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Impact of model nutrition garden concept for nutritional security of rural household in Lakhimpur district of Assam

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Abstract

Nutri sensitive Agri-Resources and Innovations (NARI) sponsored by Indian Council of Agricultural Research (ICAR) was conducted by Krishi Vigyan Kendra (KVK), Lakhimpur conducted a survey in three different blocks of the district in Assam in the year 2020-21 and 2021-22. The objective of the programme is to raise awareness about the model nutrition garden and its importance for rural food security. Random selection of fifty respondents (25 having nutri-garden and 25 do not having the same) were made from KVK's Frontline Demonstration Programme. Interview schedule was prepared and informations were collected accordingly from the beneficiaries. The total vegetable production and consumption is increased by 153.5 percent and 52.4 percent, respectively, after the implementation of the model nutrition garden. There was significant increase of per day nutrition availability/ capita recorded after intervention of the nutrition gardens. The nutrition garden demonstrations found to have encouraging effect which provides more nutrients to their diet (such as 29.42% folic acid, 62.85% iron, 37.69% calcium, 83.02% beta-carotene, 357.47% vitamin C, and 9.3% protein).

Keywords: Nutrition, nutrients, food, nutri-garden

Introduction

In the current times, interests have been increased in line with the intensifying and strengthening local food products to alleviate the negative impact of volatility of food prices at international level. There is much attention paid to nutrition garden at household level in order to improve the nutritional security of the household. Growing the daily required amount of fruits and vegetables by the households provides an additional opportunity to access vital nutrients that might otherwise not be economically manageable to the household. A door step availability of macro as well as micro nutrients could be assured which have direct influence in healthy diet of human being. In direction to meet the year-round demand of fruit and vegetables in the household, the nutrition garden is essentially playing the significant role on it (Nath *et al.*, 2009) ^[1]. The nutrition garden concept is to provide a constant source of vegetables for the family by utilizing the wastes and other organic matter enervates as daily household wastes (Indumathi *et al.*, 2012) ^[2].

In entire the country, the Nutri sensitive Agri-Resources and Innovations (NARI) project has been initiated by ICAR through the all KVKs. The purpose of the project is to sensitize and motivating the rural families on numerous aspects of healthy nutrition to fight against malnutrition. There may novel changes to their food system such as by inclusion of nutri-Thali, bio fortified varieties, nutri gardens etc.

A major portion of the Lakhimpur district population is tribal dominant and they represent basically the small and marginal land resources. Majority of these poor farmers growing paddy crop under rainfed situation. The district is sufficiency in cereal production specially in paddy and small amount of other cereals like maize and wheat. In spite of wide range of food crops available in the district, the malnutrition among the childrens (<5 years) and women (15-49 years) causes an alarming situation. There is very less awareness among the people to grow different food crops to delimitate malnutrition situation.

The layout of model nutrition garden was prepared at Directorate of Extension Education, Assam Agricultural University, Jorhat. Crops which can be repeatedly harvested are selected for the nutrition garden in order to meet the daily needs of vegetables on year-round basis.

Different crops along with their suitable varieties are selected having high nutritional values which could provide minimum resistance to the common diseases and insect pests. Though the region is rich in diversity of flora and fauna, inadequate consumption of fruits and vegetables is a common practice of the local inhabitants.

The inclusion of fruits, vegetables and pulses in daily diet are considered as absolute necessity as the entire kinds of elements such as proteins, minerals, vitamins etc. are acquired from these sources. On an average, a full-grown person requires almost 30-50 grams fruits, 300 grams of vegetables and 85 grams of different pulses for adequate maintain of a normal health.

The majority of farmers in Lakhimpur buy vegetables, fruits and pulses at inflated prices from the market to fulfil their daily needs. There is a chance of contamination of these foods with the harmful pesticides which may cause direct health issues. In spite of having enough local resources by the farmers, they are still inadequately fed. Considering the status and importance of these facts, a total of 25 nutrition gardens were established in various locations of the district.

