Environment and Ecology 40 (4B) : 2374—2379, October–December 2022
ISSN 0970-0420

Development of Organic Nutri-Gardens to Enhance Food and Nutritional Security in Farm Families

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Received 26 July 2022, Accepted 23 September 2022, Published 10 November 2022

ABSTRACT

The main objective of introducing the concept of Nutri-gardens was to encourage in farm families to cultivate healthy food crops in their home backyards. The KVK Kolar conducted Nutri garden as a Front line Demonstrations for promotion of fresh vegetable and fruit consumption by the farm families during 2019-20, 2020-21 and 2021-22. The study was conducted for three years in Kadadevandahalli village, Gundamanattha village and Shygatthuru, Srnivasapura Tq Kolar District. The farm families of 25 were randomly selected and made into three groups based on their family size; Large (6-8), Medium (4-6) and Small (2-4) where the total families were 5, 10 and 15 respectively. The total number of participants were 160, where males were 85 and 75 were females. *BMI classification showed that, malnourishment was most prevalent both in females and males (82.00%) respectively. It found that, training and demonstrations by KVK on Nutri garden model help to increase knowledge of respondents on every aspects of establishment of Nutri gardens. In this model, the vegetables and fruits were selected by taking care of balanced nutrition for family. Cross sectional design was inculcated and farm families were selected on the availability of the area, water and willingness of farm women to maintain the garden in all the seasons. Along with the vegetable seed kits perennials, fruit crops, super foods and medicinal plants were also supplied. The nutritional composition of Recommended Dietary Allowance (RDA) was computed using Nutritive Value of Indian Foods and compared the same with the nutrients intake. The percentage adequacy determined revealed that there was an increase in per cent of quantity of nutrients intake like proteins (21.82%), fiber (13.83%), vitamin A (23.87%), vitamin C (15%), Iron (14.29) and Calcium (18.34%). After introduction of nutrition garden, the consumption of fresh vegetables increased in the daily diet which contributed towards the upliftment of the nutritional status of the farm families.

Keywords Farm families, Nutri garden, Nutritional status, Nutrients intake.

INTRODUCTION

Agriculture is the primary livelihood of a majority of the population in South Asia. The region also houses a large population of undernourished people. The nutrition garden envisages developing and demonstrating a sustainable framework to improve nutritional outcomes that can be used for up scaling and wider adoption in rural population. India ranks 101 out of

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116 countries in the 2021 Global Hunger Index, and suffers from a serious level of hunger with a score of 30.3. Indeed, the country continues to with a high rate of malnutrition, and managing it continues to be a biggest challenge. The stunting levels are 38.4% and underweight numbers are 27.5% as reported in the National Family Health Survey 5 (NFHS-5). There has been only a marginal betterment over the years. Under nutrition leads to long-term effects, including cognitive and growth deficits and reduced immunity to infections. It is the underlying cause of nearly half of all deaths amongst children under five years of age in India. Food security proceeds to be a subject of grave concern for India. In spite of being the second largest producer of food, India is home to the world's second largest undernourished population (195.9 million). A review of studies examining the link between food security and malnutrition reveals a direct association with under nutrition in children in middle-income countries and concludes that under nutrition/stunting is a consequence of household food insecurity. Aparna 2010, in her study revealed, to add to the burden of malnutrition, more than half (53.1 percent) of women (15– 49 years) in India are Anemic, which has lasting effects on future pregnancies, and is also one of the causes for the high rate of low-birth weight babies. The situation worsens when infants are fed inadequate diets. According to the World Health Organization (WHO), an unbalanced diet and lack of food (other than mother's milk), is directly linked to high rates of stunting, excessive weight, and death in children under five years of age. It is therefore important to break this inter-generational cycle of malnutrition. A deterioration in minimum adequacy of diet is observed, which is a cause of interest. There is a need to look at multiple strategies to combat the issue of food security in the context of the ever-growing demand. Community gardens can play an important role in providing national food security by supplementing rations and providing essential nutrients. Nutrition gardens enhance dietary diversity by providing micro nutrients through constant supply of fruits and vegetables sufficient to meet the family's requirements. Thus, nutrition gardens can prove to be a sustainable model for providing food security and diversity to combat malnutrition at the household or community level. Hence, a demonstration of nutrition garden in farmer's field was taken up by KVK, Kolar, and Karnataka. This paper investigates the impact of nutrition garden established in farm families' back-yard and on the nutrient intake of farm families, per individual nutrient requirement of nutrients met by nutrition garden and also improved health conditions with the following objectives.

