

# **A STUDY ON CONSUMPTION PATTERN & AWARENESS OF UNDERUTILIZED FRUITS AMONG URBANITES WITHIN MAHARAGAMA DS DIVISION**

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## **INTRODUCTION**

Sri Lanka has around 60 underutilized crops with rich potential. Most of these underutilized species have lost their significance among the present generation due to many reasons such as urbanization and changing food habits. There is no organized or proper cultivation of these crop species. Most of these underutilized plant species are fruit crops and they are found in wild habitats or in home gardens, which are 100 m<sup>2</sup> to 1,000 m<sup>2</sup> in extent and are commonly found in many rural areas of Sri Lanka. (FAO 2015) Vitamins and minerals can be returned to contemporary diets through the use of micronutrient-rich underutilized and neglected species by transplanting them from their wild habitats into home gardens. (FAO 2014)

Neglected and underutilized species are those to which little attention is paid or which are entirely ignored by agricultural researchers, plant breeders and policymakers. Typically, underutilized species are not traded as commodities (Malkanathi *et al.*, 2014). Many of these varieties and species, along with a wealth of traditional knowledge about their cultivation and use, are being lost at an alarming rate, although they have been used for centuries for their food, fibre, fodder, oil or medicinal properties. Underutilized fruit (UUF) crops have many values such as, rich in nutrients, high potential to survive, easy management, environmental friendliness, *etc.* Despite low yield and relatively longer duration, the underutilized indigenous cultivars are palatable and are resistant to pests and diseases, as well as being tolerant to drought and natural hazards (FAO 2014). But these are disappearing from the consumption of most of the people, primarily in urban areas. So, the purpose of this research is to find out the reasons for under consumption of those fruits. Neglected and underutilized food resources constitute the bedrock of the diversity in traditional and indigenous food systems of developing country communities. Traditional and indigenous foods are less deleterious to the environment and address cultural needs and preserve the cultural the cultural heritage of local communities. (FAO 2014)

## **METHODOLOGY**

The research approach was deductive and survey strategy was used as the research strategy. Primary data was obtained through pre tested interviewer administered structured questionnaire and the response rate was 95%. The Maharagama Divisional Secretariat (DS) Division was selected randomly among other DS divisions in Colombo district and 100 households were selected by using multi stage sampling technique for the study. Sixteen (16) underutilized fruits in Sri Lanka were used to investigate the consumption patterns of urban people as stated in the Table 1. Data were analysed by using Microsoft Excel 2010 and SPSS Statistical Analysis 16.0 Software programs. Frequency Distribution and Chi-square Tests were used as the statistical techniques which was applied for the quantitative analysis of data.

## **RESULTS AND DISCUSSION**

### **Socio- economic characteristics of the consumers**

The major characteristics of the consumers who belong to the sample; age, gender, household size, educational level, occupation, monthly income, nationality and religion were observed in order to find the relationship between the underutilized fruits and the consumption patterns. The majority, 31% of the consumers relatively, falls within the category between 40-50 years

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of age and 21% falls within the category of age more than 60 years. This shows that the majority (more than 50%) of the sample are the people over 40 years of age, hence the elder generation is highly focused. Of the consumer families, 31% consisted of 3 member families, 30% consisted of 5 member families and 23% consisted of 4 member families. The majority of the responded (more than 50%) families consist of more than 4 member families. Of the consumers 64% were women who represent the majority of the sample.

**Table 1.** List of Underutilized fruits which was used to investigate the consumption patterns

No	Common name	Scientific name
1	Louvi( <i>lovi</i> )	<i>Flacourtia inermis</i>
2	Bitter orange ( <i>Ambuldodam</i> )	<i>Citrus aurantium</i>
3	<i>Uguressa</i>	<i>Baccaurea motleyana</i>
4	Rose apple	<i>Syzygiumspp</i>
5	Ceylon atalantia ( <i>naranspp</i> )	<i>Atalantia ceylanica</i>
6	Pomelo	<i>Citrus maxima</i>
7	Annona/Custard apple	<i>Annona muricata</i>
8	Sapodilla	<i>Manilkara zapota</i>
9	<i>Himbutu</i>	<i>Salacia reticulata(spp)</i>
10	<i>Madan</i>	<i>Carissa ovata spp.</i>
11	Golden apple/bael ( <i>beli</i> )	<i>Aegle marmelos</i>
12	<i>Nelli</i>	<i>Phyllanthus emblica</i>
13	Ceylon olive ( <i>weralu</i> )	<i>Laeocarpus serratus</i>
14	Wood apple	<i>Limonia acidissima</i>
15	Mangrove apple ( <i>Kirala</i> )	<i>Sonneratia caseolaris</i>
16	Egg fruit ( <i>Laulu</i> )	<i>Pouteria_campechiana</i>

