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MINOR FRUITS IN NUTRITIONAL GARDEN: AN APPROACH TO ACHIEVE HOUSE HOLD NUTRITIONAL SECURITY

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Abstract: For a healthy and productive nation, it is extremely necessary to nourish the entire population with adequate quantity of good quality and safe food. The diet of an average Indian is not properly balanced having more cereals consumption and inadequate amounts of vegetables and fruits. Vegetables occupy an important place in our daily life particularly for vegetarians. They increase only the nutrient value of the diet as well as the food but also palatability. Their shortfall in daily diet may lead to malnutrition, poor health and consequently other ailments.

The presence of various nutrients is essential in nutrients for substantive growth and development. The nutrients include of carbohydrates, proteins, fats, vitamins and minerals. The deficiency of any one or more of these may lead to malnutrition. Vitamins and Minerals are essential for optimal development & functioning of our immune system and therefore, are categorized as protective foods. In India 230 million people from different regions are suffering from malnutrition and related health problems such as blindness, osteomalacia and infant mortality due to lower intake of protective food.

Keywords: Adequate, Palatability, malnutrition, nutrients and protective food

Introduction: The achievement of nutrition security at the household level involves adequacy of food supply at the national level and equitable distribution of food among the population in accordance with their physiological needs ^[1]. Household gardening is the mixed cropping of fruits, vegetables, herbs, spices and other useful plants as a supplementary source of food and income ^[2]. It is an age-old practice that is common to rich and poor countries alike. The word 'garden' connotes that the - primary purpose is own household food production rather than selling (as opposed to 'fields'), though any surplus can be shared with neighbours or sometimes sold. The garden has a functional relationship to the homestead but also can be located alongside fields, rail tracks, streams, or rivers; hence 'household' rather than 'home' gardens.

Today the world has enough food to feed everyone, yet an estimated 854 million people worldwide are still undernourished ^[3]. Poverty – not food availability – is the major driver of food insecurity. Improvements in agricultural productivity are necessary to increase rural

household incomes and access to available food but are insufficient to ensure food security. "Food Security" is achieved when it is ensured that "all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which needs their dietary needs and food preferences for an active and healthy life" ^[4]. The relationship between increased food production and better nutrition and health of producing households is less straightforward than often assumed ^[5-6]. For instance, income from the sale of crops often is not used to buy quality food for the household. With the development of modern agriculture practices the potential of many of these commodity resources have been neglected. Nevertheless, in much of the world underutilized crops and commodities play a vital role in the lives of the rural and urban poor people, because they contribute to livelihoods, poverty alleviation and sustaining the environment.

One of the easiest ways of ensuring access to a healthy diet that contains adequate macro and micro nutrients is to produce many different kinds of foods in the home garden. This

is especially important in rural areas where people have limited income-earning opportunities and poor access to markets. Home garden are also becoming an increasingly important source of food and income for poor households in peri urban and urban areas.

Home gardens are found in many tropical and sub-tropical parts of the world. They are sometimes called backyard or kitchen gardens, which use the available fresh water as well as kitchen and bathroom waste water for cultivation in a small area. This is a safe practice, which does not have any toxic residues of pesticides in the vegetables produced. These gardens have an established tradition and offer great potential for improving household food security and alleviating micronutrient deficiencies [7]. Gardening can enhance food security in several ways, most importantly through:

1. Direct access to a diversity of nutritionally-rich foods.
2. Increased purchasing power from savings on food bills and income from sales of garden products.
3. Fall – back food provision during seasonal lean periods

A well developed home garden has the potential, when access to land and water is not a major limitation, to supply most of the non – stable foods that a family needs every day of the year including roots and tubers, vegetables and fruits, legumes, herbs and spices. Roots and tubers are rich in energy and legumes are important sources of proteins, fat iron and vitamins. Green leafy vegetables and yellow or orange coloured fruits provide essential vitamins and minerals. Vegetables and fruits are a vital component of a healthy diet and should be eaten as part of every meal. They are especially important in infant's diet to ensure normal growth and brain development.

The minor underutilized fruits being nutritionally rich can easily provide nutritional security. If these are incorporated in nutrition garden and properly utilized, has great potential as a source of food, besides, meeting

multipurpose needs of local communities. The minor fruits can provide remunerative novelty food too. The importance of these less known fruits is increasing as people discovered new usefulness compounds such as low caloric sweeteners, insecticidal compounds and gamma linolenic acid [8]. As alternate these fruits help diversification in agriculture besides catering to multifarious human needs [9].

Nutrition and Health Training

Nutrition: A lack of essential vitamins and minerals (particularly vitamin A, zinc, iron, folic acid, and iodine) often goes unnoticed by people affected and is therefore called 'hidden hunger' [10]. Improving human nutrition through gardening first requires people to become aware of the problem, its causes and consequences, and possible solutions. Raising nutritional awareness aims at enhancing understanding of:

- Macronutrients (carbohydrates, proteins, fats) and micronutrients (vitamins and minerals) metabolism, their food sources, functions, and related disorders.
- The importance of a balanced diet (dietary diversity), the nutritive value of different food groups (e.g. staples, legumes, fruit, vegetables, animal sources of food), and the association between fruit and vegetables colours and they nutrients contents.
- Good food and nutrition practices, including tips for food storage and processing, food safety, and preserving the nutritive quality in meal preparations.
- Nutritional awareness training should target women in charge of meal preparation, but must also include their husbands and grandmothers to have a major influence on the household's food behaviour. After the training, household members should feel motivated to improve family health through household.

