Advantages of UUC's

The advantages of these underutilized plant species are as following:

- They have potential to eliminate the poverty elimination through employment generation and income generation and also through improved efficiency and profitability of farm household labour use in both rural and urban environments.
- With the use of underutilized crops, there is a way to reduce the risk of over-reliance on very limited number of major crops.
- Role in food security to contribute to sustainable livelihoods as they can widen the food edibility options.
- These underutilized crops add nutrients to the diet and are food for low income urban people. They are adapted to fragile environments and can contribute to the stability of agro ecosystems, particularly in the arid, semi-arid lands, mountains, steppes and tropical forests.
- They provide a opportunity of a broad spectrum of crops to improve productivity and global food security and to meet new market demands.
- They assist development of rural community.

### Vegetable Crops

A wide range of vegetable crops are grown in this country, which includes solanaceous vegetables, cucurbitaceous, okra, various kinds of beans, tubers & roots crops, spices, cole crops as well as some species of leafy vegetables. These under-utilized crops as follows:

**Sechium edule (Chow-Chow):** A indigenous of tropical America, Chow-Chow is a very popular vegetable commonly called chayote as Pyri form (pear shaped) and grows abundantly without much care and attention in high hills of Meghalaya, Manipur, Mizoram, Nagaland and Sikkim (Rai *et al.*, 2002) <sup>[11]</sup>. Chow-Chow is used both fleshy fruits and starchy tuberous root used as vegetables. It is a vigorous, scrambling, tuberous-rooted monoecious perennial plant, grown for its starchy, edible fruit and seeds. This climber can spread to fifty feet, producing huge tubers. It looks like a large, dark green or whit test green with longitudinal groove on the soft skin and deep fissure at the blossom end. Some varieties have smooth skins, while others have dots of prickly spines on the surface. The flesh is crisp and white with a large white oval single seed in the center. Chow-Chow is a fruit small, 10-20cm long and 5-15 cm in diameter, weighing about 200-400g. It is often used in the place of potato.

**Momordica cochinchinensis and M. dioica (Kakrol Kartoli):** Both are widely distributed in Assam and Garo hills of Meghalaya dioecious perennial. (Ram *et al.*, 2002) <sup>[10]</sup>. Both are high nutritional and medicinal with economic values. Their immature tender green fruits are cooked as vegetable. Young leaves, flowers and seeds are also edible. Fruits are also used to cure in ulcers, piles, sores and obstruction of liver and spleen. They have several medicinal properties and are good to cure cough and indigestion. The unripe fruits of both the crops act as appetizer and astringent. The seeds are used in chest problems and stimulate urinary discharge.

**Canavalia ensiformis (Jack bean):** It belongs to family papilionaceae and cultivated on limited scale in the North Eastern region (CSIR, 1950) <sup>[4]</sup>. It is a bushy, semi-erect, annual herb, 2 m tall and the tips of its branches tend to twine under shade. Leaves are trifoliate and shortly hairy. Pods are 2-30 cm long sword shaped and 2-2.5 cm broad. The pods are ribbed near suture, pendent and 8 to 20 seeded. Seeds are white with a brownish hilum extending to half of its length. Young green pods are eaten as after cooked vegetable. The young leaves may be used as cooked and eaten as a potherb. The dried beans are good source of protein and starch, (27% protein and 42% starch, respectively) with a good balance of amino acids and lectins, canavine, concanavine, canaline which are some toxic alkaloids of non-protein-nitrogen compounds etc. The lectine which is heat labile and hydro soluble reacts with the sugar components in intestinal cells causing a disruption in cell structure, which leads to abnormalities in nutrient absorption. However, the canavine is a major toxic factor, which is present to an extent of 2-3.5% of dry seed (Fearon and Bell, 1955) <sup>[6]</sup>, which also inhibits protein metabolism. Sword bean is used to cure hiccups, vomiting, abdominal swelling, lumbago (lower back pain) due to kidney deficiency, asthma with sputum, etc.