It was found that 44% of the consumer's educational level is up to advanced level and 17% of the respondents are graduates hence it reveals that most of the consumers in the Maharagama DS Division were well educated. Twenty nine percent of the respondents had studied upto Ordinary Level. Regarding monthly income, 26% of the customers in the sample fall into income category of SLR 20,000 - 30,000 income level, 21% falls into SLR 30,000-40,000 income level. Nearly 50% of the respondents are having incomes between SLR 20,000 and 40,000 depicting that most of the respondents are in medium level of the social strata based on income. Eighty one percent of the sample represents the nationality of Sinhala and 72% of the sample represents Buddhists.

In order to study the consumption pattern of underutilized fruits the normal fruit consumption behaviours was investigated to obtain a background for the study. Of the households 65% directly purchase fruits for their day-to-day consumption rather than growing them in their home gardens. There are many reasons which were obtained for not cultivating underutilized fruits in their homegardens as mentioned below. Ninety nine percent of consumers prefer to buy fruits in their fresh form depicting that most of the people like to consume fresh fruits as they possibly can and only 2% of the sample is engaged with commercial fruit selling. Most of the people consume banana, papaya and mango in their day-to-day consumption compared to the other fruits. As figure1 depicts, among their popular fruit types, banana has 96% of popularity, papaya has 76% and mango has 51% of popularity within households.

#### **Consumption pattern of selected 16 underutilized fruits among households**

Consumption pattern was examined obtaining 5 parameters such as daily consumption, frequently consumed, periodically consumed, seldom and never, based on a time scale.

#### **Average Consumption frequency of underutilized fruits**

Depicting that urban people rarely or never consume underutilized fruits, there is 44% of the households who never consume underutilized fruits, 28% rarely consume, 24% periodically, 3.6% frequently and 0.44% daily consume underutilized fruits as a whole.

**Figure 1.** Consumption frequency rate of the selected UUF among households.

No	Common name	Consumption frequency of fruits				
		Daily	Frequently	Periodically	Rarely/Seldom	Never
1	<i>Louvi /lovi</i>	-	-	19%	<b>43%</b>	38%
2	Bitter orange	-	4%	<b>35%</b>	<b>35%</b>	26%
3	<i>Uguressa</i>	-	1%	19%	<b>43%</b>	37%
4	Rose apple	-	-	35%	<b>43%</b>	22%
5	Ceylon atalantia ( <i>naran</i> spp)	6%	16%	<b>32%</b>	25%	21%
6	Pomelo	-	5%	10%	<b>47%</b>	38%
7	Annona	-	3%	21%	<b>35%</b>	41%
8	Sapodilla	-	-	10%	22%	<b>68%</b>
9	<i>Himbutu</i>	-	-	-	-	<b>100%</b>
10	<i>Madan</i>	-	-	2%	5%	<b>93%</b>
11	Beli (Bael)	-	16%	<b>49%</b>	20%	15%
12	Nelli	1%	5%	35%	<b>45%</b>	15%
13	Ceylon olive ( <i>weralu</i> )	-	3%	<b>48%</b>	40%	9%
14	Wood apple	-	6%	<b>71%</b>	19%	4%
15	Mangrove apple ( <i>Kirala</i> )	-	-	2%	13%	<b>35%</b>
16	Egg fruit ( <i>Laulu</i> )	-	-	3%	7%	<b>90%</b>

#### **The association between socio-economic factors and consumption pattern of UUF**

Among the above 15 fruits the relationship between consumption pattern and socio-economic factors were tested using chi square test. There was no relationship with the consumption pattern of fruits with socio-economic factors except, bitter orange and Ceylon atalantia (*naran*), those also with income level only. This shows that income level affects the preference of underutilized fruits.

#### **Identifying the reasons for non-consumption of the given type of under-utilized fruits**

From Likert scale of 10 categories it was proved that the most common reasons of non-consumption of underutilized fruits are fruit scarcity which has 92% response rate and less commercial cultivation where response rate is 79%. Other reasons are high cost, less nutrient level, less tastiness, low market demand, seasonality, less awareness *etc.*

#### **Identifying the reasons for non-cultivation of UUF in Homegardens**

There were five factors which were tested by Likert scale for non cultivation of underutilized fruit crops in their home gardens. They were; time limitation, land scarcity, high cost of production, scarcity of seeds or plants and less awareness where 82% of the respondents have problems with land scarcity hence they cannot cultivate any kind of fruit. Also very few were engaged in cultivating UUF in their homegardens although home gardens provide sites to cultivate and domesticate valuable crops for the future through transplanting of micronutrient-rich, neglected and underutilized species from their wild habitats. (FAO 2014) A simple and inexpensive solution for improving the nutritional health of affected populations, particularly in the rural areas of developing nations, is to promote the consumption of micronutrient-rich neglected and underutilized species (NUS) of indigenous wild edible plants (IWFPs) (FAO 2014). Many neglected and underutilized species are nutritionally rich and are adapted to low input agriculture. The use of these species – whether wild, managed or cultivated – can have immediate consequences on the food security and well-being of the poor (FAO 2014).

