



## HOUSEHOLD FOOD AND NUTRITIONAL SECURITY OF RURAL FAMILIES OF HAILAKANDI DISTRICT THROUGH NUTRITION GARDENING

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### ABSTRACT

*Fruits and vegetables play a noteworthy role in human nutrition. They are packed with full of goodness and often contain a numeral of essential vitamins and minerals that cannot be found in other types of foods and are known as the reservoirs of vital nutrients. An important diet for an adult is suppose to have about 400 grams of vegetables per day per capita, but in the villages of Hailakandi district, Assam it is only 100 to 150 grams per day per capita. To combat with this and considering the importance of nutrition in health and its management, efforts were made through different extension approaches on utilization of household areas by each individual through nutrition garden for effective land utilization and intensive cropping. The productivity of vegetables can be increased by the growing of high yielding varieties/ hybrids, good management practices and increasing cropping intensities by*

*integration of different vegetables with suitable cropping systems. Nutrition garden is a part of vegetable based cropping system, which refers to growing of vegetables and fruits in the residential houses to meet the requirements of the family year round. It is one of the easiest ways of guarantee access to a healthy diet that contains adequate macro- and micronutrients by producing many different kinds of foods in the home garden. It aims at an efficient and effective use of land for growing essential vegetables and fruits for daily use of family. As the impact of the efforts made, the percentage of adoption of this technology among the beneficiaries was found to be 76.5 % in the district and the vegetable consumption per day per capita of an adult among the same beneficiaries has increased up to 325 grams per day per capita.*

**Key Words:** Food Security, Nutritional Security, Nutrition Garden, Rural Family

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## INTRODUCTION

The vast majority of hungry and malnourished people live in developing countries under sub-standard living conditions (Annonymous, 2010) and over half a billion of the global population suffer from chronic food insecurity. Food insecurity leads to malnutrition in human beings leading to various kinds of deficiency diseases. Fruits and vegetables provide many essential vitamins and minerals and thus play a significant role in human nutrition. Additionally, higher intakes of fruits and vegetables are associated with healthier lives including lower risks of cancer and coronary heart disease (Bloem *et al.*, 2001). One of the easiest ways of ensuring access to a healthy diet that contains adequate macro and micronutrients is to produce many different kinds of foods in the nutrition garden (Bushamuka *et al.*, 2005).

Nutrition gardening refers to the cultivation of a small portion of land which may be around the household or within walking distance from the family home (De Pee *et al.*, 2000). Nutrition gardens can be described as a mixed cropping system that encompasses vegetables, fruits, plantation crops, spices, herbs, ornamental and medicinal plants that can serve as a supplementary source of food and income. It aims at an efficient and effective use of land for growing essential vegetables and fruits for daily use and better livelihood of a family. These gardens have an established tradition and offer great potential for improving household food security and alleviating micronutrient deficiencies (Bushamuka, 2005). These can also lead to

reduced household poverty, improved nutritional status of household members and potentially empower women beneficiaries (Odebode, 2006). Gardening can enhance food security in several ways like, by providing direct access to a diversity of nutritionally-rich foods, by increasing purchasing power from savings on food bills and income from sales of garden products and by providing fall-back food provision during seasonal lean periods (Bushamuka, 2005). Further, the productivity of vegetables can be increased by the growing of high yielding varieties/ hybrids, good management practices and increasing cropping intensities by integration of different vegetables with suitable cropping systems.

During various surveys made throughout the district it was found that, in the villages of Hailakandi district the vegetable requirement per day per capita is far less than the average daily nutritional requirement. An important diet for an adult is suppose to have about 400 grams of vegetables per day per capita, but in the villages of Hailakandi district it is only 100 to 150 grams per day per capita. To combat with this and considering the importance of nutrition in health and its management, efforts were made on utilization of household areas by each individual through nutrition garden.

## **METHODOLOGY**

**Strategy :** Establishment of nutrition garden as demonstration unit

**Sample size and technique:** 200 households (@ 40 household from 05 villages) were selected through Purposive Sampling Technique based on their willingness and interest to establish nutrition garden as a demonstration unit in their household areas after conducting awareness programme on importance of fruits and vegetables in ensuring nutritional security.