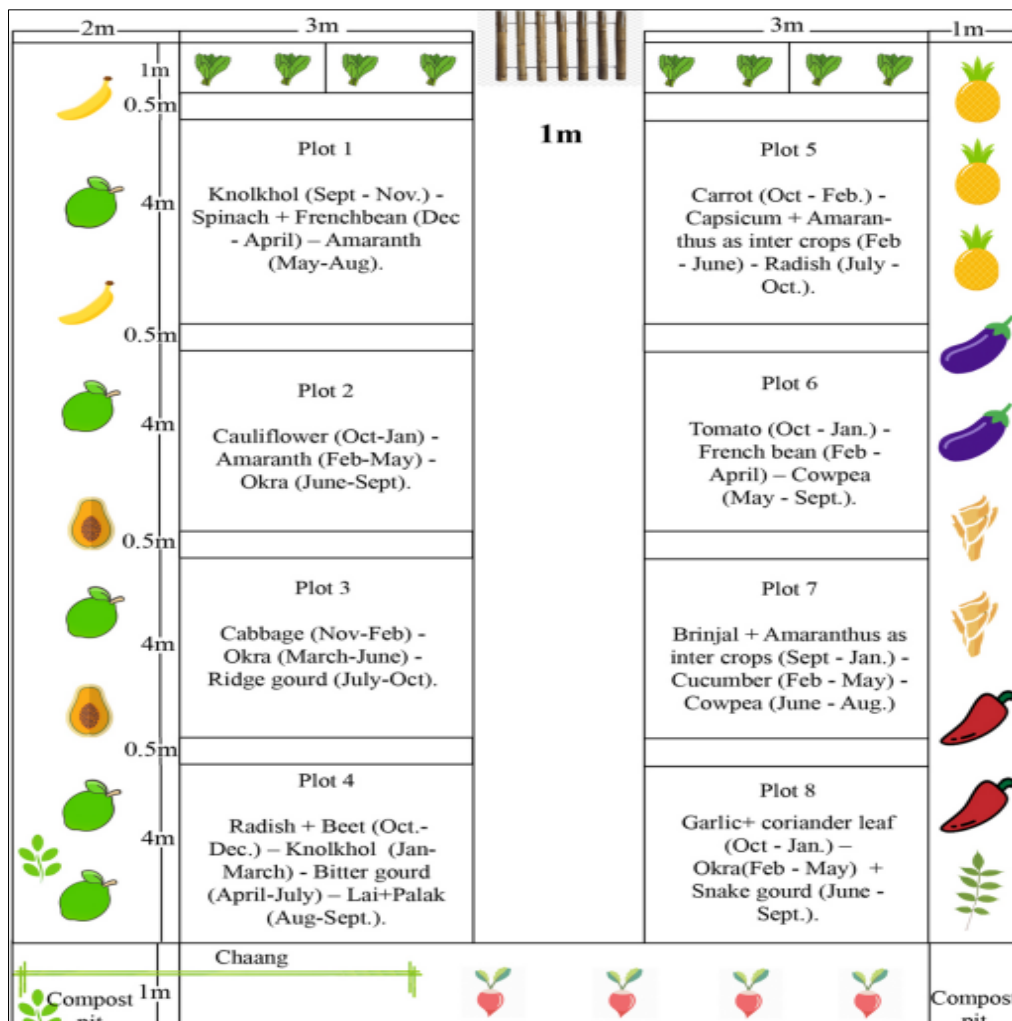
Materials and Methods

Four different development blocks viz. Karunabari, Telahi, Narayanpur and Boginodi of Lakhimpur district of Assam were selected for conducting the field level study in the year 2020-21 and 2021-22. These blocks were selected by the KVK to establish nutrition gardens as part of the Front-Line

Demonstration programme through the distribution of seeds, seedlings, plants, and technologies. Various capacity building activities were planned and implemented, including training, farmer-scientist interactions on various aspects such as on-farm vegetable production, on farm utilization of vegetables, contribution of nutrients along with average intake of vegetables etc. A group of farmers were organized for nutrition garden demonstration in order to select the population of study. Out of the total population of 50 beneficiaries, 25 numbers of women beneficiaries were selected using the random sampling technique. Another 25 numbers of women beneficiaries without having no nutrition garden were selected through the method of simple selection process.

A well-structured questionnaire and an interview schedule were utilized in respect to collect data from filed and obtaining different nutrition garden informations respectively. The Indian Food Composition Tables given by Longvah *et al.* (2017) [3] were used to calculate the per capita availability of nutrients to each individuals in the household. The recommendations given by the Indian Council of Medical Research (ICMR) on dietary allowances were utilized to compare the availability of nutrients to every individual.

An area of 200 m² was set aside for each household to establish a model nutrition garden. Both the Rabi and kharif season crops were conducted in the study. The layout of model nutrition garden prepared by Directorate of Extension Education; Assam Agricultural University are shown in Fig 1.



Source: Technical bulletin on Nutrition Garden, Directorate of Extension Education, AAU, Jorhat

Fig 1: Layout of Model Nutrition Garden

Results and Discussion

The findings of the current study along with the discussions are placed with following subsections.

