

Review Article

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Underutilized Vegetable Crops: A Lost Treasure

Madhvi^{1*}, Deepa Sharma¹, Aanchal Chauhan¹, Sanjeev K. Banyal² and Divya¹

¹Department of Vegetable Science, ²Department of Fruit Science, College of Horticulture & Forestry, Dr. YS Parmar University of Horticulture & Forestry, Neri, Hamirpur, H.P. 171001, India

*Corresponding author

ABSTRACT

Underutilized vegetable crops are those which are neither grown commercially on large scale nor traded widely. Some underutilized vegetable crops are Lettuce, Asparagus, Celery, Amaranthus, Globe artichoke, Leek, Chekurmanis, and Chinese cabbage etc. These crops are considered as valuable component to attain nutritional security because of their high content of vitamins, micronutrients and proteins. Most of underutilized vegetable crops are tolerant to harsh agro-climatic conditions. The possible reason for slow development and poor status of underutilized vegetable crops are lack of availability of planting material, lack of awareness on nutritional and medicinal importance and lack of information on production techniques. The government of India has been taking some steps to do research on underutilized crops like MIDH (Mission for Integrated Development of Horticulture), MEIS (Merchandize Export from India Scheme) and a national coordinated project has been also launched by Ministry of Agriculture. Basically, these underutilized vegetable crops have great potential for food security, income generation and environmental services and ultimately it makes Indian economy sounder.

Keywords

Underutilized vegetables, Diversification, Food security, Ecosystem stability, Economy

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Introduction

Over the last five hundred years, with increased contacts between contrasting population and the expansion of a trading system, 30 or so crops species have become intensively and are now the basis of much of the world's agriculture. Due to intensive vegetable cultivation the focus has shifted to limited number of crop species which result in

monoculture and it has narrowed down dramatically the number of species upon which global food security depends.

Although, India has diverse agro climatic conditions which is suitable for growing more than 60 cultivated and about 30 lesser known vegetable crops, not much attention has been given on underutilized vegetables known (Kumar *et al.*, 2018). Underutilized vegetable

crops are those to which little attention is paid or which are entirely ignored by consumers, agriculture researchers, plant breeders and policymakers. Usually, underutilized vegetable crops are not traded as commodities.

These species traditionally used for their food, fibre, fodder, oil and medicinal properties. These crops have less use because they are in some way not competitive with other vegetable crops.

These crops make system more sustainable through modifying and diversifying crop rotation, improving soil health and reducing the incidence of pests and diseases which occur in mono crop or short rotation cultivation system.

Food security and better nutrition, increased income for rural poor, ecosystem stability and cultural biodiversity are potential role of underutilized vegetable crops.

Features of underutilized vegetable crops and their product (Thakur, 2016)

Crop must have scientific proof of food value.
Crop must have been cultivated in the past or only being cultivated in a specific geographical areas and have indigenous uses in localized areas.

Crop must have less or no proper seed supply system.

Crop must be currently cultivated less than other conventional crops.

Received little attention from consumers, farmers, researchers and policy makers.

Importance

These crops provide diversification of diet leading to more balanced source of nutrients.

These crops play a role in keeping alive cultural diversity.

These crops are adaptable to severe environment.

They have potential to contribute to poverty eradication through employment and income generation.

They provide crop diversification and global food security.

Scope (as per various criteria)

Consumer demand

Rising: As lots of population whether young or old now a days have started preferring such vegetable seeking health benefits.

Marketability

Still in initial stages of development, lots of development need to be done regarding this by APMC (Agriculture Produce Market Committee) and Government to provide better channel for sale of produce.

Buyer

Shift of more wholesale buyers towards producers of such vegetables show great prospect of growth in future.

Store ability of crop

New released varieties of such crops have one of main focus is to increase the shelf life of produce which earlier hindered their market growth a lot.

Logistics and supply chain

This has a major issue associated with agriculture produce especially vegetable crops because of their perishability and improved supply chain management is necessary for catering to a growing demand.

Protective farming

Such crops are of high value and there is need of proper care and maintenance from

uncontrollable natural events. So, protective farming like Polyhouses is a great way to grow it seasonally as well as unseasonally.

Seasonality

Seasonality and availability issues associated with such crops can be eliminated by proper warehousing and steps are being taken in that field.

Constraints for development of underutilized vegetable crops

According to FAO's state of the World's Plant Genetic Resources for Food and Agriculture, 1998 the following are frequent constraints (Williams and Haq, 2000):

- Limited germplasm available.
- Lack of technical information.
- Lack of national policy.
- Lack of interest by researchers, agriculturist and extension workers.
- Lack of producer interest.