**Venue:** The study was conducted in 05 nos. of villages, viz. Garod Punji, Kamaladas Punji, Khasia Punji, Pedlapunji and Santosh Nagar, wherein the farmers were benefitted with vegetable seeds and technological backups. During selection of the farmers it was taken care of that each has at least two types of fruit plants.

**Intervention period:** 02 years (2011-12 and 2012-13)

**Impact assessment:** The impact of establishing nutrition garden as a demonstration unit in the rural household areas were assessed by conducting 24 hour dietary recall studying food consumption pattern before and after establishment of nutrition garden, the mean nutrient intake of households' in terms of energy before and after establishment of nutrition garden was calculated and compared. A special emphasis was also given on vegetables and fruits

intake per day. Mean vegetables and fruits intake in terms of g per day per individual was also calculated and compared. The percentage of adoption of the technology was also assessed.

## RESULTS AND DISCUSSION

A baseline survey was carried out in the 05 selected villages of the District. A total of 200 households from 05 villages (@ 40 households per village) were selected randomly to collect data on family profile, major crops grown, anthropometric measurements of women and childrens, consumption pattern, mean nutrient intake and percentage of technology adoption.

After collection, the data were tabulated and subjected to statistical analysis. Mean, frequency and percentages were calculated and revealed as described below:

**General Profile of the Family:** It includes basic information of a family collected via survey schedule prepared. The information acquired through survey schedule collected is calculated and detailed below (Table 1)

**Table 1.** General Profile of the respondents

Category	Percentage (%)
Nuclear family (< 5 family member)	63.5
Mixed house	73.5
Pucca house	10
Landholding (1.0 – 2.5 acre)	61
Cultivation practices	83
Source of information	
i. By TV	72
ii. By News paper	28

**Major crops grown by the household:**

Pulses- French Bean and Green Gram

Leafy Vegetables- Spinach, mustard, fenugreek, amaranthus and coriander.

Other vegetables- Cabbage, cauliflower, broccoli, tomato, knol khol, radish, dolicos beans, okra and cucurbits.

Fruits- Pineapple, mango, banana, star fruit, papaya and guava.

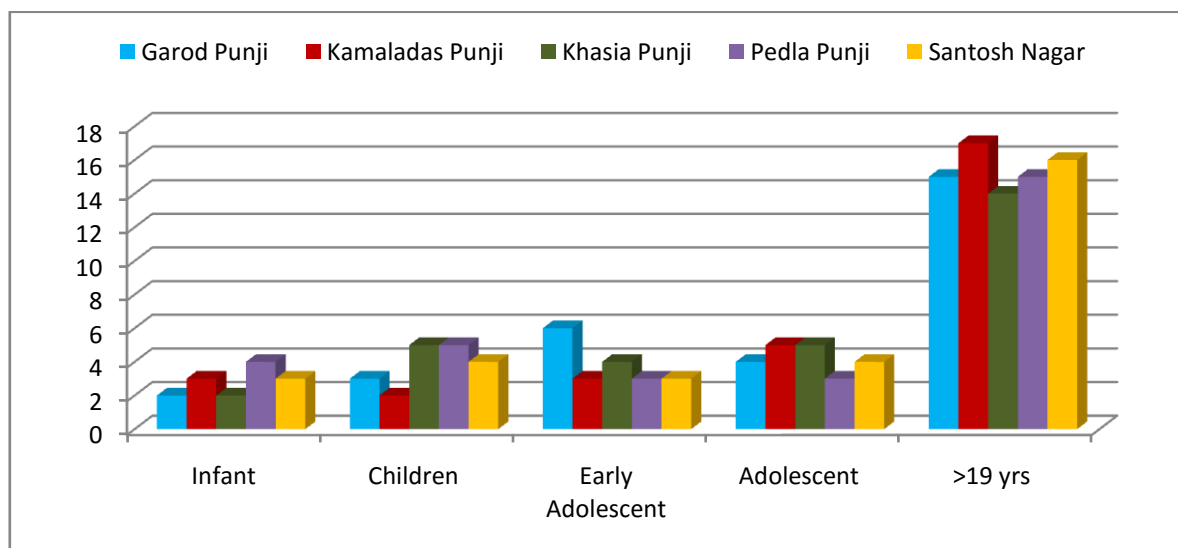
## Bench mark survey

A bench mark survey was conducted to study the nutritional status of 30 households (@ 6 household from each village) willing to establish Nutrition Garden at their household areas.