1. To assess the socio economic status of the farm families.
2. To analyze the impact nutritional status of the farm families.

MATERIALS AND METHODS

The study was conducted for three years from 2019 to 2021 in Kadadevandahalli village, Gundamanattha village and Shygatthuru, Srnivasapura Tq Kolar district. Constituting of 5,15 and 10 farm families. In Table 1 mentioned basic information of families like farm families of 30 were randomly selected and made into three groups based on their family size; Large (6-8), Medium (4-6) and Small (2-4) respectively. The total number of participants were 160, where males were 85 and 75 were females. Initially, an awareness program on health and nutrition was conducted.

The structured questionnaire was used to collect the information on their nutritional status which included their socio economic status and their dietary habits by 24 hr dietary recall method for 7 consecutive days before the implementation of Nutri garden later cross sectional design was inculcated and based on the availability of the area, water, nutritional requirements of the families and willingness of farm women to maintain the garden in all the seasons, vegetable seed kits comprising of 10 vegetable seeds (4 types of green leafy vegetables, 3 roots and tubers and 3 other vegetables), perennials (drumstick, curry leaves), medicinal (Ashwagandha, Madhunashini, Amruthaballi) and fruit plants (papaya, sapota, guava, lemon, pomelo, pomegranate, Butter fruit, Seethapal, Laxman pal and jamun) which were rich in vitamin A, C, B and in minerals like iron, calcium, phosphorus and zinc and a folder was developed which contained information on the importance of Nutri garden and the scientific designing of Nutri garden layout for all the seasons were distributed along with the seed kits by KVK, Kolar.

Table 1. Basic information of families.

Family category	Family size	Dimensions (m)	*Area required (Sq mt)
Large (5)	6-8	21*8	168
Medium (10)	4-6	16*7	112
Small (15)	2-4	14*6	84

A keen monitoring during the cultivation of Nutri garden was under taken. During the harvesting of each season yield procured, food consumption pattern and nutrient take was tabulated. Statistical analysis included percentage, percent adequacy and percent in crease was analyzed for the collected data. Then a field day program was conducted in the respective villages to create awareness on nutritional importance and Nutri garden for the upliftment of the family health and in nutrition intervention nutrition education was provided.

RESULTS AND DISCUSSION

Socio demographic characteristics of respondents has been represented in the Table 2. The results indicate that majority of the population 36.25% comes under the age group of 0-19 years followed by 26.87 % of 20-39 years, 21.25 per cent belong to the age group of 40-59 years and 15.62% are elderly who are classified under the age group of 60 years and above. The diversification of castes in farm families indicates that majority of them are others 73.75 % followed by 26.25 % were belonged to SC/ST category. When the criteria of qualification is taken into consideration most of them are illiterates 36.25 per cent followed by individuals attained primary education comprised of 33.75%, few of them have completed middle and secondary school of education that is 18.12 % and the least were 11.87 % of the population are done with pre university course and graduation. Kumar *et al.* (1994), has enumerated the similar results revealing the demographic characteristics of farm families in few Districts of Kerala state.

The majority of the annual income 72.00 per cent of the farm families obtained from different sectors of occupations like agriculture, day labor, poultry, bee keeping and cattle rearing ranges from Rs 11,000 to 50,000 and followed by 16.00% obtain income of

Table 2. Socio demographic characteristics of the respondents.

Parameters	Respondents (25) No =160	%
Age (Years)		
0-19	58	36.25
20-39	43	26.87
40-59	34	21.25
60 and above	25	15.62
Caste		
SC/ST	42	26.25
Others	118	73.75
Education		
Illiterate	29	18.12
Primary	54	33.75
Middle and secondary	58	36.25
PUC and craduation	19	11.87
Family Income (Per Annum) N=40)		
11, 000-50,000	18	72.00
51, 000-90,000	4	16.00
91, 000 and above	3	12.00
Experience in Nutri garden		
More than 3 years	6	24.00
Less than 3 years	19	76.00
Purpose		
Financial benefits	3	12.00
Family health	20	80.00
Social/ recreational	2	8.00

Rs 51,000 to 90,000. The main purpose of this study is to implement Nutria garden in farmers field based on the data compelled reveals that majority 76.00 % of them had less than three years of experience in cultivation of nutria garden and followed by least of 24.00 % had more than three years of experience in nutria garden. As the need of implementing Nutri garden in farm families was analyzed indicated that most 80.00% of them focused on health condition followed by financial benefits as the additional income to the family were 12.00 % and creating an activity for recreation purpose 8.00%

An average income of Rs 29000/- is earned by the farm families every month from seasonal crops

Table 3. Family expenditure pattern.