Nutrition gardening in economic perspective (200 sq. meter area)

A recommended quantity for balanced diet has been proposed by the National Nutrition Council of India which is fixed at 300 grams on the basis of per day per head. Leafy vegetables were the major produces from the nutrition gardens and maximum quantity consumed by the beneficiary household for the upliftment in the nutritional status. The production from the gardens were recorded on an average 418.3 kg of vegetables by the households having the nutrition garden and 165kg of vegetables by household having no nutrition garden. The households basically consume the self produces with a remarkable nutritional support and alongside opens an income opportunity of approximately Rs. 7132 mentioned in Table 2. It was also noted that there was an increasing record of consumption rate of vegetables in before and after intervention of the nutrition gardens i.e., 246kg and 375 kg respectively. The results were also in line with the findings of Bhardwaj (2013) [4] and Marsh (1998) [5].

Change in nutritional status of individual through intervention of model nutrition garden

Table 3 of the study revealed that there was availability of nutrition on after establishment of gardens by the beneficiaries. There was significant increase of nutrients per day were recorded after intervention of the model nutrition gardens. The table 3 also clarifies that 29.42% folic acid, 62.85% iron, 37.69% calcium, 83.02% beta-carotene, 357.47% vitamin C and 9.3% proteins were additionally available to recommended dietary allowances of the

respondents comparing the practices adopted by farmers. The present findings are found to be agreed with findings of Singh *et al.*, (2018) [6] and Chayal *et al.* (2013) [7].

Overall impact of model nutrition garden on farm families

The questionnaire results were placed in the Table 4 which were collected from the households of the study. The proper utilization of space and time along with good health and savings were recorded in the present study. Respondents also commented very satisfactory responses on the taste of produces they made.

Table 1: Nutrition gardening in economic perspective (200 sq. meter area)

Sl. No	Crop	Production/pl ot (3X4)	Cost of cultivation	Total return	Net return	B:C
Rabi vegetables						
1	Spinach	19	220.00	380	160.00	1.72
2	Radish	26.2	320.00	524.00	204.00	1.63
3	Cabbage	32.5	350.00	860.00	510.00	2.45
4	Cauliflower	35	340.00	875.00	535.00	2.57
5	Knolkhol	43.8	320.00	657.00	337.00	2.05
6	Tomato	47.6	360.00	1428.00	1068.00	3.96
7	Carrot	30	450.00	1160.00	710.00	2.57
8	Brinjal	32	230.00	640.00	410.00	2.78
9	Capsicum	12.5	630.00	1635	1005.00	2.59
10	French bean	25	230.00	750.00	520.00	3.26
11	Broccoli	28.2	350.00	846.00	496.00	2.41
Kharif vegetables						
12	Ridge gourd	15.2	250.00	456.00	206.00	1.82
14	Cucumber	18.6	320.00	558.00	238.00	1.74
15	Cow pea	16	260.00	480.00	220.00	1.84
16	Okra	18.7	230.00	467.5	237.5	2
17	Amaranthus	18.2	230.00	546.00	316.00	2.3

Table 2: Comparative analysis intervention of model nutrition garden and traditional kitchen garden

Parameters	Average Yield (kg/200sqm)	Market value (Rs.)	Average Consumption(kg)
Traditional method (Before intervention)	165	3300.00	246
Model nutrition garden (After intervention)	418.3	7172.00	375
Percent change (%)	153.5	117.3	52.4

Table 3: Change in nutritional status of individual through intervention of model nutrition garden

Nutritional elements	Per capita consumption per day		% Recommended Dietary allowance		Difference (%)
	Before	After	Before	After	
β carotene (µg)	2846.5	3985.20	59.3	83.02	+23.72
Vitamin C (mg/d)	70.44	142.99	176.1	357.47	+181.37
Calcium (mg/d)	104.5	226.19	17.41	37.69	+20.28
Iron (mg/d)	6.7	13.20	31.90	62.85	+30.5
Folic acid (mcg)	25.70	58.85	12.85	29.42	+16.57
Protein (g)	3.2	5.60	5.3	9.3	+4

Table 4: Overall impact of model nutrition garden on farm families

Sl. No	Parameters	Very Satisfactory (%)	Satisfactory (%)	Unsatisfactory (%)
1	Health of family	68.7	20.3	7.3
2	Variety food availability	77.8	15.4	3.5
3	Savings	69.8	22.5	4.2
4	Soil health	52.2	12.5	6.9
5	Purposeful utilization of spare time	82.3	12.3	3.4
6	Taste of food prepared	79.7	15	2.6

Conclusion

In the global wave of eliminating hunger and malnutrition, fruits and vegetables plays a vital role by contributing minerals and vitamins for maintaining human health. Healthy diet is a key assurance at the door step from the nutrition garden in respect of macro and micro nutrients. In the context of comprehensively crisis of food and hiking of food prices, the nutrition garden is one of the key resolutions for the rural households.

In the present perspective, nutrition garden is a prerequisite to upliftment of rural household livelihood through the implementation of model nutrition garden.

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