**Anthropometric measures and classification of women by BMI:** The height and weight of women in child bearing age, pregnant and lactating mother was measured and BMI was calculated. Majority (61.5%) of women at child bearing age was malnourished, 27.8% were of normal BMI and 10.7% were of either overweight or obese. Majority (82.8%) of the lactating mothers were malnourished whereas 17.2% were found normal.

**Anthropometric measures and classification of infant, children and adolescent girls based on Gomez classification:** The percent standard weight calculated by measuring the weights and heights reveal that the mean per cent standard weight per height of infant was 5.60 for 0-6 months and for older infants were 10.5 for 6-12 months.

**Mean energy intake by different age groups:** The mean energy intake was calculated for four different age groups *viz.* children (4 – 9 yrs), early adolescent (10 – 14 yrs), adolescent (14 – 19 yrs) and above 19 yrs by collecting dietary information through questionnaire on 24 hours recall basis. The distribution of respondents of the five different villages as per age is depicted in figure below (Fig 1). The data obtained for different food intake in grams were converted to kcal/ day. The data for both before establishing nutrition garden and after establishing nutrition garden was obtained and percentage increase in energy intake was compared (Table. 1)



**Fig. 1.** Distribution of respondents as per age

**Table 1.** Mean energy intake (kcal/ day) by different age group at the study area before and after establishing nutrition garden

Sl. No.	Villages	Children (4- 9 yrs)		Early Adolescent (10-14 yrs)		Adolescent (14-19 yrs)		>19 yrs	
		Before	After	Before	After	Before	After	Before	After
1.	Garod Punji	1050	1500	1750	2100	1700	2100	1700	2400
2.	Kamaladas Punji	900	1400	1600	2050	1650	2000	1850	2450
3.	Khasia Punji	1100	1450	1800	2050	1750	2150	1900	2500
4.	Pedla Punji	1250	1500	1850	2100	1850	2150	1750	2400
5.	Santosh Nagar	1000	1400	1900	2150	1800	2100	1800	2450
<b>Mean ±S.D</b>		<b>1060</b>	<b>1450</b>	<b>1780</b>	<b>2090</b>	<b>1750</b>	<b>2100</b>	<b>1800</b>	<b>2440</b>
		<b>± 129.4</b>	<b>± 50</b>	<b>± 115.1</b>	<b>± 41.8</b>	<b>± 79.1</b>	<b>± 61.2</b>	<b>± 79.1</b>	<b>± 41.8</b>

The percentage increase in energy intake was found to be 26.9 in children (4- 9 years), 14 % in early adolescent (10 – 14 years), 16.7 % in adolescent (14 – 19 years) and 26.2 % in above 19 years. This can be attributed to improved diet knowledge due awareness about health and nutrition and increase in nutrient intake due to easy availability and direct access to vegetables and fruits after establishment of nutrition garden.

**Mean vegetables and fruits intake by different age groups:** The mean vegetables and fruits intake was calculated for four different age groups by collecting dietary information through questionnaire on 24 hours recall basis. The data obtained for different vegetables and fruits intake in grams per day. The data for both before establishing nutrition garden and after establishing nutrition garden was obtained and percentage increase in vegetables (Table 2) and fruits intake (Table 3) were compared respectively.

