



Underutilized Vegetable Crops: Hidden Treasures for Sustainable Agriculture

Saroj Kumar Sahu*, Nirankar and Reshav Naik

Division of Vegetable Science, ICAR-Indian Agricultural Research Institute, Pusa New Delhi (110 012), India



Open Access

Corresponding Author

Saroj Kumar Sahu

✉: sarojsahu.horti@gmail.com

Conflict of interests: The author has declared that no conflict of interest exists.

How to cite this article?

Sahu, S.K., Nirankar, Naik, R., 2026. Underutilized Vegetable Crops: Hidden Treasures for Sustainable Agriculture. *Biotica Research Today* 8(3), 47-50. DOI: 10.54083/BRT/08.03.26/47-50..

Copyright: © 2026 Sahu *et al.* This is an open access article that permits unrestricted use, distribution and reproduction in any medium after the author(s) and source are credited.

Abstract

Underutilized vegetable crops are valuable plant resources that have not received much attention despite their rich nutrition profile, adaptability to diverse agro-climatic conditions and potential to support sustainable agriculture. These low-input crops are important source of vitamins, minerals, dietary fibre and health-promoting compounds, supporting both food and nutrition security. Commercialization of these vegetables needs standardized agronomy and solid supply chains connecting farmers and urban consumers. Government initiative schemes such as MIDH subsidies, Minimum Support Price (MSP) system and inclusion of underutilized vegetables into national programs like PM-POSHAN is essential to ensure economic viability and addressing global “hidden hunger”.

Keywords: Food security, Germplasm conservation, Hidden hunger, Nutritional security

Introduction

Underutilized vegetables are sometimes referred to as “orphan” or “neglected” crops and these are the plant species that are not grown on a large scale or not widely marketed despite their significant potential for improving global food security. These crops have received little attention in conventional agricultural practices and scientific research. These vegetables are naturally adapted to survive in adverse situations. They show high tolerance to drought, heat and poor soil conditions and need little external input, such as chemical fertilizers or irrigation. These underutilized vegetables are gaining popularity as “future smart foods” since they are nutritionally richer than worldwide popular crops. These crops provide valuable source of protein, vitamins, minerals and bioactive compounds like flavonoids and antioxidants that contribute to improved nutritional quality and human health. Promoting the routine consumption of these crops is a strategic approach to battle “hidden hunger” (micronutrient deficiencies) and can also offer many therapeutic benefits such as anti-diabetic, anti-inflammatory and anticancer properties.

Importance

Underutilized vegetables are crucial for sustainable food systems owing to their high nutritional value. They provide

concentrated vitamins and minerals that help to fight “hidden hunger” and micronutrient deficiencies. Their remarkable climate resistance makes them suitable for poor soils and adverse weather conditions, with little external input such as extensive irrigation or synthetic fertilizers. These crops are helping to stabilize farmers’ income, niche market opportunities and cheap production costs for smallholder and tribal populations (Shraddha *et al.*, 2024). These crops also enhance crop diversification by reducing over-dependence on a few major food crops like rice, wheat, maize, potatoes and tomatoes etc. The major benefits of underutilized vegetables are summarized in figure 1.

Nutritional Importance

Underutilized vegetables provide a healthier alternative to many easily available commercial crops. They are rich source of vitamins as well as important minerals. They provide important vitamins such as A, B-complex, C and E and minerals like iron for healthy blood, calcium for strong bones and zinc to boost our immunity. Their high fiber content aids gastrointestinal health and blood sugar regulation, while abundant antioxidants, including flavonoids and carotenoids, protect against cancer and cardiovascular diseases (Kaur *et al.*, 2025). These are also recognized as “future smart foods,” after having antidiabetic and anti-inflammatory properties,

