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Nutritional security through nutri-garden for rural household's empowerment

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Abstract
India has a rich heritage of indigenous fruits and vegetables. They are not only rich in minerals and vitamins but also contribute in a big way in maintaining health and overcoming hunger and malnutrition. Among the rural community their consumption is very low due to lack of purchasing power ignorance and other factors including unavailability. Despite of sufficient food grain production at national level, malnutrition is still a public health concern in our country. India is also one of the leading nations in vegetable production but the problem of malnutrition especially the micronutrient deficiencies are very common among the rural households. The underlying cause may be the unawareness, illiteracy, inadequate availability of vegetables and fruits and low purchasing power of the households. As per Recommended Dietary Allowances, daily intake of vegetables should be 300 gm/person including roots and tubers, green leafy and other vegetables. Keeping into consideration the high prevalence of malnutrition especially micronutrient deficiencies and inadequate availability of vegetables, Krishi Vigyan Kendra Namakkal has carried out 17 demonstrations from the year 2024 to 2025 on nutritional kitchen gardening. Prior to this, a total of seventeen training programmes were conducted including 164 participants on importance and establishment of nutrition kitchen garden in the same villages. The major objective was to improve 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. 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. A questionnaire was used to assess the pre and post training knowledge of participants regarding various aspects of kitchen gardening. The result of the study showed an improvement in availability of vegetables for consumption at both household and individual level. The average per capita availability of vegetables increased from 172 to 278 gm/day. The knowledge level of beneficiaries has also been improved through training programmes.

Keywords: Kitchen garden, vegetables, per capita availability, recommended dietary allowances

Introduction

Vegetables are major source of vitamins, minerals, and fibber their nutritive and medicinal values in human life are well documented. Cluster beans, Okra, Bottle Gourd, Brinjal, Ridge Gourd, Ash gourd, Radish, Tomato, Coriander, Bitter gourd, Lab-Lab.Vegetables are very important part of a good diet as they contain various nutrients for many body functions. These vegetables also provide taste, palatability, better digestibility to us and increases the appetite. (Singh *et al* 2018) [4] 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 home garden or kitchen garden is generally located close to the house and is used for growing vegetables, fruits, and other food crops for the family. 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 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. 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. 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. The daily requirement of vegetable is around 300 gm 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 inadequate 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 Namakkal has conducted various trainings and demonstrations under Home science discipline.

Materials and Methods

The present work was carried out by Krishi Vigyan Kendra in the villages namely Aniya puram, Vadukam, Pillipakkuttai, Naraikkinaru of Namakkal District during the year 2024 to 2025. Training programs were conducted in these villages with total female participants of 164. 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 programs, data on the major constraints for kitchen gardening was also collected. To find out the constraints in vegetable production, Participatory Rural Appraisal technique was used. Preferential ranking technique was utilized to identify the constraints faced by the rural women in kitchen gardening. After that, 56 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 to ensure nutrition security. It has also been ensured that the family should be of 4-6 members. 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 Cluster beans, Okra, Bottle Gourd, Brinjal, Ridge Gourd, Ash gourd, Radish, Tomato, Coriander, Bitter gourd, Lab-Lab. 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 given by Gopalan, *et al*., (1989) [3]. Then the nutrient availability was compared with the recommended dietary allowances given by ICMR (2010) for Indians.

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

S.No	Particulars	Knowledge of farm women (N=164)			
		Before training		After training	
		n	%	n	%
1	Land preparation and layout	122	74.39	158	96.34
2	Improved varieties	24	14.63	112	68.29
3	Appropriate sowing time of various vegetables and their seed rates	62	37.80	144	87.80
4	Nutrient management through organic and inorganic inputs	36	21.95	126	76.82
5	Critical stages of irrigation	52	31.70	142	86.58
6	Intercultural operations	88	53.65	150	91.46
7	Use of organic plant protection measures	27	16.46	153	93.29
8	Post harvest management and value addition	74	45.12	160	97.56

Table 2: Problem faced by women while developing nutrition garden

S. No.	Particulars	Percentage of the farm women(N=165)	
		N	Percentage
1	Lack of technical guidance	110	73.33
2	Unavailability of improved vegetable seeds and seedlings	131	87.33
3	Improper water availability for garden	36	24.00
4	Traditional method of nutritional garden	132	88.00
5	Very less priority given to household nutrition garden	137	91.33
6	Unavailability of kitchen waste water	107	71.33
7	Lack of family support to develop nutrition garden	23	15.33