**Vicia faba (Broad Bean):** It is a cool-season crop in high altitude areas, grown on a limited extent in the north eastern region. Broad bean is an annual legume botanically known as *Vicia faba* L. or locally known as Faba bean, horse bean or bankla bean. Plants are erect annuals reaching 60-125 cm in height, very leafy with robust stems. The plant has compound leaves with toothed stipules at the base, and conspicuous white flowers with the wings smeared in black. The fruit is a pod, reaching 10 cm in a length and pubescent. Seeds are 3 cm in length. It is used as green-shell, the seeds removed from the pod before maturity, or as dry beans. It is the principal protein source for poor people in this region. The protein content of bean seeds is high, amounting to about 20-25%. It is a nitrogen fixing plant, and is not poisonous to humans in the conventional sense, but the seed which are rich source of protenin have also antinutritional factors like tannins, vicine and convicine that cause favism a form of haemolytic anaemia in children. It also have a genetically transmitted, male sex-linked deficiency to the enzyme glucose-6-phosphate dehydrogenase. The disease can cause death in severe cases.

**Psophocarpus tetragonolobus (Winged Bean):** Winged bean is known for a vegetable of 20 country. It is perennial but grown as annual. As it is grown in the home gardens in Assam, Tripura and Meghalaya. A robust, climbing herbaceous perennial tree, it can attain 5 metres in height. The flowers are of different colour; it may be blue, white or purple. The pods are four sided with characteristic wings, so known as winged bean. Sahoo *et al.* (2002) <sup>[12]</sup> according vary in length from 6-36 cm (upto 50 cm) containing 5-20 seeds in each pod. The globular shaped shining seeds colour may be white, yellow, brown, black or mottled and vary in weight from 0.06-0.5g each. All parts of the plant, i.e., seeds, flowers, leaves, pods and tuber-like-roots are edible. The young tender pods can be stewed, boiled, fried, roasted or made into milk. The seeds contain 30-40% proteins, 15-20% oil and the tubers contain about 11-15% proteins, which are supposed to be 10 times more than in potatoes or yams.

Winged beans are also rich in carbohydrates and vitamin A (300 to 900 IU). Its tender leaves make good sauce and curry. The leaves, pods and tubers have medicinal uses. Flowers have a sweet taste due to nectar they contain. The tuber-like-roots are eaten after boiling or frying. The plant is a good fodder for cattle.

**Moringa (drumstick) tree:** is a fast-growing tree known as Sahjan in Hindi, deciduous perennial tree that adapts well to hot, semi-arid regions with as little as 500 mm annual rainfall [Bosch, C.H 2004] [3]. It also tolerates waterlogged conditions but prolonged flooding leads to a significant loss of plants for a short period of time. In general, moringa grows best in lowland cultivation, but it also adapts to altitudes above 2000 m. Drumstick also used in intercropping during the first three years intercropping can be taken up with brinjal, chillies, cowpea, bhindi, tomato, and cotton. Dietary or topical administration of moringa in the form of extracts, decoctions, creams, oils, powders, and porridges have been reported in the scientific literature as having antibiotic, antitrypanosomal, hypotensive, antispasmodic, antiulcer, anti-inflammatory, hypo-cholesterolemic, and hypoglycemic activities [Fahey, J.W 2005] [7]. Moringa powder has been recommended as an immune stimulant in HIV/AIDS treatment [Burger *et al.*, 2002] [1]. In folk medicine, moringa flowers, leaves, and roots are used for the treatment of various tumors, and seeds are specifically used to treat abdominal tumors [Polprasid, 1996] [8]. A dramatic reduction in skin papillomas was observed following ingestion of moringa seedpod extracts. The tender leaves and immature or partially matured pods/fruits as well as flowers are used as vegetables. The pods are also boiled, dried and ground into dry powder and stored for instant use. The dried ready-made powder is also exported. It can also be used for pickles and as dehydrated moringa.

