UNDERUTILIZED CROPS: A FUTURE SMART FOOD FOR ZERO HUNGER

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INTRODUCTION

Presently, achieving the goal of *"Zero Hunger"* which is defined as the eradication of all forms of hunger and malnutrition is a key challenge in many countries. Approximately 12% of the total global population, apparently most of them are from developing and underdeveloped countries are under the fangs of hunger and malnutrition. Although during 1970 to 1980's, we have achieved the goal of food security to some extent through the green revolution by increasing the production of few staple crops, however over the years, the global food and nutritional security in the world is constrained by many factors. Emerging evidences have suggested that increasing human population, unavailability of cropping land, overreliance on few staple crops, volatile prices of nutritionally wholesome food, changing climatic conditions and emergence of pandemic diseases are the major contributing factors in global food and nutritional insecurity. Altogether, the above circumstances invite investigation on alternate solutions for achieving the goal of Zero Hunger. Neglected and underutilized crop species (NUS), which are nutritionally sound, high yielding, low input requiring, climate-resilient, and locally available or adaptable crops, have been prioritized as *"Future Smart Food"*. The inclusion of underutilized crops in mainstream crop production and routine cuisine would be a one of the viable option in achieving the goal of Zero Hunger.

WHAT ARE NUS?

Neglected and underutilized crop species (NUS) are of less importance than staple food crops in term of total crop production and global market values. According to (Aboagye et al. 2007), crops whose contribution to the national economy has not been fully recognized and explored due to scientific ignorance, inappropriate policies, and programs. These underutilized crop species are also known as "*Indigenous crops*", "Minor crops" "*Neglected crops*", "*Orphan crops*", "*Alternate crops*" and "*Opportunity crops*". These crops constitute the bedrock of diversity in the food systems of local communities. These crops also have socio-cultural values for local farming communities, yet they remain untouched from being documented and scientifically investigated. Unlike the staple food crops, these are well adapted to marginal environmental conditions and offer sustainable production. Underutilized crops also have untapped potential to bring significant improvement in the socioeconomic status of the rural population by providing income as well as to broaden genetic resource basket for future crop improvement programs. The under-given attributes could be useful to classify a crop into the category of underutilized crops.

- Crops with poor documentation and scientific investigation.
- Adapted to specific geographical niche.
- Crops from wild and/or cultivated in traditional farming systems.
- Strongly linked with the cultural heritage of local farming communities.
- Excellent climatic resilience.
- Have less cultivated area as compared to the other conventional crops.
- Excellent nutritional profile and high yielding potential.
- Source of income generation for resource poor farmers.
- Weak or lack of efficient seed supply system.

UNDERUTILIZED CROPS AND FOOD AND NUTRITIONAL SECURITY

Food security is "reliable access to adequate and nutritious food that meets the dietary requirements and food preferences of all people, at all times for a healthy life" (FAO 2001). Presently in increasingly globalized and mechanized world, eradicating hunger and malnutrition is a prerequisite. Today we are about 7 billion and will reach 9 billion people by the year 2050. During this period, global food production has to be increased to meet the food as well as nutritional requirements of the teeming human population. Therefore, there is a dire need for diversification and intensification of our agriculture production systems. The inclusion of NUS species would be a viable strategy for fulfilling the aforesaid objective. Exploiting the large reservoir of NUS species would be useful in bringing provide multiple options to build temporal and spatial heterogeneity into cropping systems and ultimately a sustainable supply of diverse and nutritious food. Bringing diversity and intensification of cropping systems by including NUS species will also improve their adaptability to extreme climatic conditions and provide resilience to different stresses. For example, minor millets in India, due to their short life cycle and efficient root system have a comparative advantage over staple crops during drought stress. NUS species have been found resistant to many pests and diseases. These examples and combined with growing concerns over climate change and its impact on agriculture, contribute to a better appreciation of the role of NUS species in the attainment of food security and making cropping systems more resilient.

NUS species can be effective in ensuring both food and nutritional securities. NUS species have excellent nutritional profile thus offer opportunities to make the diets more nutritious thus seem to be playing a much greater role in improving nutrition and health. For example, rice bean (*Vigna umbellata*), has both sulphur containing amino acids in sufficient quantity along with other essential amino acids, *Chenopodium quinoa* has better protein quality than major cereals. NUS species also provide sufficient amount of essential micronutrients thus could play a role in improving micronutrient content in the diets of millions of people. It is widely accepted that increased consumption of locally available indigenous or traditional crops can improve human nutrition. Strategies based on diversifying diet with local food crops could be valuable and a sustainable complement to other means of tackling malnutrition.

CONCLUSION

Since the food habits of the people in today's globalization and urbanization of the world, achieving the goal of zero hunger is a key challenge. Therefore, it is pertinent that cropping systems in different parts of the world need to go under diversification and intensification. In this regard, NUS species alone or in combination with major staple food crops could make the goal of Zero Hunger achievable in the coming future. However, comprehensive and collaborative efforts are needed to prioritize NUS species as **"future smart food"** on a large scale.

Seeds of *Macrotyloma geocarpum*

Seeds of *Vigna subterranea*

Fruit and arils of *Blighia sapida*

Tubers of three most popular varieties of *Cyperus esculentus*

Crassocephalum rubens

Launaea taraxacifolia

Seeds of egussi: *Citrullus lanatus* (at the top), *Cucumeropsis mannii* (at the bottom)