

Original Research Article

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Improving Nutritional Status of Rural Household through Nutrition Garden in Golaghat and Sivasagar Districts of Assam

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ABSTRACT

In India, malnutrition and poor health is a common problem in rural areas which retards growth, increases the vulnerability and duration of illness, reduces work output and slows down social and mental development. Nutrition garden is a structured model with a multiple crops suited to all the seasons. The present study has been undertaken to assess the effect of nutrition garden in respect of nutrition and economy of the farm families of Golaghat and Sivasagar district of Assam. All total 20 households were selected through purposive sampling technique by screening households based on their willingness and interest to establish nutrition garden in an area of 200 m². Unavailability of quality seed material and lack of technical knowledge is the major constraints while availability of water for irrigation ranked second and lack of technical knowledge ranked third constraint in establishing nutrition garden. Demonstration of nutrition garden resulted in increase in homestead vegetable production and consumption of excess vegetables. After intervention, production of vegetables at beneficiary's level increased up to 151.97 per cent resulting in its increased consumption (41.12 %). Per capita availability of nutrients/day also increased significantly after intervention. Demonstration had positive effect on making availability of more nutrients (such as 2.37% protein, 34.29% iron, 19.57% calcium, 34.28% beta-carotene, 177.50% vitamin C and 16.53% folic acid of RDA) to individuals. Thus, establishment of nutrition gardens had immense role in tackling the problem of malnutrition and micronutrients deficiencies in rural areas.

Keywords

Nutrition garden, Technical knowledge, Quality seed, Nutrients

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Introduction

In India, malnutrition and poor health is a common problem in rural areas which retards growth, increases the vulnerability and duration of illness, reduces work output and slows down social and mental development. Vegetables and fruits are rich source of

nutrition which contains protein, minerals, carbohydrates and multivitamins which helps to fight against disease, malnutrition and hidden hunger. For poor households, fruits and vegetables are often the only sources of micro nutrients. Homestead production of fruits and vegetables provides the households with direct access to important nutrients

which otherwise may not be readily available or within their economic reach. Nutrition garden is a structured model with a multiple crops suited to all the seasons. The crops in the nutrition garden range from leafy vegetables to spices as well as fruit crops covering the entire food basket which cater to the nutritional demands of family. Due to inadequate consumption of vegetables, deficiency of micro-nutrients especially of iron, vitamin A and iodine are prevalent in the developing world (Hall *et al.*, 2009; Kanungsukkasem *et al.*, 2009; Leenders *et al.*, 2013; NCCDPHP, 2013). Nutrition gardening consisting of both nutritive fruits and vegetables provides the households with direct access to important nutrients can be a profitable venture for the rural people of country like India which otherwise may not be readily available or within their economic reach.

Establishment of nutrition garden in the household also enhances access to vegetables and fruits; increases skill, sets in usage of sustainable agricultural practices, utilization of nutri-dense foods, tackling the problem of malnutrition and micronutrients deficiencies in rural areas and also provides additional income generation activities. It involves many crops that can be repeatedly harvested to meet a family's vegetable needs throughout the year. The crops and their varieties are scientifically selected to be highly nutritious with minimum susceptibility to commonly prevalent insect-pests and disease problems. Although the North-eastern states are full of flora and fauna, consumption of fruits and vegetables in the region is very meagre.

Considering the importance, all total 20 nutrition gardens has been established in 20 different locations of Golaghat and Sivasagar district of Assam. The present study has been undertaken to assess the knowledge level of the farm women, effect of nutrition garden in

respect of nutrition and economy of the farm families.

Materials and Methods

The study was conducted in Golaghat and Sivasagar district of Assam during 2018-19. A total of 50 farm women were selected to obtain information regarding socio economic profile, dietary food habits, major constraints perceived in the establishment of nutrition garden and willingness to establish nutrition garden through a pre-structured questionnaire. Different capacity building activities including training, farmer's scientist's interaction on various aspects including vegetable grown in homestead, homestead vegetable utilization, average vegetable consumption, nutrient contribution from homestead vegetable gardening were planned and undertaken.

All total 20 households were selected through purposive sampling technique by screening households based on their willingness and interest to establish nutrition garden in their farm or in their backyard to ensure nutrition security. It has also been ensured that the family should be of 4-6 members. For individual household, an area of 200 m² was taken for the establishment of nutrition garden. The study was conducted in both the *kharif* and *rabi* seasons. The cropping sequences followed in the nutrition gardens are as follows:

Plot 1: Knolkhol (Sep - Nov) - *Paleng* + French bean (Dec-Apr) - Amaranthus (May-Aug)

Plot 2: Cauliflower (Oct-Jan) - Amaranthus (Feb-May) - Okra (Jun-Sept)

Plot 3: Cabbage (Nov-Feb) - Okra (Mar-Jun) - Ridge gourd (Jul-Oct)

Plot 4: Radish + Beet (Oct.-Dec) - Knolkhol (Jan-Mar) - Bitter gourd (April-July) - Lai + *Paleng* (Aug-Sep)

Plot 5: Carrot (Oct - Feb) - Capsicum + Amaranthus as intercrop (Feb - June) – Radish (Jul - Oct)

Plot 6: Tomato (Oct - Jan.) - French bean (Feb - Apr) - Cowpea (May - Sept).