Banana, papaya and mango are consumed by over 50% of the households that have these fruits in their home gardens. Home gardens play a minor role as the source of wood apple, pineapple and oranges, while consumption and availability of 17 less common fruit species were reported by less than 10 percent of the households (Chamila,2010).

## CONCLUSIONS/RECOMMENDATIONS

The fruits which are mostly popular among people in the Maharagama DS Division are banana, mango and papaya where banana has the highest popularity of 96%, papaya has the popularity of 76% and mango has 51% of popularity. Among the indicated underutilized fruits bitter orange and Ceylon atalantia (*naran*) are the only fruits which have a significant difference with socio-demographic factor income level. All other fruits except bitter orange and Ceylon atalantia (*naran*) have no relationship with any socio-economic factors. Even bitter orange and Ceylon atalantia (*naran*) has no relationship with socio-economic factors except monthly income level. The majority (43.88%) of households never consume underutilized fruits. From the other fruits, 28% rarely consume, 24% periodically, 3.6% frequently and 0.44% daily consumes underutilized fruits. Although there are factors such as high cost, less tastiness, less healthiness, *etc.* which affect non-consumption of underutilized fruits, the major factors were fruit scarcity and less cultivation. The factors which affect non cultivation in home gardens are land scarcity and less time availability.

Programs should be implemented to increase the consumption level of underutilized fruits among urban household. Programs which promote farming/cultivation of underutilized fruits commercially should be developed and farmers should be advised. Promoting the use of underutilized species needs to be achieved by highlighting their importance in their current production areas as well as exploiting further opportunities to extend their production and consumption (FAO 2014). Proper programs should be implemented to promote proper market facilities for underutilized fruits. Marketing strategies for underutilized foods and consumer awareness of the value of underutilized wild foods (FAO 2014). Education and behavioral change programs need to be promoted on underutilized fruit awareness and consumption where it should be based on local knowledge as the demographic, cultural and psychosocial factors affect consumer preferences. These programs should focus on translating accurate and useful information to consumer about the health benefits nutrient content, resistivity for adverse climates, *etc.* of underutilized fruits. Public awareness on the value of underutilized foods and information sharing; promoting food festivals, diversity fairs, food competitions, food tasting using indigenous foods; Multisectoral policy advocacy should be implemented (FAO 2014). Many neglected and underutilized species play a role in keeping cultural diversity alive. Different dishes were introduced to exemplify how to promote various underutilized wild plants in salads. Local farmers should keep growing native crop varieties, protect their food heritage and pass on traditional and local wisdom on how to eat and cook such produce (FAO, 2014).

## REFERENCES

- Rajapakse, C., Weerahewa, J., Pushpakumara, G. (2010). *Dietary Diversity versus Home Garden Fruit Diversity: A Case Study in Kandy, Kurunegala and Batticaloa Districts of Sri Lanka*, Retrieved January 20, 2015, from [www.http://www.slageconr.net/saea/arf/saea4tharf/saeaarfabs0412.pdf](http://www.slageconr.net/saea/arf/saea4tharf/saeaarfabs0412.pdf)
- Food and Agriculture Organization (2015). Country Report on the State Of Plant Genetic Resources For Food And Agriculture - Sri Lanka, Prepared by Department of Agriculture, in *State of World's Plant Genetic Resources for Food and Agriculture second report*. Retrieved January, 20, 2015, from [www.http://www.fao.org/docrep/013/i1500e/SriLanka.pdf](http://www.fao.org/docrep/013/i1500e/SriLanka.pdf)
- Food and Agriculture Organization (2014). Promotion of underutilized indigenous food resources for food security and nutrition in asia and the pacific, prepared by Patrick Durst and Nomindelger Bayasgalanbat, in *Food and Agriculture Organization of the United Nations regional office for Asia and the Pacific Bangkok*, 2014, Retrieved on January 20, 2015 from <http://www.fao.org/3/a-i3685e.pdf>
- Malkanathi, S. H. P., Karunaratne, A. S., Amuwala, S. D. & Silva, P. (2014) Opportunities And Challenges In Cultivating Underutilized Field Crops In Moneragala District Of Sri Lanka. *Asian Journal of Agriculture and rural Development* 4.1, 96-105.