Indian government strategy for development of underutilized vegetable crops

Underutilized vegetable crops in India were initiated in 1960's at the Indian Agricultural Research Institute, New Delhi. This research was later extended by, All India Coordinated Research Project (AICRP) in 1982, with its headquarters at National Bureau of Plant Genetic Resources (NBPGR), New Delhi, towards, collection, evaluation, utilization and conservation of underutilized vegetable crops.

Later on, this work was also carried out in various parts of India (Joshi, 2005). Ravi *et al.*, discussed the underutilized crops to strengthen food security and alleviate poverty in India.

Various schemes launched by government for improvement of these crops

A Centrally Sponsored Scheme, is being implemented during XII plan with effect from 2014-15, for holistic growth of the horticulture sector covering all the horticultural crops including such underutilized vegetable crops.

Objectives

- Improved cultivar
- Creation of water resources
- Capacity building for farmers and technicians

Merchandize export from India scheme (MEIS)

In the new Foreign Trade policy- 2015-2020, with effect from 1.4.2015, Merchandize Export from India Scheme has been announced by Government.

It not only replaces five similar incentive under scheme available under the foreign Trade Policy 2009-2014, but it rationalize the incentives under the erstwhile scheme, removes various kind of restrictions and significantly enlarges the scope of the earlier scheme.

Exporters/Farmers are incentivized for export of such vegetables to specified markets which promotes the farmer to grow such vegetables as there is high demand in foreign market and many countries depend on India to fulfil their vegetable requirements.

Contribution of international research organisation for development of underutilized vegetable crops

International plant genetic research institute (IPGRI)

IPGRI has spearheaded, over the last few years, specific activities at national and

international level for the better conservation and use of underutilized species. IPGRI is very active global media to raise awareness on underutilized crops and the development of systems for their share of benefits arising from their use (Table 1).

International centre for underutilized crops (ICUC)

ICUC established in 1948 to address ways of increasing the use of under-utilized crops for food, medicinal and for environmental development.

International atomic energy agency (IAEA)

IAEA of FAO is organizing a project addressing the crop improvement of underutilized species for low income deficit countries using irradiation technologies.

Global facilitation unit (GFU)

The GFU is a multi-institutional initiative that acts globally to promote an extensive use of underutilized species through supporting and facilitating the work of other stakeholders. Underutilized vegetable crops are:

Amarnathus

Amarnathus is an annual or short lived perennial plant. Amarnathus serves as a cheap rich source of protein and dietary fibre (Shukla *et al.*, 2010).

It is important source of Vitamins, especially pro-vitamin A. Amarnathus leaves contain high content of carotene, micronutrients and phytochemical like isothiocyanates and phenolic compound which possess strong antioxidant properties and have been reported to help in the prevention and suppression of diseases such as cancer, ageing and arteriosclerosis.

Asparagus

Asparagus is an herbaceous perennial plant and known as Shatawar in Hindi. It is mainly grown for its tender succulent shoots known as 'Spears' which are used as vegetable and in the preparation of soups. It continues to produce yield for 10-15 years. Asparagus juice contains a white crystalline substance known as 'Asparagine' which has diuretic properties. It has great importance in diet because of its valuable salts, vitamins and for its large amount of cellulose contents. Large quantities of asparagus spears are canned and frozen.

Lettuce

Lettuce occupying the maximum area among salad vegetables. The tender leaves and head are consumed as salad. It is initially cultivated for its edible oil which is extracted from its seeds. It is rich source of vitamins A, calcium and iron. There are 4 types of botanical varieties of cultivated Lettuce 1. Head Type 2. Cos Type 3. Leafy Type 4. Stem Type. It is herbaceous annual and produces seeds in plain. It helps to prevent cancer, insomnia, heart diseases, control anxiety and it also has antimicrobial properties.

Elephant foot yam

Elephant foot yam is also known as white spot giant arum, stink lily. In Hindi it is known as zamikand, suran and sooran. It is perennial herbaceous plant. It is used as vegetable and also used in preparation of pickle, chips and others. It is also grown for its medicinal properties. It contains betulinic acid, stigma sterol, triacotane and lupeol (Ramalingam *et al.*, 2010). It also contains blood purifier properties and used for treatment of piles, tumours, asthma and rheumatism (Kirtikar and Basu, 1989). The corms of Elephant foot contain calcium

oxalate which imparts acidity and cause irritation in mouth and throat.