Plot 7: Brinjal + Amaranthus as intercrop (Sep - Jan) - Cucumber (Feb - May) - Cowpea (Jun - Aug)

Plot 8: Garlic + Coriander leaf (Oct - Jan) - Okra (Feb - May) - Snake gourd (Jun - Sep). (*Crop selection may vary according to choice of family members and requirement of local needs*)

Krishi Vigyan Kendra has provided seed and planting material of improved varieties and vermicompost to the selected households. For *kharif* season, the vegetables selected for the garden included amaranthus, okra, bottle gourd, sponge gourd, bitter gourd, brinjal, tomato, cow pea, spinach, and radish whereas in *rabi* season, they were provided seeds/planting material of coriander, fenugreek, spinach, radish, carrot, beet root, cauliflower, cabbage, tomato, brinjal, chilli and green pea. Planting details of different crops are given in Table 1. Average yield of all the crops was recorded. After one year of establishment of nutritional garden, a post-survey was done to analyze the impact of nutrition gardens on nutritional status of selected families. Data were collected by face to face interview with the help of structured interview schedule.

The nutrient availability to every individual member of the household was calculated using the Indian Food Composition Tables by Longvah *et al.* (2017). Then the nutrient

availability was compared with the recommended dietary allowances given by ICMR (2010) for Indian population.

Results and Discussion

Socio-economic characteristics of respondents were analyzed and presented in Table 2. The table indicates that majority (78%) of respondents were belonged to nuclear family and followed by (22 %) joint family. It was observed that majority of respondents (36%) were of 25-35 yrs age group followed by 34% of 45-55 yrs and 22% were of 35-45 yrs age group. It was found that majority of the families (58%) had 3-5 family members and 20% families had less than 3 members. Results on family income showed that majority (36%) of respondents belonged to income group of less than Rs. 1.0 lakh, while 28% families belonged to more than 5 lakhs group and 24% families belonged to income group of 1-3 lakhs. While looking at their educational status, results revealed that cent per cent of respondents were literate and 38% of them had education up to class X, 32% had education level of HSSLC passed.

It is evident from Table 3 that nutrition gardening demonstration resulted in increase in homestead vegetable production and consumption of excess vegetables. Before intervention, respondents were practicing traditional practices; they used to grow only one or two seasonal vegetable. Earlier, they had to purchase vegetables from market for consumption in order to fulfill the requirements. It is obvious from Table 3 that production of vegetables at beneficiaries increased 151.97 per cent which resulted in increased consumption (41.12 %). Similar results were also reported by (Nandal and Vashisth, 2009, Chayal *et al.*, 2013).

Major constraints faced by rural women in establishing nutrition garden have also been

recorded during pre survey as well as conduct of training on nutritional gardening. Data presented in Table 4 showed that unavailability of quality seed material and lack of technical knowledge are the major constraints while availability of water for irrigation ranked second and lack of technical knowledge ranked third constraint in this regard. Several other studies were also conducted to find out these constraints in

establishing a nutrition garden in rural areas. Similar results are also reported by Sethy *et al.*, 2010; Sharma *et al.*, 2011 and Biswas and Jamir (2015). Singh *et al.*, 2018 reported availability of water for irrigation is the major constraint. Unavailability of quality seed material and lack of technical knowledge ranked second and third constraint in this regard.

Table.1 Planting details of crops in Nutrition Garden

Crop	Spacing	Population (numbers/4m×4m plot)	Seed requirement
Amaranthus	20 cm x 5 cm	1296	20 g
Bitter gourd	1.5 m x 1.0 m	6	2 g
Brinjal	60 cm x 60 cm	36	1 g
Broccoli	60 cm x 45 cm	48	1 g
Carrot	30 cm x 10 cm	432	8 g
Cabbage	60 cm x 30-45 cm	48-72	1 g
Capsicum	45 cm x 45 cm	64	1 g
Cauliflower	60 cm x 30-45 cm	48-72	1 g
Chillies	60 cm x 45 cm	48	1 g
Cucumber	1.2 m x 1.0 m	9	1 g
Colocasia	45 cm x 45 cm	64	2.0 kg
French bean	40 cm x 30 cm	108	65 g
Garden pea	30 cm x 10 cm	432	100 g
Garlic	15 cm x 10 cm	860	500 g
Knol Khol	30 cm x 25 cm	168	2 g
Okra	60 cm x 30-45 cm	48-72	15 g
Onion	20 cm x 10 cm	648	10 g
Potato	40 cm x 20 cm	162	3.0 kg
Radish	30-45 cm x 25 cm	112-168	15 g
Ridge gourd	1.5 m x 1.2 m	6	2 g
Spinach beet (Paleng)	20 cm x 5-7 cm	1000	30 g
Tomato	60 cm x 45 cm	48	1 g
Yard Long bean	60 cm x 40 cm	54	40 g
Assam lemon	2.0 m (single row)	-	-
Banana	1.8 m (single row)	-	-
Papaya	1.5 m (single row)	-	-
Tapioca	90 cm (single row)	-	-

