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Improving nutrient availability through establishment of kitchen garden in rural households of Umaria district

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Abstract

Krishi Vigyan Kendra, Umaria has carried out a total of 117 demonstrations in both Kharif and Rabi season in an area of 2.925 ha during the year 2018-19 to 2020-21 on nutritional kitchen gardening in Tali village of Karkeli block. Prior to this, six training programmes were imparted to 125 participants on importance and establishment of nutrition kitchen garden. The objective was to increase the availability of vegetables and nutrient intake at household level and to improve the knowledge of rural women regarding various technological aspects of kitchen gardening and its importance. Data on major constraints perceived by participants in establishing kitchen garden were also collected. For the conduction of demonstrations, families of 4-6 members were selected purposively. An area of 250m² was taken to establish kitchen garden for each family. An interview schedule was used to assess the pre and post training knowledge of participants regarding various aspects of kitchen gardening. The result of the study revealed an improvement in availability and consumption of vegetables at both household and individual level after demonstrations were laid. The average per capita availability of vegetables increased from 182.85 to 271.43 gm/day in Kharif where as it was increased from 212.32 to 298.97 gm/day in Rabi season. Various nutrients like protein, iron, calcium, beta-carotene and vitamin C has also been increased through kitchen garden. The knowledge level of beneficiaries on various aspects of kitchen gardening also improved through training programmes. Major constraints perceived for kitchen garden establishment was unavailability of quality planting material and seeds of HYV vegetables.

Keywords: Kitchen garden, frontline demonstration, training, constraints, nutrients

Introduction

Vegetable plays a vital role in human nutrition. They are not only the important source of various bioactive nutrient molecules such as dietary fiber, vitamins and minerals but also provide some non-nutritive phytochemicals such as phenolic compounds, flavonoids, bioactive peptides etc. to our diet. These nutrient and non-nutrient molecules reduce the risk of chronic diseases such as cardiovascular diseases, diabetes, certain cancers, and obesity Penington and Fisher (2009) [1] and Septembre-Malaterre *et al.* (2018) [2]. Vegetable also provides taste, palatability, better digestibility to us and also increases the appetite. They can be suitably grown in kitchen gardens or nutrition home gardens as short duration crops. The nutritional home or kitchen garden is generally located close to the house and is used for growing vegetables, fruits and other food crops for the domestic purpose and sale Jana (2015) [3] and Keatinge *et al.* (2012) [4]. It not only saves our money and time but also can provide a healthy, useful and environment friendly hobby for whole family. Home 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 different 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, on a daily basis 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) [5]. There are many social benefits that have emerged from kitchen gardening practices; better health and nutrition, increased income, employment, food security within the household, and enhance in community social life.

For a balanced diet, the daily requirement of vegetable is around 300 grams as per dietary recommendation of nutrition specialists including all the three types of vegetables namely include green leafy vegetables, other vegetables and roots and tubers. The present production of vegetables in our country can only provides a per capita consumption of 120 g of vegetables per day. This deficiency can be ameliorated through kitchen gardening Singh and Singh (2017)^[6].

Keeping into consideration, the importance of vegetables in daily diets and its low per capita availability, the Krishi Vigyan Kendra has conducted various trainings and demonstrations to the farm women in order to ensure better per capita availability at household level and increased level of knowledge regarding establishment of kitchen garden.

Materials and Methods

The present work was carried out by Krishi Vigyan Kendra in the nutri smart village Tali of block Karkeli in Umaria district during the year 2018-19 to 2020-21. This work was segmented into two parts. In the first part, a total of six training programmes were conducted in the village with total participants of 125 farm women. The objective of the training was to upgrade the knowledge of rural women regarding the importance of the kitchen gardening and the technical aspects and improved practices of its establishment. The data on pre and post knowledge of participants 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. To find out the constraints in vegetable production, Participatory Rural Appraisal (PRA) technique was used. Preferential ranking technique was utilized to identify the constraints faced by the rural women in kitchen gardening.

In the second phase of the programme, a total of 117 demonstrations on kitchen gardening were laid at household level, 57 (1.425 ha area) in Kharif and 60 (1.50 ha area) in Rabi season. The households were selected through purposive sampling technique by screening households based on their willingness and interest to establish kitchen garden in their farm or in their backyard. It has also been ensured that the family should be of 4-6 members. For individual household, an area of 250m² was taken for the establishment of nutrition kitchen garden. The study was conducted in both the *kharif* and *rabi* seasons. Krishi Vigyan Kendra has provided seed and planting material of improved varieties to the selected households. For *kharif* season, the vegetables selected for kitchen garden included amaranthus, okra, bottle gourd, sponge gourd, bitter gourd, brinjal, tomato, cow pea, spinach, cucumber, chilli 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.

