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MOTIVATION OF FARM WOMEN TOWARDS NUTRITIONAL KITCHEN GARDEN AND POST-HARVEST MANAGEMENT OF THEIR SURPLUS PRODUCE

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ABSTRACT

The study was carried out in kitchen garden of 20 farm women of villages Danpur, Bhagwanpur, Chattarpur, Bhurarani and Fauzi Matkota of block Rudradpur, district Udham Singh Nagar (Uttarakhand) during kharif 2013 and rabi 2013-14. Good quality hybrid and improved varieties of vegetable seeds were supplied to the farm women to grow in an area of 0.07 ha. Fixed quantity of vegetable seeds of each, bottle gourd, sponge gourd, bitter gourd, brinjal, okra, chilli and lobia were supplied in kharif season which were sown in the month of June while in rabi season onion, carrot, cauliflower, cabbage, rye, radish, spinach, pea, coriander and fenugreek seeds were supplied to each of farm women which were sown in the month of October. The economic aspect of demonstrations revealed benefit-cost ratio as 3.46 in kharif and 3.57 in rabi season. It was observed that the vegetables harvested were utilised for home consumption and the excess seedlings of cauliflower, cabbage, radish and carrot were distributed to neighbouring farm families. These vegetables were also dried and stored in powdered form as well as in dried pieces for later consumption. Thus, efforts of the present study motivated the farm women to start the practice of nutritious kitchen garden, helped to increase their yield of vegetables, through as well as storage of fresh produce in post-harvest form for later consumption.

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Introduction

Kitchen garden can be defined as a farming system which combines different physical, social and economic functions on the area of land around the family home. The kitchen garden is traditionally a very important piece of land for rural households, covering an area of about 200 to 1500 m2, the structure and function of kitchen gardens are similar throughout the region. It concentrates on three important aspects - the kitchen garden as the most direct way of providing daily food; a source of income for the purchase of other foods; and means to produce non-food items such as medicinal herbs, spices and fuelwood. Within the typical kitchen garden are social areas for meetings, children's play and gardens for display; economic areas for growing food, medicinal plants and trees and for raising animals and fish; physical areas for storage, living, washing and waste disposal. It is a place for people to live in but it also produces a variety of foods and other things for both home use and income. The kitchen garden can produce many different things: fuel for cooking, food, income, wood for building, medicinal plants, herbs, spices and flowers. Therefore, nutritional kitchen garden is only one of the possible interventions for enhancing food and nutrition security for the poor. The complex synergies of food availability, access, consumption and nutritional status with poverty, health, mental ability, productivity and economic development demand an integrated approach to solving food insecurity in the long term. Nutritional kitchen garden has a special role in this strategy, in providing direct access to food through self-reliance. Farm women have always been a part of active workforce due to their total involvement in household work, agriculture, cattle care and dairying, etc. They are also active members in growing fruits and vegetables in the nutritional kitchen garden around their homes. Focus of horticulture is increasing towards diversification through efficient land use, optimum utilisation of natural resources and creating skilled employment for rural masses, especially women folk and these efforts have been rewarding (Chadha, 2009). India requires about 180 million tonnes of vegetables by 2030 (Anonymous, 2011) which can be possible only through integration of various technologies and opportunities. Nutritional well-being requires access to enough nutritious and safe food to meet the dietary needs of all members of the household throughout the year. Attaining better food supplies and nutritional well-being is not only producing enough food locally but also requires sufficient resources such as land and labour, tools, skills and knowledge. People must have some knowledge of nutrition: the most important information is what kinds of food to eat and how to prepare the food in the right quantities and mixes and in a way that is safe and clean for the family members' healthy growth and development. An inadequate diet can affect other members of the household as well. A poor diet leads to poor work ability and illness, which means visiting the health centre and too many visits to the health centre mean lost

working time as well as lost money. These losses can be reduced or prevented if everyone in the family eats enough healthy foods, drinks clean water and practises good hygiene and in this respect a well planned nutrition garden helps to attain nutritious food. Present study is an attempt to know the production and post-harvest management of the vegetables produced in the kitchen garden of farm women. The study was conducted with the following objectives:

Objectives

- To motivate farm women and create awareness towards the establishment of nutritional kitchen garden for household nutrition security.
- To impart knowledge among farm women regarding the layout, raising of nursery and sowing of different seasonal vegetables.
- To train farm women on the development of value added products from vegetables.
- To start nutritional kitchen garden as a source of income generation activity among farm women.
- To identify the factors and attributes in food system that prioritise the development of nutritional kitchen garden in villages.