Family expenditure	Avrg value (Rs)
Food	21 00
Education	3950
Health and medecine	850
Fruits and vegetables	400
Saving and loan	17500
Others	4250
Total	29,050

harvested, dairy and sericulture. The family expenditure is based on their requirements and it is been represented in the Table 3. The major investment is based on the loans, debts and savings by the farm families 60.24% followed by miscellaneous like festivals, ceremonies, pantries and education of children 13.59% and least 1.38% was spent of fruits and vegetables purchased.

Adoption of Nutri garden has a good impact on the food consumption pattern. As the food consumption pattern of the farm families were taken into consideration before Nutri garden it indicated that the families had low consumption essential food groups measured cooked quantity in cups (21.68) like pumpkin, papaya, green leafy vegetables, roots and tubers and also other vegetables which were not grown and not even consumed regularly as they had monotype cropping of vegetables. Sunwar *et al.* (2006), describes that many challenges and opportunities were made to create awareness among rural public on importance of proportionate consumption of food groups in day to day life, this study made by him holds similar result in the present study later after the demonstration and by having awareness through Nutri garden intervention improved their food consumption pattern compared by measuring cooked quantity in cups (28.18). Nutri garden also reduced the cost of vegetables procurement nearly Rs 7,160/- and even chemicals free vegetables enhanced their health conditions shows in Table 4.

An overall nutrient intake of the farm women is the mirror image of the nutrient intake of the farm families which is revealed in Table 5. Vijayalakshmi *et al.* (2012) in her study suggests that the impact of Nutri gadern holds high the empowerment of women. The nutrients intake has a drastic change when compared to before Nutri garden to the after Nutri garden demonstration.

Nutri garden was implemented all-round the year and yield of vegetables which were consisted of seed kits comprising of 10 vegetable seeds (4 types of green leafy vegetables, 3 roots and tubers and 3 other vegetables), perennials (drumstick, curry leaves), medicinal (Ashwagandha, Madhunashini,

Table 4. Impact of Nutri garden on farmer's family's food consumption.

Sl. No.	Food group	Avg consumption		Amount spent (Rs)	
		Before	After	Before	After
01	Cereals	4.00	4.20	3200	3400
02	Minor illets	1.85	2.65	3200	4100
03	Pulses	2.50	3.20	4300	5200
04	Yellow and red fruits and vegetables	0.48	1.20	1750	580
05	Green leafy vegetables	1.45	3.16	1600	480
06	Tuber crops	3.75	5.56	3900	950
07	Others vegetables	5.54	7.25	2500	580
08	Milk and milk products	1.95	3.56	2900	3300
09	Meat*	3.54	2.76	5900	3200
10	Egg	3.23	4.63	1500	1950
11	Fish*	0.84	1.95	750	1650
12	Sprouted cereals	1.15	2.68	500	1950
13	Fat	2.15	0.76	3900	2400
14	Oil seeds	1.44	1.95	2400	2300
15	Processed foods	1.97	0.84	2100	950
	Total	35.84	46.35	40400	32990

(* weekly once)

Table 5. Impact of Nutri garden on nutrient intake of farm women (n=25).

Nutrients	RDA	Before		After		Impact
		Avg	%	Avg	% supply	% change
Energy (kg)	2230	1905.3	85.43	2005.5	89.93	4.30
Protein (mg)	55	39.45	71.72	48.78	88.69	19.24
Fat (g)	25	19.75	79.00	23.45	93.80	15.60
Fibre (mg)	30	23.45	78.16	25.98	86.60	16.93
CHS (mg)	600	455.21	75.86	491.78	81.96	6.72
Iron (mg)	21	17.45	83.09	18.98	90.38	12.33
Carotene (mg)	4800	3750.45	78.13	4100.21	85.42	8.01
Vitamin-C (Mg)	40	34.52	86.30	37.87	94.67	9.85

