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MAXIMIZING UNDEREXPLOITED VEGETABLE CROP PRODUCTION FOR FOOD SECURITY

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INTRODUCTION

India, renowned for its vast population representing approximately one-fifth of the global population and with over 70% of households engaged in farming, faces significant challenges in meeting the increasing demand for food. Despite the diverse agro-climatic conditions conducive to cultivating over 60 commonly known vegetable crops and approximately 30 lesser-known varieties, insufficient attention has been directed towards harnessing the potential of underutilized vegetables. These underutilized crops or plant species encompass those with untapped potential to contribute substantially to food security, nutritional and medicinal health, income generation, and environmental preservation.

Underutilized species, as defined by the National Academy of Sciences, exhibit potential for broader cultivation or utilization beyond their current scope. According to the National Research Council, underexploited crops are former widely cultivated species superseded by more attractive alternatives.

Amaranthus	Moringa	Kale
		

IMPORTANT FEATURES OF UNDEREXPLOITED VEGETABLES CROPS

- Few of these crops are cultivated commercially compared to other commonly grown crops.
- They have traditional uses within specific regions.
- These crops have not received attention from farmers, researchers, extension services, policymakers, or technology suppliers.
- They may offer high nutritional value and possess medicinal or therapeutic properties, among other potential therapeutic applications.
- They are characterized by their landrace varieties.
- They demonstrate the cultivation and utilization of indigenous knowledge.

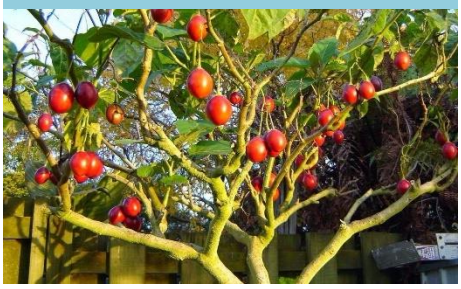
- ❖ They require minimal external inputs for production.
- ❖ They are well-suited for organic farming.
- ❖ These crops thrive in marginal agricultural lands with poor soil fertility.
- ❖ They are suitable for small-scale farming systems.
- ❖ They are easy to store and process, making them accessible to resource-limited communities.
- ❖ They present local business opportunities.

Globe artichoke	Basella	Ivy gourd
		

UNDEREXPLOITED SOLANACEOUS VEGETABLE CROPS

- ❖ The tree tomato is a perennial shrub commonly cultivated in the backyards of Meghalaya and Sikkim.

Tree tomato



- ❖ A small and delicate tree, typically reaching a height of 2-3 meters, bears plentiful egg-shaped berries with pointed ends, often clustered near the young shoots.
- ❖ The fruit, which hangs from long stalks, is smooth and egg-shaped with pointed ends, often appearing singly or in clusters of 3 to 12. It is capped with a persistent conical calyx.
- ❖ Tree tomatoes exhibit a variety of colors, including solid deep-purple, orange, yellow, or red-and-yellow.
- ❖ Fruits are with light orange pulp and seed are black in colour.
- ❖ Tree tomatoes are enjoyed as a tasty chutney, either consumed raw.

UNDEREXPLOITED LEGUME VEGETABLE CROPS

- ❖ These vegetables have a remarkable trait of biologically fixing nitrogen, which means they can contribute up to five hundred kg N/ha/year to the soil annually.
- ❖ Beans, a type of legume, are particularly important. They serve as a vegetable when immature and as a staple food crop when mature, holding significant importance in both stages.
- ❖ In addition to well-known varieties like French beans and vegetable peas, there are several other beans cultivated on a limited scale in various regions of the country.
- ❖ Beans serve as a vital source of protein, particularly in comparison to other food sources.
- ❖ Crops such as Broad beans, Cluster beans, Indian beans, Sword beans, Lima beans, Jack beans, Winged bean etc., contribute to the diversity and potential of legumes in a agriculture.

UNDEREXPLOITED CUCURBITACEOUS VEGETABLE CROPS

- Underutilized cucurbits are witnessing a resurgence owing to their nutritional and medicinal value, particularly due to their antioxidant properties.
- This category includes vegetables such as sponge gourd, wild cucumber, spine gourd, pointed gourd, ivy gourd, sweet gourd, and various others.
- Many of these cucurbits play a significant role as minor vegetables in the culinary practices of Northern, Eastern, and Southern India.
- Examples of such crops encompass the oriental pickling melon, long melon, Snap melon, spine gourd, sweet gourd, pointed gourd, ivy gourd, and more.

Unfortunately, inadequate policy measures have led to a lack of systematic efforts in estimating the cultivation area and production of these crops.

Winged Bean	Sword Bean	Lima Bean
		

ADVANTAGES OF UNDEREXPLOITED VEGETABLE CROPS

- These crops have the potential to alleviate poverty by generating income and providing employment opportunities.
- They help mitigate the risk associated with heavy reliance on a limited number of major crops.
- They contribute to sustainable livelihoods by enhancing food security for households through increased food diversity.
- These crops enrich diets with essential nutrients and serve as comfort food for urban populations with limited incomes.
- Well-suited to delicate ecosystems, they can bolster the resilience of agro ecosystems, particularly in arid, semi-arid regions, hills, steppes, and tropical forests.
- They offer a diverse range of crops to meet evolving market demands.
- These crops foster rural community development through small-scale initiatives.
- They are deeply intertwined with traditional ethnicities and values, embodying a rich cultural and sacred heritage. Thus, they represent an essential means of preserving and celebrating cultural and nutritional diversity.

LIMITATIONS OF THE UNDEREXPLOITED VEGETABLE CROPS

- There exists a lack of comprehensive data concerning the production, nutritional value, consumption patterns, and utilization of numerous underutilized plant products, which often receive less attention compared to widely popular fruits.
- There is a lack of awareness regarding the economic and business potential of these products.
- Limited access to value-added food processing technology at the village level hampers development.

- The absence of high-quality planting materials and effective software to shorten gestation periods and improve fruit quality is a significant challenge.
- There is a general lack of interest among researchers, farmers, and extension personnel in these underexploited crops.
- Manufacturers show little interest due to low yields and losses during post-harvest handling and transportation.
- The lack of a marketing network and infrastructure for underutilized fruits, along with the absence of a national strategy, further compounds the issue.
- Insufficient investment and access to credit further hinder the development of these crops.
- There is a notable scarcity of scientific tools for testing, evaluating, and managing post-harvest aspects of underutilized vegetables, which presents a significant challenge.

FUTURE PROSPECTS

- Emphasizing local traditions and indigenous knowledge.
- Encouraging collaboration among stakeholders within communities and fostering partnerships at the state, regional, and international levels.
- Sharing and disseminating success stories to drive progress.
- Employing market-oriented strategies to analyse and stimulate demand.
- Empowering and enhancing the negotiating capacity of rural communities, particularly the economically disadvantaged, in dealings with both the private sector and governmental entities.
- Incorporating gender-sensitive management and utilization approaches into mainstream practices.
- Adopting an interdisciplinary approach to addressing challenges and implementing solutions.

CONCLUSION

The conclusion is that we should diversify the plant species consumed by humans. This requires global awareness among researchers, planners, policymakers, growers, and consumers. We need to focus on preserving genetic diversity and utilizing underutilized species to develop better crops, which can help combat poverty, hunger, and malnutrition.