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Food and Nutritional Security Through Nutrition Gardening in Unnao District

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ABSTRACT

Malnutrition is a serious public health problem in rural areas of India. In Unnao district of Uttar Pradesh more than 90 per cent farmers have small and marginal land holdings and are unable to meet out daily recommended requirement of fruits and vegetables. Hence most of them are victims of malnutrition specially micronutrient deficiency. To overcome these problem 30 demonstrations of Nutrition Gardening during 2015-16, 2016-17 and 2017-18 were conducted in adopted villages with the objectives to assess the vegetable production from 150 m^2 area, availability of vegetables from nutrition garden to different family size and impact of nutrition gardening on food consumption pattern of the respondents. Planned layout was designed and year calendar was followed for round the year availability of fruits and vegetables through nutrition garden. Improved variety of seed and seedlings were provided to the beneficiaries. The results shows that the beneficiaries were growing 10-14 vegetables in planned nutrition garden at a time as compare to 3-6 vegetables in earlier practice. It was also recorded that demonstration results an increase in homestead vegetable production as compare to check and food consumption pattern of vegetables of respondents improved. The results also revealed that 150 m^2 area of planned nutrition garden is appropriate to medium size family. It can be concluded from the findings that Nutrition garden is one of the easiest ways of ensuring access to a healthy diet. Thus large scale promotion of Nutrition gardening is needed for nutritional security of the rural households.

Keywords: Demonstration, Malnutrition, Micronutrient deficiency, Nutrition garden, Nutritional security

INTRODUCTION

In rural areas of India malnutrition and poor health status is a common problem. It retards growth, increases the risk and duration of illness, reduces work output and slows social and mental development. For poor households vegetables and fruits are often the only sources of micronutrients in the family diet. Fruits and vegetables are major sources of vitamins, minerals and fibers; their nutritional and medicinal values in human life are well documented FAO (2017). For each small and marginal family it is not possible to consume these components in daily diet. Cultivation of these commodities by gardening in a systematic manner in small piece of land available with almost all houses is quite possible and family can take vegetables from this nutrition garden round the year. This is especially important in rural areas, where establishment of nutritional garden is easy due to availability of space and farm families are already engaged in agricultural practices. Nutrition gardening directly provides food and nutritional security by making access to food that can be harvested instantly, prepared and fed to family members daily or whenever required. There are many social benefits that have emerged from nutritional gardening practices like better health and nutrition, increased income, employment generation, food security within the household and enhancement in

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community social life. Apart from having a good amount of production of vegetables at national level, the per capita availability in diet is quite low in our country. Many of the rural families use to grow vegetables in their backyards for their household consumption but still they lack in adequate consumption of vitamins and minerals because of unorganized cultivation of vegetables. Keeping in view the importance of nutrition garden in rural scenario, the Krishi Vigyan Kendra, Unnao has taken this as an initiative for food and nutritional security for rural community of the District.

METHODOLOGY

This research was undertaken by Krishi Vigyan Kendra in 3 adopted villages namely Dhaura, Buxikhera and Arerkala of Hasanganj block of Unnao district during the year 2015-16 to 2017-18 to investigate role of nutritional gardening in addressing food security. This research used both qualitative and quantitative approach to collect data from households and stakeholders. Purposive sampling technique was used to select beneficiaries. Those beneficiaries were selected who have 150m^2areas in their backyard or nearby area of their house for development of nutrition garden and were interested in nutritional gardening to ensure food security. Every year ten families from adopted villages were selected thus making total of 30 families. The study was conducted in *Kharif, Rabi* and *Zaid* season of the year. Different capacity building activities including trainings, exposure visits and farmer - scientist interaction on various aspects of nutrition gardening including importance of fruits and vegetables grown in nutrition garden, their utilization, average vegetable consumption, and nutrient contribution in daily diet from garden vegetables were undertaken.

Krishi Vigyan Kendra provided seed and seedlings of improved varieties to the selected households. Planned layout was designed to utilize maximum land of the garden with effective utilization of resources and year calendar was advocated to be followed to take more vegetables per unit area. The basic functions of food and their requirement to different age group were taken into consideration while planning the nutrition garden. The beneficiaries were guided and advised about planning a kitchen garden in scientific and organic way so that all the seasonal vegetables could be grown and made available round the year. Few plants of nutritious fruits like Guava, Lemon and Papaya etc. were also supplied and planted in the nutrition garden. The size of garden was designed to be of 150 m^2 area to provide sufficient vegetables to the average family. Total amount of fruits and vegetables produced were recorded from each Nutrition garden and average yield per unit area was calculated. A dietary survey was done in the selected households in order to assess their food consumption pattern before and after establishment of nutrition garden using food frequency questionnaire. The average production of nutrition garden of three consecutive years was calculated under three heads *viz,* Green Leafy Vegetables, Roots and Tubers and Others and was considered as amount of vegetables in kg available for consumption of family members per annum. Per day requirement of vegetables for each selected family was calculated as an individual basis as per recommended dietary allowances of ICMR and then requirement for a year was calculated. Assumed requirement of vegetables to different family size per year was calculated by taking average requirement of small, medium and large family individually.

