

Role of kitchen gardening in diet diversification and nutritional security

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■ **ABSTRACT :** Kitchen gardening is the revolutionary step to increase vegetables production as well as provision of cheap vegetables to the consumers. The main focus of the study was to assess the role of kitchen gardening on nutrition security of rural household. A total of 60 rural women were selected to assess the impact of kitchen gardening by random sampling method that has undergone the training programme at KVK Vaishali and Muzaffarpur (Additional). Results showed that an increase in the knowledge of participants after their participation in training on various aspects of kitchen gardening. Unavailability of quality seed material was the major constraint (83.33%) for production of vegetables in kitchen garden. Low availability of water for irrigation and adoption of traditional practices for growing vegetables ranked second and third constraint, respectively. After getting training on kitchen garden from KVK, farm families get fresh and organic vegetables year round and their nutritional needs are fulfilled. The average yield of the vegetables increased from 30.5 kg/unit in farmers practice to 110 kg/unit under recommended practice. Results also revealed 60 per cent increase in the average per capita consumption of vegetables. After demonstration, consumption of vegetables increased, especially of green and leafy vegetables. Homestead kitchen gardening along with nutrition intervention will improve the nutritional security and health in rural livelihoods, but the approach is normally slow and results are achieved over a long run.

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Vegetables are major source of vitamins, minerals, and fibres. They are very important part of our diet as they contain various nutrients for many body functions. Vegetables also provide taste, palatability, better digestibility to us and increase the appetite. Vegetables are suitably grown in kitchen gardens as they are mostly short duration crops. A family can take vegetables from these kitchen gardens round the year.

The nutritional kitchen garden is generally located close to the house and is used for growing vegetables, fruits, and other food crops for the family (Jana, 2015). It not only saves our money and time but also can provide a healthy, useful and environment friendly hobby for whole family. Kitchen gardens can help us in recycling of household waste especially when a compost pit is developed. One of the easiest ways of ensuring access

to a healthy diet that contains adequate macro- and micronutrients is to produce many kinds of foods in the home garden. This is especially important in rural areas where people have low purchasing power and distant markets. Kitchen 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. Home gardens are also becoming an increasingly important source of food and income for poor households in peri-urban and urban areas. Kitchen gardens can be grown in the spaces available at the backyard of the house or roof or it can be established with joint efforts on a common place or land (Christensen, 2011). The term malnutrition implies both under nutrition including micronutrient deficiencies, and over-nutrition. After over 70 years of independence, India is still a country in developmental transition and continues to battle with infectious disease and conditions related to under nutrition.

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 (Tripathi and Selvan, 2016). The daily requirement of vegetable is around 300 gms as per ICMR but the availability is very low. Many of the rural families used 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 vegetables in daily diets and its low availability, the Krishi Vigyan Kendra Muzaffarpur and Vaishali has conducted various trainings and demonstrations for rural men and women. Training and other group activities around a central demonstration garden can serve to demonstrate different varieties, hybrids or other important garden techniques such as live fencing, composting, use of bio-pesticides, year-round production etc. Kitchen gardening activities are centered on women and it can also increase the income of women, which may result in the better use of household resources and improved caring practices and empowerment of women. In order to preserve health and prevent malnutrition; we should develop a kitchen garden; grow fresh and clean vegetables and make them a part of our daily diet (Nandal and Vashisth, 2009).

■ RESEARCH METHODS

This research was undertaken in rural areas of Bihar

in district Muzaffarpur and Vaishali, to investigate the role of kitchen gardens in addressing nutritional security. The research used both qualitative and quantitative approach to collect data from households and stakeholders. Stratified sample was used to pick household respondents. The research was conducted in two villages in a block of Vaishali district in 2012-13 and thereafter in Muzaffarpur district in 2017-19 in *Kharif*–*Rabi* and *Zaid* season. Villages adopted for the study were Lautan, Itha Rasulnagar in muraul Block of Muzaffarpur district and Sendhwari and Hariharpur village in Hajipur Block of Vaishali District. Fifteen families from each village were selected randomly making a total of 60 respondents.