Methodology

Creation of awareness on nutritional kitchen garden among farm women to motivate farm women for the practice of nutritional kitchen garden and development of value added products from vegetable produce. This was achieved by the following methods:

- Frequent visits made by the home scientists of KVK, Kashipur to the field sites.
- Continuous and healthy discussions with the farm women during field visits on need and importance of nutritional kitchen garden.
- Creating awareness by conducting trainings on related aspects of nutrition garden, preservation methods, etc.
- Field day organised by the home scientists to motivate other farm women. The purpose was to introduce a new idea, a new crop and to stimulate the interest of as many farm women as possible to offer general guidance to answer questions and queries for popularisation and adoption of planned nutritional kitchen garden.
- Technical and scientific guidance provided to each farm woman in layout, raising of nurseries, planting methods, manuring and composting of area.

- Demonstrations conducted on the post-harvest management of vegetables produced through low cost preservation techniques.

Selection of Farm Women for Demonstrations: Twenty farm women were purposively selected from Danpur, Bhagwanpur, Chatarpur, Bhurarani and Fauji Matkota villages of Rudrapur block, district Udham Singh Nagar, Uttarakhand State for conducting demonstrations.

Area of Nutritional Kitchen Garden: Ten demonstrations on nutrition kitchen garden were conducted during kharif, 2013 in an area of 0.02 ha (200 sqm per demonstration) and ten demonstrations in rabi, 2013-14 in an area of 0.05 ha (500 sqm per demonstration). Women in each village were selected on the basis of the availability of the area for establishing nutrition kitchen garden and showed desire and interest to practise it.

Duration of Nutritional Kitchen Garden: Five months each in rabi and kharif.

Quantity of Vegetable Seeds Given: Fixed quantity of vegetable seeds of each of bottle gourd (2 g), sponge gourd (2 g), bitter gourd (2 g), brinjal (2 g), okra (50 g), chilli (2 g), lobia (200 g) were supplied in kharif, while in rabi season onion (50 g), carrot (50 g), cauliflower (5 g), cabbage (5 g), rye, (5 g), radish (50 g), spinach (50 g), pea (160 g), coriander (50 g), and fenugreek seeds (50 g) were supplied to farm women which were sown in the month of June for kharif season and October, 2013 for rabi season.

Selection of Farm Women for Identifying Factors and Attributes for Nutritional Kitchen Garden Development in Villages : Forty women were randomly selected for imparting trainings and for identifying the factors and attributes in food system that prioritise the development of nutritional kitchen garden in villages. They were trained on various preservation techniques for storage of vegetables in different forms for later consumption. Technical advices were also imparted on development of different value added products from the vegetables produced. For wider dissemination of technology among women apart from conducting discussions and organising field day, regular trainings were conducted to create awareness among farm women regarding the importance of nutrition garden, layout, planting and management of kitchen garden. It served as a source of income and development of value added products as well as post-harvest management of vegetable produce.

Method of Data Collection: Seasonal vegetable produce from nutritional kitchen garden was recorded weekly in kilograms. The information was collected from the farm women purposively selected for conducting demonstrations. These farm women were interacted during field visits and other extension activities for obtaining information related to nutritional kitchen garden produce. Discussions were held with the farm women to assess their knowledge on technical know-how and importance of nutritional kitchen garden.

Results and Discussion

A properly developed kitchen garden can supply a significant proportion of a household's daily food needs. Nutrition gardening contributes to household food security by providing direct access to food that can be harvested, prepared and fed to family members, often on a daily basis. The current study examined participant satisfaction and the short-term effectiveness of a garden based nutrition education programme through conducting demonstrations on vegetable production in kitchen garden. Figures 1 and 2 show the total production as 2171 kg in kharif, 2013 and 5183 kg plus seedlings of onion, cauliflower and cabbage in rabi season, 2013-14. It was observed that the vegetables harvested were utilised for home consumption and the excess seedlings of cauliflower, cabbage, radish and carrot were distributed to neighbouring farm families. Table 1 depicts that the yield of all vegetables from 10 families in kharif, 2013 and rabi, 2013-14 season as 108.55q/ha and 103.66 q/ha, respectively. It was also found that per member availability per day was 362 g and 863.83 g in kharif and rabi seasons, respectively (Table 1). The produce of seasonal vegetables from 200-500 sqm per family was found to be sufficient to meet out the daily requirement of 300g/day/ head and the excess produce of seasonal vegetables yields an additional monetary benefit to the farm women. The economic aspect of demonstrations revealed benefit-cost ratio as 3.46 and 3.57 in kharif and rabi seasons, respectively. It was revealed from discussions that the potential economic benefits of nutritional kitchen gardening were returns to land and labour often higher than those from field agriculture; gardening gives dual benefits of food provision and income generation; household processing of kitchen garden produce (drying, value addition) increases their market value and ensures year-round supply. The excess produce of green leafy vegetables like rye, spinach, coriander and fenugreek were dried, powdered and stored for incorporation into food products during off-season period. Technical guidance provided during the study period resulted in safe and good yield of vegetables as well as their post-harvest management for later consumption. The efforts of the present study benefited the farm women in increasing their yield of vegetables through as well as storage of fresh produce in post-harvest form thereby enhancing their knowledge. Other vegetables like cauliflower, carrot and radish were consumed in different forms such as vegetable and curry preparation, snacks as halwa and kheer, fresh salad, stuffed paranthas, pickles, etc. Impact data suggest that the intervention increased the number of vegetables consumed. More than 90 per cent of women valued the intervention`s hands on activities such as planting, maintaining, harvesting and preparing the foods produced in their garden and it proved to be an innovative strategy to expose women to the benefits of gardening through a variety of experiential learning activities. Even very poor, landless or near landless people practise gardening on small patches of homestead land,