**Table 2.** Mean vegetables intake (g/ day) by different age group at the study area before and after establishing nutrition garden

Sl. No.	Villages	Children (4- 9 yrs)		Early Adolescent (10-14 yrs)		Adolescent (14-19 yrs)		>19 yrs	
		Before	After	Before	After	Before	After	Before	After
1.	Garod Punji	95	290	120	295	135	320	115	330
2.	Kamaladas Punji	90	285	90	280	120	300	100	345
3.	Khasia Punji	115	300	135	320	140	355	110	350

4.	Pedla Punji	120	325	140	340	150	335	115	345
5.	Santosh Nagar	135	330	125	310	130	315	120	350
<b>Mean ±S.D</b>		<b>111 ±</b>	<b>306 ±</b>	<b>122 ±</b>	<b>309 ±</b>	<b>135 ±</b>	<b>325 ±</b>	<b>112 ±</b>	<b>344 ±</b>
		<b>18.5</b>	<b>20.4</b>	<b>19.6</b>	<b>23.0</b>	<b>11.2</b>	<b>20.9</b>	<b>7.6</b>	<b>8.2</b>

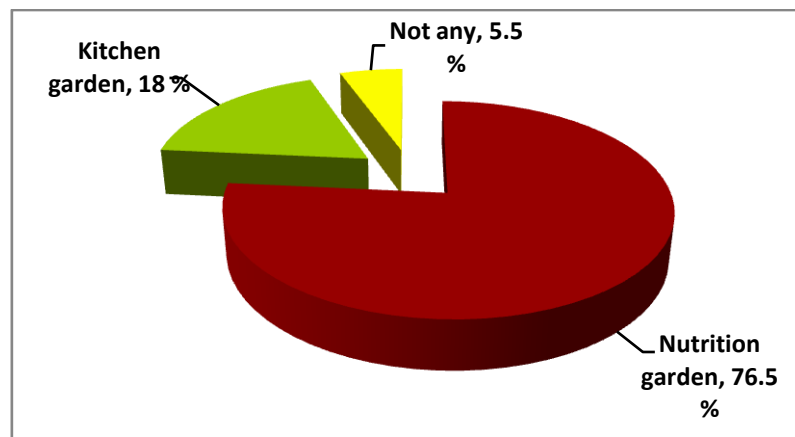
The percentage of vegetables intake has comparatively increased after establishing nutrition garden. In children (4- 9 years) the increase is 63.7 %, in early adolescent (10 – 14 years) is 60.5 %, in adolescent (14 – 19 years) is 58.5 % and in age group above 19 years is 67.4 %. This can be attributed as an impact of awareness programmes on health and nutrition after which nutrition garden was established and as a result, people has a direct access to variety of fresh vegetables including leafy vegetables.

**Table 3.** Mean fruits intake (g/ day) by different age group at the study area before and after establishing nutrition garden

Sl. No.	Villages	Children (4- 9 yrs)		Early Adolescent (10- 14 yrs)		Adolescent (14-19 yrs)		>19 yrs	
		Before	After	Before	After	Before	After	Before	After
1.	Garod Punji	60	270	125	325	120	335	110	345
2.	Kamaladas Punji	45	250	90	300	100	310	100	340
3.	Khasia Punji	80	265	100	315	115	340	120	350
4.	Pedla Punji	95	285	110	320	100	330	125	330
5.	Santosh Nagar	85	275	115	310	110	345	110	340
<b>Mean ±S.D</b>		<b>73 ±</b>	<b>269 ±</b>	<b>108 ±</b>	<b>314 ±</b>	<b>109 ±</b>	<b>332 ±</b>	<b>113 ±</b>	<b>341 ±</b>
		<b>20.2</b>	<b>13</b>	<b>13.5</b>	<b>9.6</b>	<b>8.9</b>	<b>13.5</b>	<b>9.7</b>	<b>7.4</b>

The percentage of fruits intake has also comparatively increased after establishing nutrition garden. In children (4- 9 years) the increase is 72.9 %, in early adolescent (10 – 14 years) is 65.6 %, in adolescent (14 – 19 years) is 67.2 % and in age group above 19 years is 66.9 %. This drastic increase in fruits intake is also the result of various awareness programme after which many of the beneficiaries became health conscious and started including fruits from their nutrition garden.

**Percentage of adoption of the technology:** Out of the total selected household of 200 numbers, 153 numbers of household (76.5 %) adopted the technology i.e. they are still practicing nutrition garden and 36 numbers of households (18 %) are still practicing kitchen garden with very few numbers of crops whereas 11 numbers of households (5.5 %) neither has a nutrition garden nor a kitchen garden. The percentage of adoption of nutrition garden is also depicted below (Fig 2)



**Fig. 2.** Percentage of adoption of technology

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