Potential minor fruits of India: The major domesticated minor fruits grown in tropical and sub- tropical part of the country are as under

Common Name	Botanical Name
Bale	<i>Agle marmelos</i>
Monkey jack	<i>Artocarpus lakoocha</i>
Palmyra palm	<i>Borassus Flabellifer</i>
Ker	<i>Capparis decidua</i>
Karonda	<i>Carrisa congesta</i>
Citron	<i>Citrus medica</i>
Elephant apple or Chalta	<i>Dillenia indica</i>
Aonla	<i>Emblica officinalis</i>
Wood apple	<i>Feronia limonia</i>

Kokam	<i>Garcinia indica</i>
Khirni	<i>Manilkara hexandra</i>
Tree bean	<i>Parkia roxburghii</i>
Date sugar palm	<i>Phoenix silvestris</i>
Khejri	<i>Prosopis cineraria</i>
Jamun	<i>Syzygium cumini</i>
Indian jujube	<i>Zizyphus nummularia</i>
Jharber	<i>Zizyphus nummularia</i>
Chironji	<i>Buchanania lanzan</i>
Lasora	<i>Cordia mixa</i>
Tendu	<i>Diospyros melanoxyl</i>
Phalsa	<i>Grewia subinaequalis</i>
Mahua	<i>Madhuca indica</i>
Pilu	<i>Salvadora species</i>

Nutritive Importance of Minor Fruits: As mentioned above the fruits provide more or less all the nutrient but these are of outstanding value for vitamins and minerals such as.

especially eye and skin, night blindness and dryness of eye. The minor/underutilized fruits rich in vitamin ‘A’ content are presented as under:

Vitamin “A”: The deficiency of vitamin A can cause stunted growth, proneness to infection

Name of fruits	Vitamin A (IU)
Artocarpus heterophyllous	175-540
Diospyros kaki	2000-2710
Eugenia uniflora	1200-2000
Fortunnella sp.	2530
Moringa oleifera	184
Gnetum gnemon	10889
Wild mango	1000-4800

Vitamin ‘C’: It is essential for growth, resistance to disease and formation of healthy bones and teeth. Average requirement of vitamin C in the body of human being varies from 20-27

mg. Its deficiency is wide spread in the world. The minor fruits are rich in vitamin C and some of them are extremely rich source such as:

Common Name	Botanical name	Ascorbic acid (mg/100g pulp)
Kiwi Fruit	<i>Actinidia chinensis</i>	300
Sugar apple	<i>Annona reticulate</i>	41-44
Custard apple	<i>Annona squamosa</i>	42
Aonla	<i>Emblica officinalis</i>	500-625
Surinam cherry	<i>Eugenia uniflora</i>	25-44
Kumquat	<i>Fortunalla spp.</i>	52-151
Barbados cherry	<i>Malpighia glabra</i>	1500-5600
Passion fruit	<i>Passiflora edulis</i>	35-50
Manila tamarind	<i>Pithecollobium dulce</i>	138
Straberry guava	<i>Psidium cattleianam</i>	25-50
Chinese jujbe	<i>Zizyphus jujube</i>	188-544
Indian jujub, (ber)	<i>Zizyphus mauritiana</i>	39-166

Minerals: Calcium, Phosphorus and iron are the major minerals required by the human body in addition to sodium and potassium. The calcium gives strength and firmness to the bones, helps formation of healthy teeth and is also necessary for clotting of blood and movement of muscles. The rich sources of calcium are tamarind

(0.74%), Bale (0.09%), Wood apple (0.03%). Iron is essential for development of blood and body cells. Karonda, Green Mango, Custard Apple, jamun are rich source of iron. The amount of minerals in 50gm of the edible portion of the fruit is presented in the table given below:

Fruits	Mineral (g)	Calcium (g)	Phosphorus (g)	Iron (mg.)
<i>Tamarindus indica</i>	1.45	85	55	5.5
<i>Ficus religiosa</i>	1.15	145	45	-
<i>Cordia dichotoma</i>	1.10	20	30	-
<i>Manikara elangii</i>	1.15	106	15	-
<i>Moringa oleifera</i>	1.00	15	55	2.7
<i>Feronia limonia</i>	0.95	65	55	2.7
<i>Ficus bengalensis</i>	0.95	132	22	-
<i>Aegle marmalos</i>	0.85	43	25	0.3

<i>Buichannania lanzan</i>	0.85	39	14	-
<i>Fcus cunia</i>	0.80	94	20	-
<i>Bambusa arundinacea</i>	0.80	5	55	0.8
<i>Flacourtia indica</i>	0.65	50	50	-
<i>Grewea asiatica</i>	0.55	65	20	1.6

Conclusion: A homestead garden is a garden near a home that is designed to provide vegetables to the family throughout the year, as well as supplemental income if there is a surplus production result. The vegetables are carefully chosen so that they contain the key necessary vitamins and minerals, are suitable to the climate of the region, and provide a continuous supply.

The main objective of a nutritional kitchen garden is the maximum output and a continue supply of vegetables for the table throughout the year. In rural and semi urban area, availability of land is more and one can go for production of all type of fruits and vegetables according to the requirement and choice of the family. Moreover, farmers in rural areas may take it up in more intensive way by following proper crop rotation and improved agro-technologies for good production.

Minor food crops are product of rainfed horticulture. They are valued source of essential nutrients for human body and health promoting substances especially vitamins, minerals organic acids, flavonoids, pigments, carotenoids etc. Therefore, not only important in nutritional security but heath security also.

It will help not only to improve the nutritional security of the household level but also to reduce the market price of vegetables as well. It is a better way for physical exercise and also nourishes the plants and cereals basic values of work- ethic, self sufficiency and responsibility among the family members.

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