The objective of the training was to upgrade the knowledge of rural women regarding the importance of the kitchen gardening and the technical aspects of its establishment. Pre and post knowledge data of trainees was collected with the help of an interview schedule. Data on their basic profile was collected which included the information regarding their caste, education, income, etc. During training programmes, data on the major constraints for kitchen gardening was also collected. The villages were guided and advised about planning a kitchen garden in scientific and organic way so that all the seasonal vegetables could be grown fresh and available round the year. It has also been ensured that the family should be of 4-6 members. Individual household backyard area was taken for the establishment of nutrition kitchen garden. The study was conducted in the *Kharif*, *Rabi* and *Zaid* seasons. Krishi Vigyan Kendra has provided seed and seedling of improved varieties to the selected households under Front Line Demonstration programme during 2012-13, 2017-18 and 2018-19. For *Kharif* season, the vegetables selected for kitchen garden included *Amaranthus*, okra, bottle gourd, sponge gourd, bitter melon, brinjal, tomato, cowpea, spinach, and radish whereas in *Rabi* season, they were provided seeds/seedlings of coriander, fenugreek, spinach, radish, carrot, beet root, cauliflower, cabbage, tomato, brinjal, chilli and green pea.

To assess the impact of establishing nutrition kitchen garden in the rural households, average yield per unit was obtained. A dietary survey was done in the selected households in order to assess their food consumption pattern before and after establishment of kitchen garden using 24 hour dietary recall method. The nutrient

availability to every individual member of the household was calculated using the food composition tables (Gopalan *et al.*, 1989). Then the nutrient availability was compared with the recommended dietary allowances (ICMR, 2010) for Indians. The data obtained was finally statistically analyzed using frequency and percentage for its significance.

■ RESEARCH FINDINGS AND DISCUSSION

A total of 60 rural women were selected to assess the impact of kitchen gardening by random sampling method that has undergone the training programme at KVK Vaishali and Muzaffarpur (Additional). The age group of the respondents varied from 18 to 50 years and the mean age estimated as 25.76 ± 5.50 years. Most of the females were educated upto primary level (30.36%). Their per capita income ranged between Rs. 500 to 2500 per month with a mean of Rs. 960.48 ± 285.80 . The knowledge of the women participants was assessed through collection of data through semi-structured interview schedule before and after training programmes. Data obtained is presented in Table 1 showed an increase

in the knowledge of participants after their participation in training on various aspects of kitchen gardening. Very few (16.66%) rural women had knowledge on improved varieties whereas the highest knowledge was observed on land preparation aspect (76.67%) before the training. After training, their knowledge has been increased in all the aspects of vegetable production through kitchen gardening. A total of 96.66 per cent rural women showed knowledge on use of organic plant protection measures, 95.00 per cent had good knowledge about land preparation and layout; and of post harvest and value addition followed by intercultural operation. Malabasari and Hiremath (2016) also reported an increase in the knowledge of rural women after providing training on various aspects of kitchen garden. According to them, training programme helped in capacity building of rural women by creating awareness, increasing the knowledge about innovative technologies, and practicing improved skills which helps in the empowerment of rural women. During conduction of training on nutritional kitchen gardening, some constraints faced by rural women have also been perceived. Results presented in Table 2 showed that

Table 1 : Pre and post training knowledge of farm men and women regarding establishment of nutrition kitchen gardening (n=60)

Sr. No.	Particulars	Knowledge of farm men and woman			
		Before training		After training	
		n	%	n	%
1.	Land preparation and layout	46	76.67	57	95
2.	Improved varieties	10	16.66	42	70
3.	Appropriate sowing time of various vegetables and their seed rates	24	40	53	88.33
4.	Nutrient management through organic and inorganic inputs	15	25	48	80
5.	Critical stages of irrigation	20	33.33	51	85
6.	Intercultural operations	34	56.67	56	93.33
7.	Use of organic plant protection measures	10	16.67	58	96.66
8.	Post harvest management and value addition	27	45	57	95.00

Table 2 : Major constraints perceived in the establishment of nutrition kitchen garden

Sr. No.	Particular	Participant		Rank
		n	%	
1.	Unavailability of quality planting material and seeds of HYV vegetables	50	83.33	I
2.	Low availability of water for irrigation	46	76.66	II
3.	Lack of technical knowledge related to establishment of nutritional kitchen garden like improved varieties, seed rate, sowing time, major insect pest diseases and their management, fertilizer and manure application, irrigation etc.	29	48.33	IV
4.	Lack of interest in kitchen gardening	25	41.66	VI
5.	Adoption of traditional practices for growing vegetable	32	53.33	III
6.	Lesser priority is given to kitchen gardening than other farm activities	26	43.33	V
7.	Lack of knowledge regarding preservation and processing of surplus produce	19	31.66	VII