RESULT AND DISCUSSION

Demographic distribution of families of respondents were analyzed and, presented in Table 1. The table indicates that majority (73%) of respondents belonged to nuclear family and majority (53%) with medium size. Education wise 37 per cent of the respondents were illiterate and only 20 per cent respondents were found who have educational status of High School or more. Majority (60%) belong to OBC category followed by General (27%) and SC (13%) category. Majority (67%) of the respondents belonged to income group of 50,000 to 1,00,000 per annum. Majority (67%) of the respondents had marginal land holding followed by small (27%) land holding.

Data in Table 2 depicts average production of vegetables of three selected villages from nutrition garden covering 150 m^2 areas. Respondents who were doing unplanned gardening were cultivating 3-6 vegetables at

Table 1: Demographic distributions of the respondents

Variable	Category	Number	Percent
Type of Family	Joint	08	27
	Nuclear	22	73
Size of the	Small Size (1-4 members)	08	27
Family	Medium Size (5-7 members)	16	53
	Big Size (>7 members)	06	20
Education	Illiterate	11	37
	Primary	08	27
	Middle	05	16
	High school and more	06	20
Caste	General	08	27
	OBC	18	60
	SC	04	13
Annual Income	<50000	06	20
(Rs)	50000-100000	20	67
	> 100000	04	13
Land Holding	Marginal (<1ha)	20	67
	Small (1-2 ha)	08	27
	Medium (2-4 ha)	02	06

a time in a season such as in *Kharif*- coriander, brinjal, pumpkin and bottle guard *etc.* where as in *Rabi* radish, cabbage, cauliflower, potato and spinach *etc*. in *Zaid*- sponge guard, pumpkin, okra *etc*. but in case of planned gardening they had grown 10-14 vegetables in a season by following proper crop rotation. Similar results were reported by Savita *et al*. (2018). From each bed 3-4 vegetables were taken in a year. Ridge of beds were used for sowing root crops like radish, carrot, onion, turnip and beet root etc. It is evident from the table that nutrition gardening demonstration results an increase in homestead vegetable production as compare to check. In green leafy vegetable category 313.77 per cent increase in the production of planned nutrition gardening was found in the year 2015-2016 as compare to unplanned gardening. In the year 2016-2017 this change was 261.90 per cent and in the year 2017-2018 it was 247.33 per cent. The year wise decrease in the per cent change may be due to awareness among villagers after seeing the demonstrations being conducted in their villages. In demonstrations more focus was given to increase the production of Green Leafy Vegetables which is generally lacking in the diet. In Roots and Tubers category of vegetables, per cent increase in the average production of planned garden against unplanned garden was found in the range of 23.13 per cent to 55.02 per cent in three years. Highest average production was found in the Year 2017-2018 which was 158.09 kg/year. In other vegetable category also profound increase in the average production of vegetables from planned garden was found as compare to check. It is very clear from the table that total increase in the production of vegetables of demonstrated nutrition garden ranged from 97.28 per cent to 117.59 per cent as compare to check in the three years and average production was highest in the year 2017-2018 which was 574.99 kg/year.

Table 3 shows average production of vegetables of last three years from nutrition garden of three selected villages in kg/year and per cent availability to different family size viz. small, medium and large. The results revealed that 150 m^2 area of planned nutrition garden is appropriate to medium size family (average family