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 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 given by Gopalan *et al.* (1989)^[7]. Then the nutrient availability was compared with the recommended dietary allowances given by ICMR (2010) for Indians. The data obtained was finally statistically analyzed for its significance.

Results and Discussion

General profile of the respondents

A total of 125 rural women were participated in the training programme. They were of 21 to 53 years of age group. The mean age was 28.26±9.36 years. Most of the females were educated up to primary level (44.8%) and among them 22.4% were found illiterate. Majority of participants (48.8%) belonged to other backward class followed by schedule tribe (41.6%), general category (4.8%) and schedule caste (0.8%). Their per capita income ranged between Rs. 700 to 1860 per month.

Training

Training helps in better performance of the individual to carry out work more efficiently and effectively through improved knowledge and skill and brings changes in the attitude of the people. Data obtained is presented in Table 1 showed the knowledge of participants before and after their participation in training on various aspects of kitchen gardening. Prior to the training, only 4 to 36.8% women had knowledge about various aspects of kitchen gardening. They were least familiar with the aspect of nutrient management (4%) followed by appropriate sowing time and seed rate (7.2%), improved varieties (10.4%) and so on. After training, the knowledge of farm women has been increased in all the aspects of vegetable production through kitchen gardening. A total of 98.4% women had knowledge on importance of kitchen gardening followed by post harvest management and value addition of vegetables (97.6%) etc. after participating in training. In accordance, KVK Tapi demonstrated the kitchen gardening in tribal areas and reported that majority of the tribal farm women had low level of knowledge (75%) before contact with KVK. After contact with KVK, 89% of the tribal farm women had high level of knowledge (Chauhan (2012)^[11], Shahi (2019)^[12] and Revanwar (2020)^[13] also reported increased knowledge of women after providing trainings on various aspects. 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 through entrepreneurship.

During conduction of training on nutritional kitchen gardening, some constraints faced by rural women have also been perceived. Data presented in table 2 showed that unavailability of quality planting material and seeds (88%) is the major constraint for production of vegetables in these areas. Lack of technical knowledge related to establishment of nutritional kitchen garden (75.2%) and Low availability of water for irrigation (65.6%) ranked second and third constraint respectively in this regard. Other constraints noticed were lack of interest in cultivation, wild animals, traditional practices of vegetable production, not giving much priority to kitchen gardening etc. In accordance, some constraints were also reported by Sharma *et al.* (2011)^[8], Bishwas and Jamir (2015)^[9] and Singh and Singh (2017)^[6] in establishing a kitchen garden in rural areas. In a study, Kaur and Sharma (2018)^[10] revealed three types of constraints faced by farmers in adoption of kitchen gardening when collected data from three districts of Punjab viz Jalandhar, Nawanshehar and Kapurthala and revealed that socio-cultural constraints were major in Jalandhar, input constraints in Nawanshehar and general constraints in Kapurthala.

Table 1: Pre and post training knowledge of farm women regarding establishment of nutritional kitchen garden

Particulars	Knowledge of farm women (N=125)			
	Before training		After training	
	n	%	n	%
Importance of kitchen gardening	24	19.2	123	98.4
Land preparation and layout	43	34.4	115	92.0
Improved varieties	13	10.4	108	86.4
Appropriate sowing time and seed rates	09	7.2	121	96.8
Nutrient management through organic and inorganic inputs	05	4.0	102	81.6
Critical stages of irrigation	21	16.8	116	92.8
Intercultural operations	46	36.8	120	96.0
Use of organic plant protection measures	17	13.6	114	91.2
Post harvest management and value addition	42	33.6	122	97.6

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

Particulars	Participants (N=125)		Rank
	n	%	
Unavailability of quality planting material and seeds of HYV vegetables	110	88.0	I
Low availability of water for irrigation	82	65.6	III
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.	94	75.2	II
Lack of interest in kitchen gardening	10	8.0	VIII
Adoption of traditional practices for growing vegetable	46	36.8	V
Lesser priority is given to kitchen gardening than other farm activities	42	33.6	VI
Lack of knowledge regarding preservation and processing of surplus produce	56	44.8	IV
Wild animals	22	17.6	VII

