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Richa Singh
KVK Amberpur, Sitapur, Uttar Pradesh, India

Vinod Kumar Singh
KVK Amberpur, Sitapur, Uttar Pradesh, India

Suresh Singh
KVK Amberpur, Sitapur, Uttar Pradesh, India

Correspondence
Richa Singh
KVK Amberpur, Sitapur, Uttar Pradesh, India

Organic backyard gardening: a promising approach to enhance household food security and wellbeing

Richa Singh, Vinod Kumar Singh and Suresh Singh

Abstract
In developing countries where the pervasiveness of hunger and food scarcity is more acute, are resorting to various counter strategies to meet the growing demand and to avert food insecurity and famine. Much attention is needed towards home gardens as a strategy to enhance household food security and nutrition. Farmers with small backyard spaces have been selected and were encouraged to go for cultivation of diverse vegetables and fruits primarily for house consumption. They were provided with initial critical inputs and a pack of assorted seeds containing seasonal vegetables having a combination of leguminous, fruit, root, and leafy vegetables. The present Study was conducted in five villages of Sidhauli, Sitapur District, Uttar Pradesh. Ten families of each village were selected by purposive sampling technique, consisting the total sample of 50 respondents. The data were collected from each respondent through personal interview method with the help of structured schedule. The study revealed that the production of vegetables at beneficiaries farm increased up to 160.93 per cent which resulted in increased consumption (83.63%) and distribution (273.33%) and there was significant increase in consumption of vitamin A, energy, phosphorus, calcium, iron and protein in the daily diet of family members after intervention of nutritional kitchen garden

Keywords: organic backyard garden, food security, fruits and vegetables, micronutrients

Introduction
Food insecurity, malnutrition and healthcare are the major problems faced by most of the developing countries in the world. The concept of food security should be broadened to make it holistic so as to mean every individual has the physical, economic and environmental access to a balanced diet that includes the necessary macro and micro-nutrients and safe drinking water, sanitation, environmental hygiene, primary health care and education so as to lead a healthy and productive life. Home gardens play an important role in fulfilling dietary and nutritional needs [1]. 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 [2]. Micronutrient malnutrition among women of reproductive age increases the risk of mortality during labour and delivery and increases the risk of dietary deficiency in their newborn children during critical growth and development periods [3]. For poor households, vegetables and fruits are often the only sources of micronutrients in the family diet. Home gardening is one of the world's most ancient food production practices and is practiced throughout the world [2]. In the context of ever increasing problems of malnutrition and smaller farm size for field crops production, the only feasible option for farm households is to grow vegetables intensively in the homestead, which can provide household food security [4].

The goal of community gardens was to increase household and intra household food security throughout the year. Community gardens provide marketing opportunities to rural people and built a base for food production for the vulnerable. Home gardens can be of different size. They are called small gardens or kitchen gardens located near the homestead specifically for vegetables and water for irrigation can be obtained from dish washing and bathing. Community gardens act as a survival strategy for the poor in many communities to share resources together in order to meet their daily basic needs and mutual obligations [5]. Kitchen garden plays an important role for rural families to provide diversified vegetables in their daily diet. It is now well conceived that by simply adding greens and other vegetables to the available food grains the diet of the average Indians can substantially be upgraded. To make this recommendation realistic adoption of kitchen garden is the best option which can supply required vegetables in daily diet to the rural families [6].

The quantity of vegetable produced per capita in India is much lower than what is recommended by the dieticians. In India per capita availability is around 135 g against the minimum requirement of about 300 g for a balance diet. Even this low level of average supply does not fully reflect the consumption pattern of the rural household and those below the poverty line where per capita vegetable consumption is very low, even lower than 40 g per day[6]. The production of fruits and vegetables provides the household with direct access to important nutrients that may not be readily available or within their economic reach [3]. Home gardening is a means to improve household food security. Moreover, home gardening increases the diversity of foods available to the household, which, in turn, leads to better bioavailability and utilization of nutrients. Vegetables and fruits can also make other foods more palatable, leading to an overall increase in food intake. In their aim to improve the overall quality of the diet, home gardens address multiple nutritional requirements simultaneously. Equally importantly, home gardening has been shown to be a source of additional income for the household, since the family can sell a portion of the garden's produce [3]. Therefore, present study was conducted to see the impact of kitchen gardening in improving the nutritional security of households in rural areas.

Methodology

The present study was conducted in Sidhauli block of Sitapur District, Uttar Pradesh. From this block, five villages were selected where most of the families having kitchen garden of different sizes are interested to improve the practice. The number of families with kitchen garden was decided for villages by purposive sampling method. The families of each village were selected by Simple Random Techniques. In this way 10 families from each village were selected. Thus, the total study sample consisted of 50 respondents (one for each family) from all the 5 selected villages of Sidhauli block. The data were collected from each respondent through personal interview method with the help of structured schedule.

Different capacity building activities including training, exposure visit and 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. Pre-survey was conducted to obtain information regarding profile and respondent's dietary food habits and nutritional deficiency diseases were also pre-surveyed. After one year of establishment of nutritional garden, a post-survey was done to analyse the impact of kitchen gardens on nutritional status of selected families. Data were collected by face to face interview with the help of structured interview schedule.