Table.2 Socio economic profile of the respondents

	Particulars	Number	Percentage
1.	Age (yrs)		
a)	25-35	18	36.00
b)	35-45	11	22.00
c)	45-55	17	34.00
d)	≥ 55	4	8.00
2.	Education		
a)	Under matric	19	38.00
b)	HSLC passed	7	14.00
c)	HS passed	16	32.00
d)	Graduate and above	8	16.00
3.	Occupation		
a)	Agriculture	39	78.00
b)	Service	9	18.00
c)	Others	2	4.00
4.	Family size		
a)	< 3 members	10	20.00
b)	3-5 members	29	58.00
c)	5-7 members	6	12.00
d)	> 7 members	5	10.00
5.	Annual income (Rs.)		
a)	<1 lakh	18	36.00
b)	1-3 lakh	12	24.00
c)	3-5 lakh	6	12.00
d)	> 5 lakh	14	28.00
6.	Food Habit		
a)	Vegetarian	48	96.00
b)	Non-vegetarian	2	4.00

Table.3 Per unit production and consumption of vegetables before and after establishing nutrition garden

Particulars	Production (kg)	Purchase (kg)	Consumption (kg)
Before intervention	152.00	101.00	253.00
After intervention	383.00	-	357.00
Change	231	-101	104
Percent change (%)	151.97	-100	41.11

Table.4 Major constraints perceived in the establishment of nutrition garden

Sr. No.	Particulars	Participants (50)		Rank
		Number (n)	%	
1	Unavailability of quality seeds and planting material of HYV vegetables	40	80	I
2	Low availability of water for irrigation	38	76	II
3	Lack of technical knowledge related to establishment of nutritional garden like improved varieties, seed rate, sowing time, major insect pest diseases and their management, fertilizer and manure application, irrigation etc.	32	64	III
4	Adoption of traditional practices for growing vegetable	20	40	VI
5	Lack of interest of youth towards nutrition gardening	23	46	V
6	Less priority towards kitchen gardening than other farm activities	15	30	VII
7	Lack of knowledge regarding preservation and processing of surplus produce	25	50	IV

Table.5 Per capita availability of nutrients before and after establishing nutrition garden

Nutrients	Per capita availability of nutrients per day		%RDA		Difference (%)
	Before	After	Before	After	
Protein (g)	2.90	4.20	5.27	7.64	+2.37
Iron (mg)	5.70	12.90	27.14	61.43	+34.29
Calcium (mg)	102.60	220.00	17.10	36.67	+19.57
Beta carotene (mcg)	2200.70	3846.20	45.85	80.13	+34.28
Vitamin C (mg)	68.66	139.66	171.65	349.15	+177.50
Folic acid (mcg)	21.20	54.25	10.60	27.13	+16.53

Availability of vegetables in terms of nutrient before and after establishment of nutrition garden is presented in Table 5. Per capita availability of nutrients/day increased significantly after intervention. It is obvious from the Table that 2.37% protein, 34.29% iron, 19.57% calcium, 34.28% beta-carotene, 177.50% vitamin C and 16.53% folic acid of RDA were more available to individual after demonstration when compared with farmers practice. The results are in agreement with the findings of Chayal *et al.* (2013), Yusuf *et al.* (2008) and Singh *et al.*, (2018).

In conclusion though India is the second

largest producer of fruits and vegetables, their consumption is meager especially among the rural population. Increased consumption of fruits and vegetables is one of the easiest and cheapest ways of enhancing health of family members. Nutrition gardening can be path of a low cost sustainable approach for mitigating malnutrition especially in rural households. Nutrition gardening contributes to household food security by providing fresh and safe to eat vegetables that can be harvested, prepared and fed to family members, often on a daily basis. Even very poor, landless or near landless people can also practice gardening on small patches of homestead land. The findings

of the study show the relative importance and prospects of nutrition gardening in both the districts. Improved consumption of vegetables will help to address micronutrient deficiency disorders like anaemia, goiter, night blindness etc. and play a significant role in tackling the problem of malnutrition.

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