**Coccinia grandis (Kundru or tondli):** It is widely grown in Assam and Tripura. Plants are slender and much branched climber. Flowers are dioecious perennial, solitary in the leaf axils, rather large and long peduncled. Various parts of the plants are used in the indigenous system of medicine in both Ayurvedic and Unani practice. In India, the ivy gourd known as "bimba" in Sanskrit, has been recorded in the Mahabharata period. The plant is reported to reduce the amount of sugar in the urine and improve the general metabolism of patients suffering from diabetes. Some parts of the plants particularly the leaves and roots are used by the Ayurvedic and Unani practitioners in the treatment of conditions similar to diabetics when insulin treatment has failed and lowering the blood sugar level. The cooked leaves are used externally in eruptions of the skin and also mixed with ghee are applied as ointment to sores. Boiled in ginger oil, they are applied externally in the treatment of ring worm, psoriasis, itch, etc. Tender fruits are used as vegetable and recommended for fever patient.

**Pointed gourd *Trichosanthes dioica*:** important tropical vegetable mostly grown in India. It is commonly known as parwal or patol. In Bihar and eastern UP pointed gourd is grown in diara lands near the rivers. Assam-Bengal region is considered as primary center of origin of parwal, which is also widely cultivated in Tripura. Botanically, the crop is dioecious in nature and entomophilous in nature. The tender immature green fruits are used as a cooked vegetables, either fried or in curries. The fruits are also used for sweets. The tender shoots and leaves are also eaten, particularly in West

Bengal to preparation of syrup for convalescents. It is easily digestible and good for maintaining healthy heart brain.

***Sauropus androgynus*:** Known as Chekurmanis in Tamil. It was introduced from Malaysia. A small perennial shrub. It is distributed in Sikkim Himalayas Khasi hills and Western Ghats. It is grown in southern India, especially Tamil Nadu, Kerala and Karnataka, Its leaves are eaten as vegetables. It has exceptionally high Pro-vitamins A content (47,500 IU/100g). It is planted in home gardens in hedges, on bowers, trellis or round vegetable beds. It grown well in mild humid climate It is propagated by softwood or semi-hard wood cuttings. The first harvest is after 5-6 months of planting. The plants are tipped at 60-90 cm height to encourage development of lateral branches.

## Conclusion

Underutilized crops are the options for scaling-up neglected crops for large-scale agriculture appear to be increasingly exhausted, many species have the potential to contribute to food security, nutrition, dietary and culinary diversification, health and income generation. However many underutilized crops were once more widely grown but are today falling into disuse for a number of problems with respect of agronomic, genetic, economic and cultural factors. Farmers and consumers are using these crops less due to they have not competition with other crop species in the same agricultural environment. The underutilized crops have good option for region is one of the richest reservoirs of genetic variability and diversity of different horticultural crops, within which exist in plant types, morphological and physiological variations, reactions to diseases and pests, adaptability and distribution. In general decline of these crops may erode the genetic base and prevent the use of distinctive useful traits in crop adaptation and improvement. Production, post-harvest handling and processing of underutilized fruits practiced today perpetuate heavy losses, inadequate infrastructure facilities cripple marketing prospects, low production of underutilized fruits results in lesser yield of processed products, thereby increasing the production cost during processing. To overcome these problems, the development of technologies is required urgently to minimize the losses during post-harvest handling and also technologies suitable for specific processing purposes, products development and storage of fresh and processed products. Whatever research and field projects have been carried out these are mostly fragmented and information on them is difficult to compile. However, this paper will attempt to provide the background, current research, constraints for sustainable production, approaches to research and potential strategies and action plans which we hope would be helpful to lead the strategic development of underutilized crops for sustainable food and nutrition security and poverty alleviation. By corroborating the ethnobotanical data, the ways to combat food security can be unlocked. UUC's are indispensable for food and nutrition security and will have a greater potential for income generation and environmental services. As underutilized crops have a great potential to alleviate hunger directly through increasing food production in the challenging environments where major food crops are severely limited day by day. This paper finally concludes that with the realization of importance and uses of the underutilized crops in India, the potential for agricultural - rural development and food and nutrition security can be unlocked and enhances nutrition, dietary and culinary diversification, health and income generation.

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