Results and Discussions

The nutrition gardens contribute to income generation, improved livelihoods, and household economic welfare as well as entrepreneurship and rural development. The economic evaluation clearly shows that nutrition gardens were also contributed towards enhancement of social participation among rural folks as more than 50-60 kg vegetables where been gifted to neighbours for their use. The sale of produced from nutrition garden improves the financial status of the family providing additional income, while contributing social and cultural amelioration. Food availability refers to the supply of food made available through domestic production accessibility is ensured when an individual is able to obtain food without any physical, social or economic barriers Bhardwaj *et al*., 2013 [1]. Food adequacy or utilization is achieved through various biological and non-biological process that ensure sufficient energy and nutrient intake. Homestead vegetable production contributes to household food security by providing direct access to food that can be harvested, prepared and feed to family members, often daily. Average vegetable production in nutrition garden was 425.00 kg and 60 kg respectively in a family established nutrition garden and the family having no nutrition garden. The families consumed their originally grown vegetable which help to improve their nutrition and further surplus produce was sold in the village market fetching small income of Rs. 1000-15000 per Annam. The combined value of garden production, including sale of surplus vegetables produce and animal products combined with savings in food and medical expenses constitutes a considerable proportion of total income. Similar result was also reported by Galhena *et al*., 2013. The National Nutrition Council of India has proposed for the country a balanced diet in the recommended quantity of 300 grams per head per day. The respondents mainly produced leafy vegetables in their nutrition garden consumed maximum amount of vegetable for improvement of their food and nutrition status Under frontline demonstration of Krishi Vigyan Kendra, Namaakkal, a total of 56 demonstrations on kitchen garden has been conducted in the adopted villages. Each garden was established in 250 m2 area. The result presented in Table-3 showed that the average yield of the vegetables increased from 77.4kg/unit in farmers practice to 125kg/unit under demonstration. With the result, the

average per capita consumption of vegetables increased 61.6%. Before plantation of kitchen garden, average per capita availability and consumption of vegetables was 57.33 % of Recommended Dietary Allowances which was increased up to 92.66 %. 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 leafy vegetables. They found that the vegetables harvested were utilized for home consumption and the excess seedlings of vegetables 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. Availability of vegetables in terms of nutrient before and after establishment of kitchen garden is presented in Table-3. Per capita availability of nutrients/day increased significantly after kitchen gardening intervention.

Table 3: Economic Evaluation of Nutrition Garden

Sl. No.	Crop	Yield/Bed	Gross cost	Gross Return	Net Return	B:C Ratio
1	Cluster beans	48.4	236.00	563.00	227.00	1:2.3
2	Okra	49.6	350.00	992.00	642.00	1:2.8
3	Bottle Gourd	46.5	320.00	558.00	238.00	1:1.7
4	Brinjal	44.9	450.00	898.00	448.00	1:1.9
5	Ridge Gourd	49.5	280.00	495.00	215.00	1:1.7
6	Ash gourd	38.5	280.00	520.00	240.00	1:1.8
7	Radish	34.6	310.00	540.00	230.00	1:1.7
8	Tomato	44.3	475.00	1550.00	1075.00	1:3.2
9	Coriander	25.7	255.00	771.00	516.00	1:3.0
10	Bitter gourd	15.5	450.00	542.5	92.00	1:1.2
11	Lab-Lab	35.5	240.00	355.00	115.00	1:1.4

Table 4: Contribution of vegetables produced from nutrition garden to food and nutrition security

Name of Vegetables	Average Production	Market Value (Rs)	Average Consumption	Average Consumption	Nutritional Status
Cluster beans, Okra, Bottle Gourd, Brinjal, Ridge Gourd, Ash gourd, Radish, Tomato, Coriander, Bitter gourd, Lab-Lab	425 kg	6375	250kg	120kg	130 kg Additional consumption improved

Conclusion

Kitchen garden can be established at household or community level in order to ensure the daily supply of fresh vegetables in the diets. Low availability of water for irrigation was perceived as major constraint in establishing a kitchen garden. Average per capita availability of vegetables increased from 172 gm/day to 278 gm/day after kitchen gardening was done in selected families. Trainings and front-line demonstrations were provided to farm women to increase their knowledge about gardening and to ensure the adequate supply of vegetables to selected farm families.

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