Article History

RECEIVED on 12th March 2026

RECEIVED in revised form 25th March 2026

ACCEPTED in final form 27th March 2026

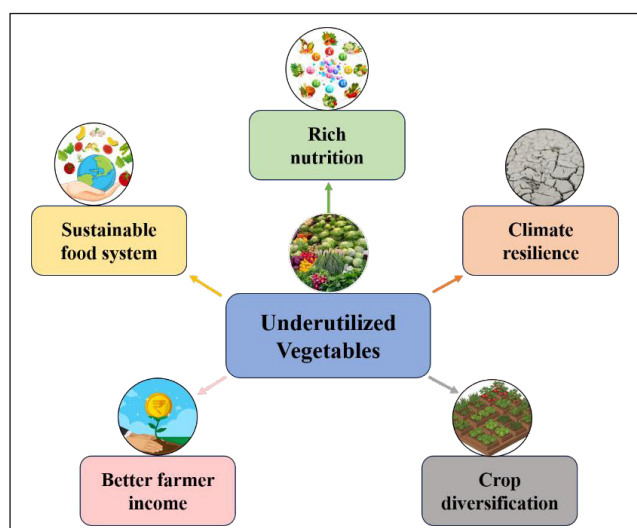


Figure 1: Major contributions of underutilized vegetable crops to sustainable food systems

making them critical for addressing the global “triple burden” of malnutrition.

Major Underutilized Vegetable Crops

Green leafy vegetables such as amaranth and moringa are important sources of vitamin A, vitamin C, iron and calcium. Winged beans and rice beans are hardy in nature, that can be grown in marginal soils and provide beneficial plant-

based protein. Spine gourd and ivy gourd are such unique species that are usually highly appreciated to manage health concerns like diabetes and digestion. Moreover, local favourites like elephant foot yam, water spinach and basella are significantly more nutritious than staples such as cabbage or tomatoes. These ‘hidden treasures’ offer an important resource to build a better, more diverse and more resilient food system for the future. Table 1 provides an overview of major underutilized vegetable crops and their distribution across India.

Contribution to Sustainable Food Production

Underutilized vegetables play very important roles in the diversification of the food production system and lowering the worldwide over-reliance on rice, wheat and maize, the three dominating staples, thereby enhancing food and nutrition security (Kaur et al., 2025). These “future smart foods” are generally much more nutrient-dense than conventional crops, providing key vitamins, minerals and antioxidants that are crucial for combating “hidden hunger”. They are highly climate resilient and grow in marginal soils and adverse weather conditions such as poor soils and extreme weather like drought, high temperatures and floods where mainstream commercial crops generally fail. Well adapted to low-input and organic farming, they need few external inputs and are very effective in kitchen gardens and urban agriculture, boosting household self-sufficiency and local economic opportunities.

Table 1: Major underutilized vegetable crops in India and their distribution

Crops	Scientific Name	Major Uses	Major Growing Regions
Leafy Vegetables			
Garlic chives	<i>Allium tuberosum</i>	Leafy vegetable, spice and condiment	North India, Himachal Pradesh and Northeast states
Basella (Indian spinach)	<i>Basella alba/B. rubra</i>	Leafy vegetable	West Bengal, Odisha, Assam and Southern India
Water spinach	<i>Ipomoea aquatica</i>	Leafy vegetable	North-East India, West Bengal and South India
Bathua	<i>Chenopodium album</i>	Leafy vegetable used in curries and parathas	North India and the Himalayan region
Chekurmanis	<i>Sauropus androgynus</i>	"Multivitamin green"; immature shoots and leaves used as vegetable.	Tamil Nadu and Kerala.
Agathi	<i>Sesbania grandiflora</i>	Leaves, flowers and tender fruits are used in curries and salads.	Tamil Nadu and throughout tropical India.
Common Purslane	<i>Portulaca oleracea</i>	Succulent leaves and stems eaten raw or cooked.	Throughout India, including the Himalayas.
Jute Mallow	<i>Corchorus olitorius</i>	Leaves used in mucilaginous soups and saag.	West Bengal, Assam and Odisha.
Ponnanganni	<i>Alternanthera sessilis</i>	Leaves, flowers and tender stems consumed as a cooling herb.	Eastern and Southern India.
Legume vegetables			
Winged bean	<i>Psophocarpus tetragonolobus</i>	Multipurpose vegetable, (pods, leaves, seeds and tubers)	North-East India, Bengal, Bihar and Western Ghats
Tree bean	<i>Parkia roxburghii</i>	Tender pods, seeds and young shoots are used as vegetable.	North-Eastern states (Manipur, Assam, Nagaland, Tripura, Mizoram)

Table 1: Continue...