unavailability of quality seed material is the major constraint (83.33%) for production of vegetables in these areas. Low availability of water for irrigation and adoption of traditional practices for growing vegetables ranked second and third constraint, respectively. Other constraints included lack of interest in cultivation, lack of technical knowledge, traditional practices of vegetable production not giving much priority to kitchen gardening etc. In a similar study conducted at Burdwan district of West Bengal, it was found that input constraint was most important constraint as it was ranked in 1st position (Sethy *et al.*, 2010). Another study reported the unavailability of quality planting material and seeds of HYVs of vegetable, less availability of water for irrigation, lack of knowledge about improved varieties, seed rate and sowing time, lack of knowledge regarding major pests and diseases identification and their management and lack of interest among rural youth were reported major bottlenecks in successful adoption of kitchen gardening (Sharma *et al.*, 2011). Similar results were also reported by Biswas and Jamir (2015).

Front line demonstration:

Under front line demonstration of Krishi Vigyan Kendra, Vaishali and Muzaffarpur (Additional), a total of 60 demonstrations on kitchen garden was conducted in the adopted villages. Each garden was established in backyard area. The result presented in Table 3 showed that the average yield of the vegetables increased from 30.5 kg/unit in farmers practice to 110 kg/unit under recommended practice. Results also revealed 60 per cent increase in the average per capita consumption of

vegetables. Before plantation in kitchen garden, average per capita availability and consumption of vegetables was 50.00 per cent of Recommended Dietary Allowances which was increased upto 80.50 per cent. It has also been observed that the consumption of roots and tubers was more common in comparison to green leafy vegetables. After demonstration, consumption of vegetables increased especially of green and leafy vegetables. Awasthi *et al.* (2016) also reported similar results after plantation of kitchen garden in Kanpur dehat and Kushinagar districts of Uttar Pradesh by. In another study carried out by Singh *et al.* (2016) in Rudrapur block of US Nagar district corroborate these findings where good quality hybrid and improved varieties of vegetable seeds were supplied to the farm women to grow in kitchen garden. They found that the vegetables harvested were utilized for home consumption and the excess seedlings of cauliflower, cabbage, radish, and carrot were distributed to neighboring farm families. The surplus vegetables were dried and stored in powdered form as well as in dried pieces for later consumption.

Availability of vegetables in terms of nutrient before and after establishment of kitchen garden is presented in Table 4. Per capita availability of nutrients/day increased significantly after kitchen gardening intervention. It is obvious from Table 4 that 4.3 per cent protein, 35.00 per cent iron, 34.5 per cent calcium, 44.5 per cent beta-carotene, 150 per cent vitamin C and 17.00 per cent folic acid of RDA were more available to individual after demonstration when compared with farmers practice. Similar results were also reported by Chayal *et al.* (2013) and Vani Bhushanam and Usha

Table 3 : Per unit production and availability of vegetables before and after establishing nutrition kitchen garden

Technology	Average yield (kg/unit area)	Average per capita availability (g/ day)	% change in availability (g/day)	% RDA
Farmers’s practice	30.5	150.00	-	50.00
Recommended practice	110.00	240.00	60.00	80.50

Table 4 : Per capita availability of nutrients before and after establishing nutritional kitchen garden

Nutrients	Per capita availability of nutrients/day		% RDA		Difference (%)
	Before	After	Before	After	
Protein(g)	3.0	5.5	5.50	9.80	4.3
Iron (mg)	2.0	4.50	10.50	45.50	35.00
Calcium (mg)	130.00	350.0	25.50	60.00	34.5
Beta-carotene(mcg)	2000	4150	40.00	84.50	44.50
Vitamin C(mg)	80.0	170.00	200.00	350.0	150.00
Folic acid(mcg)	20.50	52.00	9.50	25.60	17.00

Rani (2013) in the per cent intake of calcium, iron and vitamin A at the end of the intervention.

Conclusion:

Nutrition is considered critical for women. Nutrition is an input into development especially economic development and its neglect would adversely affect health, and cognition. Kitchen garden established at household ensures the daily supply of fresh vegetables in the diets and have helped to improve the food and nutritional security of women as well as their family members. Average per capita availability of vegetables increased from 150g/day to 240 g/day after kitchen gardening was done in selected families. Homestead kitchen gardening along with nutrition intervention will improve the nutritional security and health in rural livelihoods, but the approach is normally slow and results are achieved over a long run.

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