vacant lots, roadsides or edges of a field, or in containers. Gardening may be done with virtually no economic resources, using locally available planting materials, green manures, "live" fencing and indigenous methods of pest control. Thus, home gardening at some level is a production system that the poor can easily enter. Gardening provides a diversity of fresh foods that improve the quantity and quality of nutrients available to the family. Households with gardens typically obtain from them more than 50 per cent of their supply of vegetables and fruits, medicinal plants and herbs; those households having garden systems that include animal-raising also obtain their primary and often only source of animal protein (Soleri, Cleveland and Frankenberger, 1991; Marsh and Talukder, 1994; UNDP, 1996). Very small mixed vegetable gardens can provide a significant percentage of the recommended dietary allowance for protein (10 to 20 per cent), iron (20 per cent), calcium (20 per cent), vitamin A (80 per cent) and vitamin C (100 per cent) (Marsh and Talukder, 1994; AVRDC, 1983-1989). Homestead production is also an important source of supplementary income for poor rural and urban households around the world.

Dissemination of Technology Through Field Day and Trainings

Field day was organised in the month of December, 2013 at Fauzi Matkota village to motivate the other farm women for adoption of nutritional kitchen garden. Nutrition education is essential for ensuring effective linkages between garden, food availability and consumption and between consumption and bio-availability or absorption by the body. The most successful demonstration in Fauzi Matkota village was shown to the nearby farm women for adoption of scientific practices in kitchen gardening and its related benefits for wider scale dissemination of technology to the villagers which may promote both gardening techniques and nutrition education. This ensures that gardens are planned to provide a year-round supply of nutrient-rich foods that are compatible with local taste preferences. Farm women were technically guided and trained on various post-harvest management techniques of the produce. On this aspect trainings were also conducted for other farm women for development of low cost value added products and preservation techniques to enhance their knowledge for the utilisation of produce and its storage in different preserved forms during off-season. Hence, awareness was created for nutritional benefits of gardening and post-harvest management practices.

Factors Identified for Nutritional Kitchen Garden Development in Villages

Developing the kitchen garden for food production is a very important part of attaining an adequate food supply for the household. There are several reasons why this is so as reflected during field visits. One reason is the isolation of many rural villages. Food from other areas must sometimes be transported from far away, so are either expensive to buy in the village or are not available. Opportunities for

earning income are also limited in villages. There are other factors in the food system that make it difficult to ensure that household food supplies are adequate such as shortage of land, shortage of water, too few people to clear the land, hand tools which limit the amount of land cleared, late land preparation because of bad planning, limited variety of crops, crops planted wrongly, poor seed distribution, limited inputs, limited family labour, lack of knowledge on layout and management of nutrition garden, insufficient knowledge of food preservation and lack of information on children's needs. Under demonstrations conducted in kharif and rabi season revealed that 90 per cent of women are involved in maintaining nutrition garden. They are the predominant working hands in nutrition garden. The consumption pattern of vegetables of households increased over the conventional kitchen garden which in turn promotes dietary iron, calcium and beta carotene intake. Through nutrition garden the emphasis was given to properly utilise the backyard space with introduction of the nutritionally rich and more productive vegetables of hybrid/ high-yielding vegetables. The farm women could increase net returns, considerably, due to savings on reduced external purchase of vegetables for culinary purposes. Kitchen gardening produce can bring monetary benefits to the farm women in many ways such as by selling the seedlings, by preparing and selling value added products and by saving money to be spent on purchase of seasonal vegetables from markets.