Table 2: Year wise average vegetable production of nutrition garden

Group of Vegetables	Year 2015-16 (N=20)			Year 2016-17 (N=20)			Year 2017-18 (N=20)		
	Average production (kg/year)		% change	Average production (kg/year)		% change	Average production (kg/year)		% change
	Demons-tration	Check		Demons-tration	Check		Demons-tration	Check	
Green Leafy Vegetables (GLV)	233.7	56.48	313.77	229.66	63.46	261.90	248.17	71.45	247.33
Roots and tubers	150.56	97.12	55.02	140.85	114.39	23.13	158.09	124.26	27.23
Others	154.8	94.13	64.45	171.53	87.82	95.32	168.73	95.75	76.22
Total	**539.06**	**247.7**	**117.59**	**542.04**	**265.68**	**104.02**	**574.99**	**291.46**	**97.28**

members 6, three adults and 3 children) and it can fulfill 100 per cent requirement of vegetables as per RDA for all the three groups of vegetables. Whereas for small family (average family members 4, Two adults and 2 children) size it is too big as evident from the table that availability is near around 1.72 times more than the requirement, so some area of this can be used for fruit plants. For Large size family (average family members 7, three adults, 2 adolescents and 2 children) this size is small and only 82.87 per cent requirement of vegetables can be fulfilled by nutritional gardening. Findings of Nandal *et al.* (2009) also supported the study.

Table 4 indicates the categorization as percentage of respondents according to food frequency/ food consumption pattern. The results revealed that in both the groups, cereals (basically wheat and rice) were included in their daily diet. In case of pulses 67 per cent respondents before establishing the nutrition garden were taking it in daily diet, 27 per cent twice a week and 6 per cent once in a week, especially in lunch time. After establishing nutrition garden slight increase in percentage was found in daily consumption of pulses which was 70 per cent. It may be due to utilization of money in purchase of pulses saved from nutrition garden.

The green leafy vegetables consumption pattern shows major shift in results. Before intervention only 7 per cent of the respondents were consuming GLV in their daily diet whereas after intervention 67 per cent of the respondents were consuming GLV in daily diet. It was due to availability of fresh, healthy GLV in the nutrition garden. It was also observed that before intervention consumption of roots and tubers was more common as

Table 3: Optimization of availability of vegetables from nutrition garden (150 m^2) to different family size

Group of Vegetables	Average Production of three years (kg/year)	Small Family Size		Medium Family Size		Large Family Size	
		Assumed requirement (kg/Year)	Availability (%)	Assumed Requirement (kg/Year)	Availability (%)	Assumed Requirement (kg/Year)	Availability (%)
GLV	237.17	146	162.45	219	108.30	310.25	76.44
Roots and tubers	149.83	82.15	182.39	127.75	117.28	191.62	78.19
Other	165.02	91.25	180.84	109.5	150.70	164.25	100.47
Total	**552.02**	**319.4**	**172.83**	**456.25**	**120.99**	**666.12**	**82.87**

Table 4: Per cent distribution of respondents according to food consumption pattern

Food Groups	Before Establishing Nutrition Garden (n=30)				After Establishing Nutrition Garden (n=30)			
	Daily	Twice in a week	Once in a week	Occasionally	Daily	Twice in a week	Once in a week	Occasionally
Cereals	100	-	-	-	100	-		
Pulses	67	27	6	-	70	30		
Green Leafy Vegetables	7	53	40	-	67	13	-	-
Roots and Tubers	100	-	-	-	33	47	20	
Other Vegetables	67	33			83	17	-	
Fruits	-	-	33	67	10	53	37	
Fats and Oils	100	-			100	-	-	
Milk& Milk Products	67	33		-	73	27	-	
Meat	-	7	20	17	-	13	13	17
Sugar and Jaggery	100	-			100	-	-	

compare to green leafy vegetables and potato was the main vegetable which was included in their daily diet but after intervention, education and motivation, it was slightly replaced with GLV and other vegetables. Singh *et al*. (2018), also reported increased per capita vegetable consumption after establishment of kitchen garden under frontline demonstration in Sagar district of Madhya Pradesh.

In total it was found that after establishment of nutrition garden, there was an increase in the consumption of "protective foods" such as pulses, milk and dairy products in addition to vegetables, which while adding calories to diet, also contribute to the increase in other nutrients whose intake is particularly lacking in the diet of rural poor. Chayal *et al*. (2013) and Arya (2018) reported significant increase in daily intake of Vitamin A, Vitamin C, Energy, Calcium, Iron and Protein by respondents in a study of nutrition garden in Bundi district of Rajasthan. Findings of Bhushan *et al*. (2013) also support the study.

CONCLUSION

It may be concluded from this study that establishment of nutrition gardens can play an important role in tackling the problem of malnutrition by providing diversity in diet in rural areas. Improved consumption of green leafy vegetables from nutrition garden is a low cost sustainable approach for reducing micronutrient malnutrition. A 150 m^2 area of planned nutrition garden is appropriate for medium size family in terms of availability of vegetables. There is need to upscale the Nutritional Gardening in rural areas with nutrition education in order to promote increased consumption of diverse and nutrient rich food.

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