Crops	Scientific Name	Major Uses	Major Growing Regions
Velvet Bean	<i>Mucuna pruriens</i>	Mature beans are boiled and eaten and used by tribal groups.	Nagaland, Uttar Pradesh and Bihar.
Sword Bean	<i>Canavalia gladiata</i>	Young fleshy seedpods are used as a vegetable.	South India (Eastern and Western Ghats).
Faba Bean	<i>Vicia faba</i>	Protein-rich seeds are used in various culinary preparations.	North India, including Uttar Pradesh, Bihar and the Himalayas.
Jack Bean	<i>Canavalia ensiformis</i>	Young green pods are eaten as a cooked vegetable.	North-Eastern region (Manipur, Meghalaya).
Cucurbits			
Chow-chow (Chayote)	<i>Sechium edule</i>	Fruit, starchy roots and leaves are used as vegetable	High hills of Meghalaya, Manipur, Mizoram, Nagaland and Sikkim
Pointed gourd (Parwal)	<i>Trichosanthes dioica</i>	Edible fruits and nutritious leaves	West Bengal, Bihar, Assam and Odisha
Spine gourd (Kakrol)	<i>Momordica dioica</i>	Tender fruits are used as a vegetable	Eastern and Northeastern India (West Bengal, Bihar, Assam)
Ivy Gourd	<i>Coccinia grandis</i>	Tender green fruits are used as a cooked vegetable.	South India and widely across tropical India.
Snap Melon	<i>Cucumis melo var. momordica</i>	Young fruits are used as vegetable.	Northeastern states.
Teasel Gourd	<i>Momordica subangulata</i>	Immature fruits are used as a vegetable (Kakrol).	Eastern and North-Eastern India.
Roots and Tubers			
Elephant foot yam	<i>Amorphophallus paeoniifolius</i>	Tuber, stem and leaves are used as vegetables	Tripura, Meghalaya, Bihar and Eastern Uttar Pradesh
Arrowroot	<i>Maranta arundinacea</i>	Tuberous rhizomes used as a source of high-quality starch.	Cultivated in regional pockets across India.
Yam Bean	<i>Pachyrhizus erosus</i>	Crisp underground tuber eaten raw or as a vegetable.	Bihar, West Bengal, Odisha and Chhattisgarh.
Others			
Vegetable Fern	<i>Diplazium esculentum</i>	Tender uncurling fronds (Dhekia) are used in stir-fries.	North-East India (Assam), West Bengal and Himachal Pradesh.
Clove bean	<i>Ipomoea muricata</i>	Tender fruits are used as vegetable	Kerala
Tamarillo (Tree Tomato)	<i>Cyphomandra betacea</i>	Ripe fruit pulp used for making delicious chutneys.	Meghalaya, Sikkim, Nagaland and Mizoram.
Lotus	<i>Nelumbo nucifera</i>	Stems, seeds and tender rhizomes used as vegetables.	Throughout India, particularly in wetlands.

Constraints

Several constraints, such as lack of improved varieties and undesirable agronomic features, such as asynchronous maturation, restrict the wide adoption of underutilized vegetables. Despite the nutritional and economic importance, these crops are neglected due to lack of awareness, inadequate market demand, minimal policy support, limited seed availability and no established seed certification system (Ali and Bhattacharjee, 2023). This forces the farmers to rely on low-quality, farm-saved seed. Besides, these crops are carrying higher economic risk than the mainstream staples due to unorganized supply chains, lack of cold-chain infrastructure and absence of minimum support

prices (MSPs). Figure 2 illustrates the main challenges and future opportunities for these crops.