In the present study, seed cost was ₹ 2250 and ₹ 3178, gross income was found as ₹ 54275 and ₹ 129575, whereas net income was found to be ₹ 38575 and ₹ 93272 during kharif and rabi season, respectively (Table 1). The beneficiaries also get value added products and seedlings. This net return can be enhanced by performing daily task in kitchen garden by themselves or by the contribution of their family members. Scientific guidance on technical parameters of vegetable cultivation helps in reducing the cost of cultivation such as advice on high-yielding and pest resistant varieties, technical know-how on compost making and use of improved farm implements for weeding and maintaining kitchen garden field can enhance the efficiency of farm women. This could help in increasing net return. Vegetable growing enabled maximum utilisation of land cultivation in a small area. It could be observed from Table 2 that respondents perceived profitability as one of the attributes of nutritional kitchen garden technology as they gained additional yield and income due to adoption of improved vegetables. The other attributes such as low initial cost (85 per cent), timely availability (92.5 per cent), quick return on investment (85 per cent), feasibility at field level (87.5 per cent), and lower perceived risk (85 per cent) were perceived as important attributes of kitchen garden for quicker adoption at field level by the farm women. Thus, nutrition garden demonstrations established in selected villages acts for the promotion of nutrition garden which is a cost-effective means of solving

micro-nutrient deficiency. It helps in providing fresh fruits and vegetables especially green vegetables to the household and rotation of vegetables provide variety in the diet. Also the scientific guidance given through different extension activities helps in dietary improvement and enhancement of awareness among rural community for improved and hybrid seeds of vegetables.

Conclusion and Policy Implications/ Recommendations

Fruit and vegetable availability is a predictor of fruit and vegetable intake. Nutritional kitchen gardens have been advocated as a means of preventing malnutrition among rural families. The nutritional kitchen garden established at different villages certainly proved to be an effective intervention for attaining household food and nutrition security. The vegetables produced at home helped to meet the daily requirements of vegetables of each and every household member. The surplus produce of vegetables was preserved through different post-harvest techniques such as sun drying of green leafy vegetables (spinach, fenugreek, *rye*) and other vegetables such as carrot, radish, cauliflower, as well as development of value-added products such as pickles. Apart from this, trainings, demonstrations and field day conducted helped to motivate and create awareness among other women to start nutritional kitchen garden for household nutrition security and development of value-added products through post-harvest management techniques.

Recommendations

- Nutritional kitchen garden be practised at each household level who are having area around their houses.
- Provision of subsidised quality vegetable seeds, fruit saplings at village level be made quite in advance either in collaboration with extension agencies or state department of agriculture and horticulture or other research institutions.
- Linkages with retail shops/local haats/ NGOs needs to be done for the sale of fresh produce of vegetables from nutritional kitchen garden.
- Marketing strategy for the sale of value added products needs to be developed.

Fig.1 : Production of Seasonal Vegetables in Nutritional Kitchen Garden (Kharif, 2013)

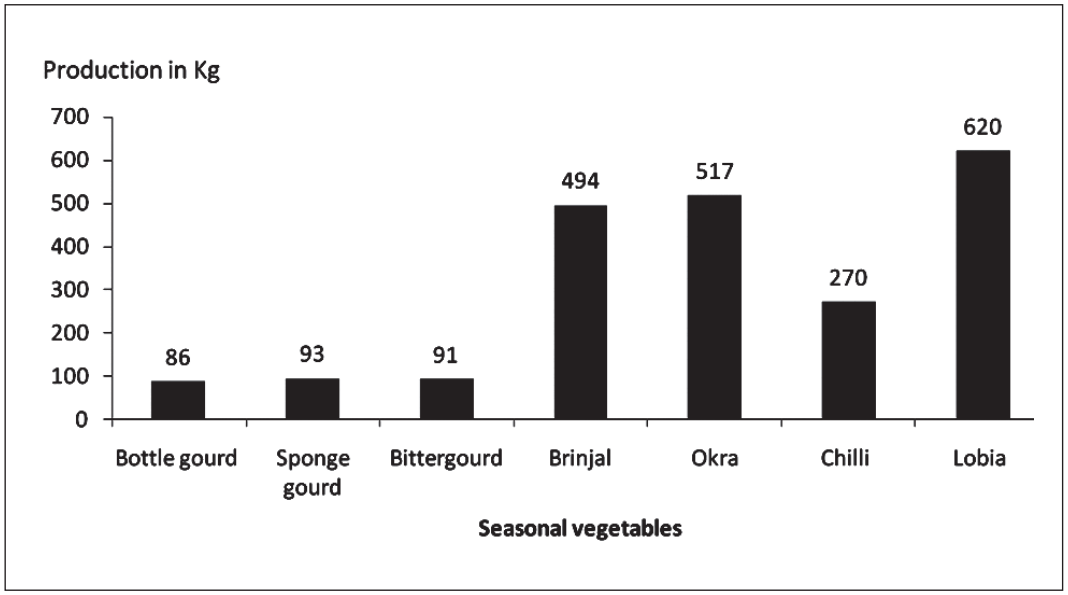

Fig. 2 : Production of Seasonal Vegetables in Nutritional Kitchen Garden (Rabi 2013-14)