Result and discussion

Socio-economic characteristics of respondents were analysed and are presented in Table 1. The table indicates that majority (86%) of respondents were belonged to nuclear family and followed by (14%) joint family. It was found that majority of the families (60%) were from medium sized families followed by small size (30%) and big size (10%). Results on family income showed that majority (44%) of respondents belonged to income group of more than Rs. 1.0 lack. While looking at their educational status, results revealed that 84 per cent heads of the family were literate to primary level educated. Results on land holding depicts that majority (60%) had medium scale land followed by small (28%) scale land and only (12%) had large scale land. Before demonstration respondents cultivated different vegetables such as bottle gourd, bitter gourd, sponge gourd, green chilli, brinjal, lady's finger, tomato and radish. But after intervention they had grown vegetables like that bottle gourd, bitter gourd, green chilli, pumpkin, brinjal, tomato, cucumber, ridge gourd, lady's finger, cluster bean, cow pea, spinach, coriander, cauliflower, onion, cabbage, carrot, pea, fenugreek, soya and radish in *Kharif*, *Zaid* and *Rabi* seasons. It is evident from Table 2 that kitchen gardening demonstration resulted in increase in homestead vegetable production, consumption and distribution of excess vegetables to neighbours, relatives and near and dear ones. Before intervention, respondents were practicing traditional practices; they used to grow only one or two seasonal vegetable or even not practicing any kitchen garden. To fulfil the daily requirement of vegetables, they had to purchase vegetables from market for consumption but they do not purchase the vegetables on regular basis. For this reason vegetables are lagging from their diet resulting in low consumption of vegetables in diet then the requirement (RDA). It is obvious from Table 2 that production of vegetables at beneficiaries farm increased up to 160.93 per cent which resulted in increased consumption (83.63%) and distribution (273.33%) and money saving and similarly mentioned by Chayal *et al* [2]. Different essential nutrients contribution from vegetables is presented in Table 3. Nutritional value of different vegetables was calculated according to Nutritive Value of Indian Foods by C. Gopalan (National Institute of Nutrition, ICMR, Hyderabad). Table 3 indicates that there was significant increase in consumption of vitamin A (95.83%), energy (163.28%), phosphorus (108.42%), calcium (146%), iron (132.71%), and protein (128.71%) in the daily diet of family members after intervention of nutritional kitchen garden and earlier studies reported similar findinds [4-7].

Conclusion

It may be concluded that establishment of kitchen gardens had immense role in tackling the problem of malnutrition and micronutrients deficiencies in rural areas. Home gardening has been shown to be an important way to improve the intake of vitamin A-rich foods, particularly for poor households and in countries where plant foods are the main source of vitamin A. Women are the main care-takers of the garden, and kitchen garden empowers them, ensures better utilization of the income for food, and increases family welfare. All these benefits are important contributions towards poverty alleviation. In addition, home gardening increases the diversity of foods, which in turn leads to overall better utilization of nutrients.

Table 1: Socio personal characteristics of respondents (n=50)

Variable	Categories	Number	Per cent
Type of family	Joint family	7	14
	Nuclear family	43	86
Size of family	Small size (1-4 members)	15	30
	Medium size(5-7 members)	30	60
	Big size(>7 members)	5	10
Annual income	<50,000	10	20
	50,000-1,00,000	18	36
	>100000	22	44
Education	Illiterate	3	6
	Literate	25	50
	Primary	17	34
	Middle	5	10
	Graduation	-	-
Land holding	Small	14	28
	Medium	30	60
	Large	6	12

Table 2: Vegetable production and utilisation pattern

Particulars	Production (Kg)	Purchase (Kg)	Distribution (Kg)	Consumption (Kg)
Before intervention	215	75	15	275
After intervention	561	-	56	505
Change	346	-75	41	230
Per cent change	160.93	-100	273.33	83.63

Table 3: Change in nutritional status through Nutritional Kitchen Garden

Essential nutrients	Per day per head consumption through vegetables		Increase in consumption	
	Before intervention	After intervention	Total	Per cent
Vitamin A (IU)	468.52	917.53	449.01	95.83
Energy (Kcal)	35.3	92.94	57.64	163.28
Phosphorus (mg)	61.51	128.2	66.69	108.42
Calcium (mg)	39.69	97.78	58.09	146.35
Iron (mg)	1.07	2.49	1.42	132.71
Protein (gm)	1.92	4.38	2.46	128.12

Table 4: Vegetables grown in different season

S.no.	Crop name		
	Kharif season	Rabi season	Zaid season
1.	Lady's finger	Cauliflower	Bottle gourd
2.	Bitter gourd	Cabbage	Bitter gourd
3.	Bottle gourd	Tomato	Lady's finger
4.	Sponge gourd	Chilli	Lobia
5.	Ridge gourd	Spinach	Pumpkin
6.	Cow pea (Lobia)	Soya methi	Brinjal
7.	French bean (sem)	Radish	Cluster bean (gwar phali)
8.	Chilli	Brinjal	Chilli
9.	Brinjal	Pea	Tomato
10.	Pumpkin	Carrot	-
11.	Cucumber	Potato	-
12.	Colocassia	Garlic	-
13.	Yam (Elephant foot)	Onion	-

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