



POLICY BRIEF

COMBATING MICRONUTRIENT DEFICIENCIES THROUGH HOME GARDENS IN SRI LANKA

Vegetables and fruits are rich in micronutrients which are essential for healthy growth and development. In Sri Lanka, the average consumption of foods rich in micronutrients is low in comparison to the WHO recommendations. Inadequate availability of micronutrient-rich food at affordable prices is the key reason for low micronutrient intake levels in Sri Lanka. This policy brief suggests that promoting cultivation, harvesting and consumption of under-utilized food crops in home gardens is a feasible strategy to sustainably alleviate micronutrient deficiencies persistent in the Sri Lankan population.

Micronutrients, which include both vitamins and minerals, perform several critical functions in the human body and hence are considered as essential to maintain optimal health. Micronutrient deficiency, also referred to as 'hidden hunger' could lead to mental impairment, poor health and productivity and even death. Micronutrient deficiencies are recognized as an important global public health problem, with more than two billion people in the world affected. In Sri Lanka, deficiencies in iron, vitamin A, calcium, and zinc are prevalent.

Micronutrient deficiencies are associated with consumption of monotonous diets that are high in energy and low in protein and fat which are predominantly based on starchy staples with little animal products, and a few vegetables and fruits. The World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO) recognize the importance of fruits and vegetables, which are excellent sources of micronutrients, in the prevention of chronic diseases. The WHO recommends a minimum intake of 400 grams of fruits and vegetables per day (World Health Organization, 2003). Despite this recommendation, food consumption surveys conducted by the Department of Census and Statistics in 2016 revealed that an average Sri Lankan consumes only 113g of vegetables and 76g of fruits per day (Department of Census and Statistics, Household Income and Expenditure Survey, 2016). One reason for low consumption of fruits and vegetables is their non-availability at affordable prices.

In Sri Lanka, a substantial portion of fruits and vegetables are sourced from home gardens. Home gardens are also the home for some under-utilized food crops which are rarely eaten and are unknown and unfamiliar and have not received much attention by the local communities. Thus, the establishment and promotion of micronutrient-rich food

crops (both well utilized and under-utilized) within home gardens in Sri Lanka, is a viable strategy to address micronutrient deficiencies.

SRI LANKAN HOME GARDENS

Home gardens can be defined as a farming system with multiple farming components, such as annual and perennial crops, livestock and occasionally fish, on an area of land around the family home. Home gardens provide environmental services, household needs, and employment and income generation opportunities to households. The diversity of home gardens is based on several factors including; geography, tree density, plant and animal diversity, and socioeconomic and cultural aspects of households members.

In Sri Lanka, approximately 14 percent of the total area of the country is covered by home gardens (Department of Census and Statistics, 2002). There exist 1,415,625 home gardens in Sri Lanka covering 188,994 acres of land (Department of Census and Statistics, 2002). Most home gardens in Sri Lanka are rich in food crops. The common food crops found in home gardens in Sri Lanka can be categorized as cereals, vegetables, leafy vegetables, spices, legumes, oil crops, root and tuber crops, fruit crops and herbal crops. Livestock and poultry do not occupy a significant position in home gardens of Sri Lanka.



Table 1 shows some important micronutrient-rich food crops existent in Sri Lankan home gardens. Interestingly, most of them are under-utilized, meaning that these species are not widely grown, rarely found in the market and not cultivated commercially. They have lost their significance among the present generation due to several reasons, mainly urbanization, which has prevented people from cultivating their own food, and also their changing food habits which includes eating away from home and giving priority to processed, readily prepared food. In order to popularize these species and increase incentives for their production, FAO recommends these foods to be re-labeled as Future Smart Food (FSF) (Food and Agriculture Organization of the United Nations, 2018).

TABLE 1: SOME IMPORTANT MICRONUTRIENT RICH ‘FUTURE SMART FOOD’ CROPS IN SRI LANKAN HOME GARDENS

Food item	Examples
Cereals	Finger millet, Sorghum, Little millet, Heen Meneri and Thana hal
Vegetables	Kekiri, Thibbatu, Bitter gourd, Ash gourd, Diyalabu, Bread fruit, Jack fruit, Okra, Chilies, Ridged gourd, Tomato, Murunga, Beans, Brinjal, Elabatu, Snake gourd, Long bean
Leafy vegetables	Thampala, Sarana, Thebu, Kirihenda, Spinach, Gotukola, Kowakka, Kohila, Kathurumurunga
Spices	Cinnamon, Turmeric, Lemon grass, Cardamom, Goraka, Curry leaf, Nutmeg, Rampe, Pepper, Cloves, Ginger
Legumes	Black gram, Green gram, Cowpea, Horse gram
Oil crops	Mustard, Soya bean, Ground nut, Sesame
Root and Tuber crops	Kiriala, Gahala, Welala, Buthsarana, Taro, Raja ala, Sweet yam, Greater yam, Sweet potato, Cassava, Coco yam
Fruit crops	Rose apple, Lawulu, Sidaran, Bilin, Beli, Kamaranga, Nelli, Banana, Papaw, Mango, Pineapple, Avacado, Kurumba, Woodapple, Guava, Katu anoda, Weli anoda, Peni dodam, Durian, Rambutan, Mangosteen, Cashew, Soursop, Sweetsop, Carambola, Gaduguda, Sapodilla, Jam, Passion fruit, Kunth, Pomegranate, Amberella, Dan, Madan
Herbal crops	Ginger, Endaru, Welpenela