Amruthaballi) and fruit plants (papaya, sapota, guava, lemon, pomelo, pomegranate, Butter fruit, Seethapal, Laxman pal and jamun). On an average 55.7 kg of vegetables was procured by the farm families for consumption. Perennials like curry leaves, Drumstick, Chakramuni, Jamun Papaya, Sapota, Guava, Amla, and Pomegranate were bearing just few months before as they took long time to grow. The relevant data has been indicated in Figs. 1–3 respectively which reveals that all kinds of vegetables were produced in their backyard or farmyard as suitable in particular seasons like summer, *kharif* and *rabi.* Mendenz et al., 2001 and Shastri *et al.* (2002) made an interdisciplinary study of crops in home garden which included variety of fruit plants, veggies and perennials benefiting the farming families health conditions. Bhavana *et al.* (2021), in her study suggests nutrition intervention through Nutri garden has increased the per cent of important nutrients uptake like protein (19.24%), fibre (16.93%), Iron (12.33%) and Vitamin C (9.85%). This

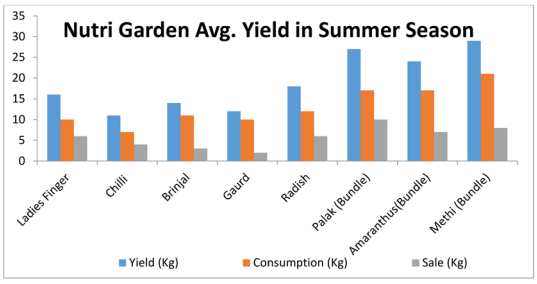

Fig. 1. Nutri garden avg yield in summer season

increase in nutrients intake is the clear indicator of the improvised health condition of the farm families. Nutri garden and nutrition education has also reduced the junk food and street foods uptake by the farm families. An adjoining study made by Sumner *et al.* (2010), indicated that the local food diversity gained tremendous health benefits and healed many of the minor health issues the farming community.

CONCLUSION

It may be concluded that the women of the family needs to be create awareness about the importance of Nutri garden as the health of the family is in the hands of the home maker. There are lots of 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.

In nutshell, nutrition gardening is the easiest way to ensure access to a healthy diet that contains adequate amounts of essential nutrients by producing

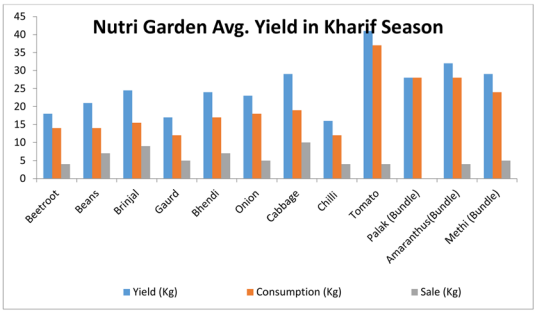

Fig. 2. Nutri garden avg yield in *kharif* season.

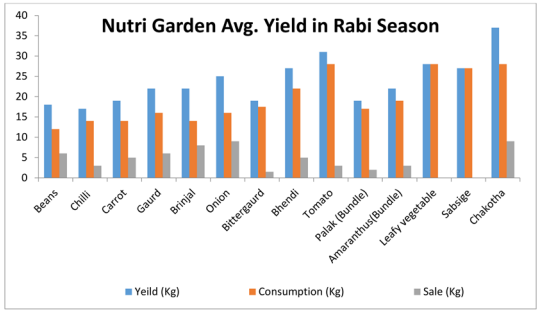

Fig. 3. Nutri garden avg yield in *rabi* season.

diverse kind of vegetables. Vegetable nutrition garden can be established on a small piece of land provides healthy and pesticide free vegetables for the family. Thus, fresh and safe to eat vegetables will be available for domestic consumption all the year round and improved consumption of vegetables will help to address nutrient deficiency disorders like Anemia, Goiter, Night Blindness and so on.

In this study we can conclude that awareness about involvement of nutritional food (vegetables and fruits) in daily diet among farm families can help them to balance diet. Trainings and demonstration on Nutri garden helps them to develop skill to establish Nutri garden at their own place in an organic manner. Thus we can say Nutri-Garden is an easiest way from food production to nutritional security for farm family in the district. Nutri gardens can play a crucial role to combat hidden hunger.

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