Pointed gourd

Pointed gourd is known as ‘King of gourd’. It is also known as Parwal, Pravar in Hindi. In India, it is often called Green potato. Its leaves are very nutritive and used leafy as vegetable. It is rich source of carbohydrates, Vitamin A, Vitamin C and minerals. Its juice is used as tonic, alopecia and subacute cases of enlargement of liver (Nadkarnier, 1996). It is dioecious climber with perennial root stock.

Underutilized vegetable crops have potential to solve nutritional problems and increase the

employment opportunities and finally it could contribute the national economy. Thus, these crops require special attention and must be commercialized in order to utilize to treat many lifestyle related ailments. The possible reasons for their low production are cost intensiveness, overdependence of farmers on traditional crops and high market price in current scenario.

There is a vital need to take up programme on genetic resources consideration, management, utilization and improvement of these crops to ensure the food and nutritional security for future. Thus, Government, GOs and NGOs has been taking some steps towards increasing the production of these crops.

Table.1 List of underutilized vegetable crops

S.NO.	Common Name	Scientific Name
1	Amarnathus	<i>Amarnathus spp.</i>
2	Asparagus	<i>Asparagus officinalis</i>
3	Lettuce	<i>Lactuca sativa</i>
4	Celery	<i>Apium graveolens</i>
5	Leek	<i>Allium porrum</i>
6	Globe Artichoke	<i>Cynara scolymus</i>
7	Elephant Foot Yam	<i>Amorphophallus campanulatus</i>
8	Brussels sprout	<i>Brassica oleracea var. gemmifera</i>
9	Kale	<i>Brassica oleracea var. acephala</i>
10	Chinese cabbage	<i>Brassica compestris spp.</i>
11	Winged bean	<i>Psophocarpus tetragonolobus</i>
12	Jack bean	<i>Canavalia ensiformis</i>
13	Pointed gourd	<i>Trichosanthes dioica</i>
14	Parsnip	<i>Pastinaca sativa</i>
15	Rhubarb	<i>Rheum rhabarbarrum</i>



INCREASE CONSUMER ACCEPTIBILITY & AWARENESS

PROVIDING BETTER WAREHOUSE FACILITIES TO CASH IN OFF SEASON DEMAND

PROCESSING OF SUCH VEGETABLES ALSO HAS A GREAT SCOPE, NOT ONLY FOR LOCAL DEMAND EVEN ALSO FOR EXPORTS.

PROMOTING INTENSIVE /LARGE SCALE CULTIVATION WHICH WILL RESULT IN CULTIVATION COST DROP LEADING TO AFFORDABLE PRICES FOR CONSUMERS, EVENTUALLY INCREASING THE DEMAND

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References

- Joshi, V., 2005. Some promising underutilized industrial crops for cultivation on wastelands of India. Green page: Article. *Natural Product Radianance*, 4(5), 396-403.
- Kirtikar, K.R., Basu, B.D., 1989. *Indian Medicinal Plants*, Published by Lalit Mohan Basu, Allahabad, India, 4, 2609-2610.
- Kumar, R., Rajashree, V., Sagar, L., Tripura, U., Karthick, K., Karthick, R., and Prasath, G., 2018. Underutilized vegetables as rich source of medicinal value: A boon for the Pharmaceutical industries and farmer income. *International Journal of Chemical Studies*, 6(4), 3320-3323.
- Nadkarni, A.K., 1996. *Indian materiamedica*. 3rd ed. Mumbai: *Popular Prakashan*, 3, 1236.
- Ramalingam, R., Hima, B.K., Bindu, M.B., Ravinder, N.A., and Banji, D., 2010. Phytochemical and anthelmintic evaluation of corm of *Amorphophallus campanulatus*. *International Journal of Pharma and Bio Sciences*, 4, 1-9.
- Ravi, S.B., Hrideek, T.K., Kumar, A.T.K., Prabhakaran, T.R., Mal, B., and Padulosi, S., 2010. Mobilizing neglected and underutilized crops to

- strengthen food security and alleviate poverty in India. *Indian Journal Plant Genetic Resource*, 1(23), 110-11.
- Shukla, S., Bhargava, A., Chatterjee, A., Srivastava, A., and Singh, S.P., 2010. Genotypic variability in vegetable amaranth (*Amaranthus tricolor* L) for foliage yield and its contributing traits over successive cuttings and years. *Euphytica*, 151(1), 103-110.
- Thakur, M., 2014. Underutilized food crops: Treasure for future India. *Food Science Research Journal*, 5(2), 174-183.
- Williams, J.T., Haq, N., 2002. Global research on underutilized crops - an assessment of current activities and proposals for enhanced cooperation. Southampton, UK: International Centre for Underutilized Crops. *International Standard Book Number*, 92-9043-545-3. Accessed on 21st August 2013.

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