Frontline demonstration

Average per unit production and average per capita availability of vegetables in both Kharif and rabi season is presented in Table 3 and Table 4. In Kharif season kitchen garden was laid at 57 locations covering 1.425 ha area during the year 2018-19 to 2020-21. Average yield in farmers practice was only 82.32 kg where as in recommended practice of kitchen gardening, farm women harvested around 121.82 kg vegetables per unit. Per capita availability of vegetables increased from 182.85 gm/day to 271.43 gm/day (48.60%). Prior to the establishment of kitchen garden only 60.95% of the required vegetables were available to the individual after that which increased up to 90.48% of the recommended dietary allowances for the Indians. Sinha (2018) ^[14] also reported that the total vegetable production, consumption and calorie intake of respondents were increased by 100 per cent and 53 per cent respectively after implementation of demonstration on kitchen gardening in Gaya district of Bihar. In Rabi season, the frontline demonstration on kitchen gardening was done in a total of 1.50 ha land and at 60 locations during the year 2018-19 to 2020-21. The average yield of vegetables increased which resulted in an increase of per capita availability at households. The availability increased from 212.32 gm/day to 298.97 gm/day. A total of 40.81% change in the availability was recorded. Data also revealed that after establishing kitchen garden at households, the per capita availability almost reached the daily recommended requirements. In a study at Sagar district of Madhya Pradesh, Singh *et al.* (2018) ^[15] reported the average per capita increased availability of vegetables from 172 to 278 gm/day after establishment of kitchen garden.

Availability of vegetables in terms of nutrient before and after establishment of kitchen garden in both kharif and rabi season is presented in Table 5. It is obvious from the table that per capita availability of nutrients/day increased after kitchen garden intervention. Before conduction of frontline demonstration on gardening, vitamin C was the only nutrient which the individuals were having in adequate amount in both kharif and rabi season. Rest of the nutrients like protein, calcium, iron and beta – carotene were very less in their diets through vegetables. Table also revealed that 6.18% and 5.45% protein, 11.62% and 9.14% iron, 11.71% and 17.97% calcium, 40.66% and 48.20% beta-carotene, 124.4% and 110.73% vitamin C of RDA were more available to individual after demonstration when compared with farmers practice in both the kharif and rabi season respectively. Borthakur *et al.* (2021) ^[16] in a study conducted at 20 households of Golaghat and Sivasagar district of Assam also found that demonstration of nutrition garden resulted in increased homestead vegetable production and consumption of excess vegetables. According to them, 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. Similar findings were also reported by Rana *et al.* (2021) ^[17]. They revealed that the production and consumption of the vegetables increased by 218.25% and 95.40% respectively which resulted in additional intake of iron (32.70%) and calcium (110.40%) when kitchen garden was established at Setewani village of Seoni district in M.P under frontline demonstration.

Table 3: Average per unit production and availability of vegetables before and after establishing nutrition kitchen garden in Kharif season

Year	Area (ha)	Location (No.)	Average Yield (kg/unit area)		Average Per capita availability (gm/ day)		% change in availability (gm/day)	% RDA		% Difference in RDA
			FP	RP	FP	RP		FP	RP	
2018-19	0.125	5	80.05	122.6	177.9	274.4	54.24	59.3	91.46	+32.17
2019-20	0.55	22	85.61	120.5	190	268	41.05	63.33	89.33	+26
2020-21	0.75	30	81.29	122.4	180.64	271.9	50.52	60.21	90.63	+30.42
	1.425	57	82.32	121.82	182.85	271.43	48.60	60.95	90.48	+29.53

*FP(Farmers Practice) and RP (Recommended Practice)

Table 4: Average per unit production and availability of vegetables before and after establishing nutrition kitchen garden in Rabi season

Year	Area (ha)	Location (No.)	Average Yield (kg/unit area)		Average Per capita availability (gm/ day)		% change in availability (gm/day)	% RDA		% Difference in RDA
			FP	RP	FP	RP		FP	RP	
2018-19	0.25	10	102.23	132.61	227.17	294.6	29.68	75.72	98.20	+22.48
2019-20	0.50	20	94.18	136.00	209.80	302.2	44.04	69.93	100.73	+30.80
2020-21	0.75	30	90.00	135.04	200.00	300.1	50.05	66.67	100.03	+33.37
	1.50	60	95.47	134.55	212.32	298.97	40.81	70.77	99.66	+28.88

*FP(Farmers Practice) and RP (Recommended Practice)

Table 5: Average per capita availability of nutrients before and after establishing nutritional kitchen garden in Kharif and Rabi Season