FUTURE SMART FOODS IN HOME GARDENS: A HIDDEN ALTERNATIVE TO IMPROVE FOOD AND NUTRITION SECURITY IN SRI LANKA

Several studies highlight the key role of home gardens in enhancing food security by providing direct access to a variety of nutritionally rich foods, increasing purchasing power from savings on food bills and income generation from product sales, and by providing a fallback food during periods of temporary food scarcity (Pushpakumara, Wijesekara, & Hunter, 2010; Galhena, Dilrukshi, Freed, Russell, & Maredia, 2013; Marambe, Pushpakumara, Weerahewa, & Punyawardena, 2012; Daulagala *et al.*, 2012). The combination of trees, crops and livestock with different production cycles and rhythms provides a relatively uninterrupted supply of food products, which helps to increase the self-reliance of households (Pushpakumara, Wijesekara, & Hunter, 2010).

The benefits of home gardens extend outside the household, as often, the harvest from home gardens is shared among neighbours which are particularly helpful in achieving food security in rural villages. Most home gardeners tend to grow various kinds of food crops which assure the food supply throughout the year. Research findings indicate that sustainable production of various foods and direct access to these foods is helpful in achieving the nutritional quality of meals and diet of the households (Pushpakumara, Marambe, Silva, Weerahewa, & Punyawardena, 2012).

Under-utilized food crops are generally low yielding and do not require application of large amounts of agricultural inputs purchased from the market. This is due to inter-relationships among different components of the home garden system. For example, the output

of one component becomes an input to another hence application of purchased inputs is minimal. As a result, the cost of cultivation and harvesting of home garden produce is lesser and hence more affordable. This suggests that increasing plant diversity in home gardens could help achieve food and nutrition security in households. Another desirable feature of the under-utilized food crops is their resistance to various biotic and abiotic stresses. Home gardens are known to be climate smart eco-systems. Introducing selected under-utilized fruit and vegetable species based on the nutrient composition of species, and creating awareness among households with regard to their nutritional value, are two feasible avenues for home gardens to support food and nutrition security and alleviate micronutrient deficiencies.

CHALLENGES

Despite all these advantages of traditional food crops, there are some elements that have prevented their widespread utilization. Time limitation, land scarcity, scarcity of seeds or plants, lack of awareness about their medicinal and nutritional value, low economic value of produce, inadequate awareness of how to prepare these foods by younger generations and insufficient options for value addition can be identified as reasons for less availability and under-utilization of 'Future Smart Foods' available in home gardens in Sri Lanka. Only a small fraction of home gardeners are engaged in cultivating these foods in their home gardens, and some do not even harvest or consume what is available.



HOW TO PROMOTE AVAILABILITY AND UTILIZATION OF UNDER-UTILIZED CROPS IN HOME GARDENS

Having realized the importance of home gardens, the national development policy framework of the Government of Sri Lanka has included various strategies to expand and improve food production of home gardens. The National Agriculture Policy of 2007 highlights the need to promote home gardens, especially focusing on the urban sector. The development programmes that focus on home gardens include “Api Wawamu Rata Nagamu” (Let us grow and uplift the nation) in 2007, “Divi Neguma” (Livelihood development) in 2011, and the home gardening promotion programme under the Food Production National Programme implemented since 2016. The key strategy adopted by these programmes is intensification of the home gardens and activities including training, extension and provision of planting materials.

Whilst the above measures aid to enhance food production in home gardens, the following fundamental issues need to be addressed in order to ensure food and nutritional security in a sustainable manner; (a) Improved understanding of the system with planned introduction and utilization of protocol for plant/tree/ animal species; (b) understanding the key reasons as to why some micronutrient-rich food crops are under-utilized in home gardens; and (c) ensuring appropriate measures are included into the system to lead to enhanced utilization. Other strategic interventions would be the selection of species based on unique nutrition issues in a particular area, for example, vitamin A or iron deficiencies, and integrating home garden skills training with health and nutrition education.

Accordingly, the following recommendations are proposed:

(i) Improving the understanding of the system and planned introduction and utilization protocol for plant/tree/ animal species:

- providing easy access to planting materials, facilitating the sharing of planting materials and proper guidance to maintain efficient and creative home gardens;
- introducing appropriate technologies and crop management techniques to home gardens to increase productivity and quality of harvest;
- introducing technology packages, such as induction of flowering, proper pruning of food crops, and rejuvenation which are essential to enhance productivity; and
- replacing old varieties with improved varieties or with plants obtained by vegetative reproduction which are more productive.

(ii) Understanding the key reasons as to why some micronutrient-rich food crops are under-utilized in home gardens:

- Better understanding of the reasons as to why animal components are excluded in the majority of home gardens in Sri Lanka and adopt appropriate measures to include them into the system.

(iii) Selection of species based on unique problems of the area and household needs (i.e. malnutrition due to vitamin A or iron deficiencies or poverty):

- Design programmes to increase consumption level of micronutrients-rich under-utilized food crops among households. This can be done by recognizing and promoting the complementarities of these foods with existing staple crops for nutrition enhancement, climate change resilience and diversification of cropping systems, and re- label NUS as 'Future Smart Food (FSF)' to popularize these species.

(iv) Integrate home-garden skills training with health and nutrition education programmes:

- Public awareness of the nutrition-sensitive and climate-resilient benefits of 'Future Smart Food' crops to address hunger, malnutrition and climate change should be raised among decision makers and the public through information sharing. Food festivals, media advertisements, diversity fairs, food competitions and food tasting using indigenous foods should also be promoted.

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