Future Prospects

The future of underutilized vegetables depends on a multi-dimensional strategy that includes germplasm conservation in gene banks, community-based seed exchanges, farmer training programs, expanding local and regional markets, sharing traditional recipes and raising awareness about their nutritional value can encourage more people to grow and eat these vegetables. Value addition to these crops through the development of shelf-stable “superfoods” and functional snack products would enhance their marketability, reduce post-harvest losses and address the growing consumer

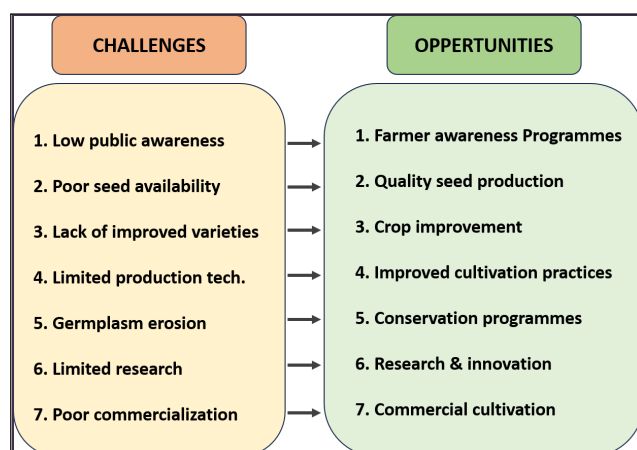


Figure 2: Major challenges and future opportunities for underutilized vegetable crops in India

demand for healthier plant-based solutions. The commercial scale-up of these products needs standardized agronomy and solid supply chains connecting farmers and urban consumers. Finally, strong government support through policy interventions such as subsidies under the Mission for Integrated Development of Horticulture (MIDH), extending Minimum Support Price (MSP) frameworks and integrating these 'Amrit Fasal' (Nectar Crops) into national nutrition programs such as PM-POSHAN is vital to ensure economic viability and combat 'hidden hunger' around the world.

Conclusion

Underutilized vegetable crops play a vital role for enhancing food and nutritional security for promoting sustainable agriculture. These crops are rich in essential nutrients, adapt well to diverse environmental conditions and require fewer inputs than many traditional vegetables. The cultivation and utilization of underutilized crops remain limited due to

poor public awareness, minimal commercial support and lack of research. This could increase diversity of vegetable production and development of farmers' livelihoods through farmer knowledge, conservation of native germplasm, improved production technology and more market opportunities. The growing impact of climate change and malnutrition, underutilized vegetable crops are emerging as valuable component of future sustainable food systems.

References

- Ali, A., Bhattacharjee, B., 2023. Nutrition security, constraints and agro-diversification strategies of neglected and underutilized crops to fight global hidden hunger. *Frontiers in Nutrition* 10, 1144439. DOI: <https://doi.org/10.3389/fnut.2023.1144439>.
- Kaur, S., Kaur, G., Kumari, A., Ghosh, A., Singh, G., Bhardwaj, R., Kumar, A., Riar, A., 2025. Resurrecting forgotten crops: Food-based products from potential underutilized crops a path to nutritional security and diversity. *Future Foods* 11, 100585. DOI: <https://doi.org/10.1016/j.fufo.2025.100585>.
- Kumaresan, M., Arumugam, V.A., Mariyappillai, A., Subramani, M., 2024. Nutritional content of underutilized vegetable crops: A source for nutritional security and human health. *Asian Research Journal of Agriculture* 17(2), 233-241. DOI: <https://doi.org/10.9734/ARJA/2024/v17i2442>.
- Shraddha, Bhardwaj, R.K., Shukla, Y.R., Akshay, D.A., Vashishat, R.K., 2024. Underexploited tropical and subtropical vegetable crops for diversification and nutritional security: A review. *Agroecology and Sustainable Food Systems* 48(8), 1094-1114. DOI: <https://doi.org/10.1080/21683565.2024.2348638>.