Season	Nutrients	Per capita availability of nutrients/day		% RDA		Difference (%)
		Before	After	Before	After	
Kharif	Protein(g)	2.52	5.92	4.58	10.76	+6.18
	Iron (mg)	1.28	3.72	6.10	17.71	+11.62
	Calcium (mg)	76.66	146.93	12.78	24.49	+11.71
	Beta-carotene(mcg)	1232.33	3184	25.67	66.33	+40.66
	Vitamin C(mg)	85.46	135.22	213.65	338.05	+124.40
Rabi	Protein(g)	2.67	5.67	4.85	10.31	+5.45
	Iron (mg)	1.55	3.47	7.38	16.52	+9.14
	Calcium (mg)	65.07	172.86	10.85	28.81	+17.97
	Beta-carotene(mcg)	1701.33	4015	35.44	83.65	+48.20
	Vitamin C(mg)	98.53	142.82	246.33	357.05	+110.73

Conclusion

It can be concluded from the findings of the above study that the availability of the nutrients especially the micronutrients can be increased in the daily diets of every individual by providing them adequate amount of vegetable through nutrition kitchen garden. Variety of vegetables should be grown in the kitchen garden order to address the problem of malnutrition.

References

- Pennington JAT, Fisher RA. Classification of fruits and vegetables. *Journal of Food Composition and Analysis*. 2009;22(1):23-31.
- Septembre-Malaterreb A, Remizeb F, Pouchereita P. Fruits and vegetables, as a source of nutritional compounds and phytochemicals: Changes in bioactive compounds during lactic fermentation. *Food Research International*. 2018;104:86-99
- Jana H. Kitchen gardening for nutritional security. *Rashtriya Krishi*. 2015;10(2):13-16.
- Keatinge JD, Chadha ML, Hughes JDA, Easdown WJ, Holmer RJ, Tenkouano A, *et al*. Vegetable gardens and their impact on the attainment of the Millennium Development Goals. *Biological Agriculture and Horticulture*. 2012;28(2):71-85.
- Christensen TE. What is a kitchen Garden? Kitchen gardening technology introduced in LCWU Pakistan Educational News Keiko Y, 2011, 1-2.
- Singh G, Singh RK. Economic analysis of kitchen gardens at farmers' doorsteps. *International Research Journal of Agricultural Economics & Statistics*. 2017;8(2):299-304.
- Gopalan C, Rama Shastri BV and Balasubramanian SC. Nutritive value of Indian foods. Revised and updated by Narasingha Rao, BS, Deosthala, YG and Pant KC. NIN, Hyderabad, 1989.
- Sharma K, Singh G, Dhaliwal NS, Yadav VPS. Constraints in Adoption of Recommended Kitchen Gardening Techniques. *Journal of Community Mobilization and Sustainable Development*. 2011;6(1):096-099.
- Biswas PK, Jamir S. Constraints faced by farmers in adoption of kitchen gardening techniques in Mokokchung district, Nagaland. *International Journal of Farm Sciences*. 2015;5(3):207-211.
- Kaur A, Sharma M. Study on constraints faced by farmers in adoption of kitchen gardening in central plain zone of Punjab. *International Journal of Farm Sciences*. 2018;8(1):79-81.
- Chauhan Nikulsinh M. Impact and constraints faced by tribal farm women in kitchen gardening Rajasthan *Journal of Extension Education*. 2012;20:87-91.
- Shahi V, Singh P, Vikas Kumar, Maurya R. Role of kitchen gardening in diet diversification and nutritional security. *Asian Journal of Home Science*. 2019;14(2):288-292.
- Revanwar MS. Vegetable Nutrition Garden: Effectual Method to Improve Nutritional Security in Rural Areas of Nanded District. *International Journal of Research and Review*. 2020;7(7):320-324.
- Sinha N. Nutrition gardens for improved food security and enhanced livelihoods in Gaya district of Bihar.

- International Journal of Current Microbiology and Applied Sciences. 2018;7:3456-3462.
15. Singh V, Yadav KS, Tripathi AK. Kitchen gardening: a promising approach towards improving nutritional security in rural households. International Journal of Microbiology Research. 2018;10(5):1216-1219.
 16. Borthakur M, Begum T, Neog M, Borthakur S. Improving nutritional status of rural household through nutrition garden in Golaghat and Sivasagar districts of Assam. International Journal of Current Microbiology and Applied Sciences. 2021;10(01):2588-2594.
 17. Rana GK, Singh NK, Deshmukh KK, Mishra SP, Saini KPS. Kitchen garden: An ideal approach to enhance household nutritional security in rural areas of Seoni district (M.P.). The Pharma Innovation Journal. 2021;10(5):254-258.