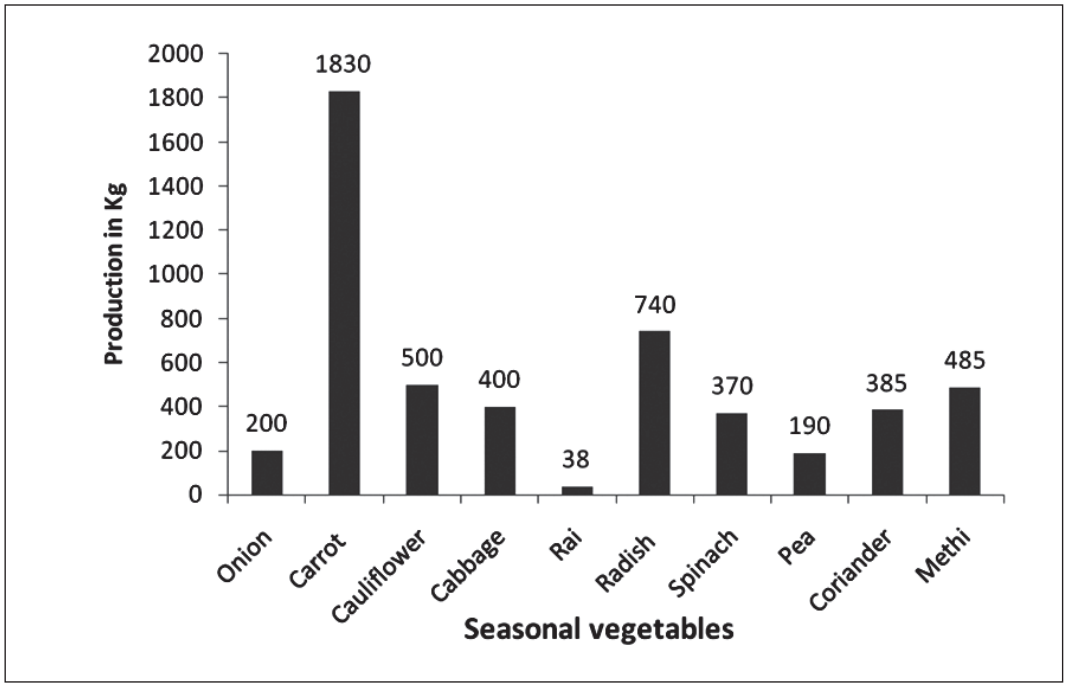

Table1: Technical Observations of Demonstrations

Technical observations	Kharif, 2013	Rabi 2013-14
No. of demonstrations	10	10
Area (ha.) 0.2	0.5	
Seed cost (₹)	2250	3178
Duration (m)	5	5
Total Production (kg)	2171	5183 (and seedlings of onion, cauliflower and cabbage)
Yield (q/ha)	108.55	103.66
Gross Income (₹)	54275	129575
Net Income *(₹)	38575+ value added products	93272+ value added products + seedlings
Per month availability (kg)	43.4	103.66
Per day availability (kg)	1.45	3.45
Per member availability (g), considering 4 members	362	863.83
Benefit-cost ratio	3.46	3.57

*Subject to change due to saving in cost of cultivation.

Table 2: Perceptions of Attributes of Nutritional Kitchen Garden by Farm Women

Attributes and Opinion	Percentage (N=40)
Initial cost	
High -	
No difference	6 (15%)
Low 34 (85%)	
Feasibility-Suitability of soil and irrigation	
Not feasible	5 (12.5%)
Feasible	35 (87.5%)
Profitability	
No difference	4 (10%)
Additional yield	36 (90%)
Availability of planting material	
Not at all -	
Late	3 (7.5%)
Timely	37 (92.5%)
Immediacy of return	
Low yield	3 (7.5%)
No difference	3 (7.5%)
Quick	34 (85%)
Perceived risk	
Risky	6 (15%)
Not risky /lowered risk	34 (85%)

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