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Nutri garden: A sustainable approach to improve nutritional security & dietary diversity of farm families

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Abstract

India is the world's second-largest producer of fruits and vegetables, yet it still faces challenges in increasing their consumption among the population. Tackling food security amid rising demand requires a comprehensive and multifaceted approach. One promising solution lies in the concept of Nutrition gardens, which play a vital role in enhancing dietary diversity by consistently providing essential micronutrients through a steady supply of fruits and vegetables. The study was conducted with the objective of promoting nutrient consumption and dietary diversification to improve the nutritional security of the farm families. The Dr. YSRHU - KVK, Nellore 2 (Periyavaram) conducted Nutri garden as Front line Demonstrations for the year round availability of fresh vegetables, leafy vegetables, fruits and promoted its consumption by the farm families during 2022-23 & 2023-24. It is an affordable and sustainable strategy to combat malnutrition while enhancing both nutritional well-being and economic stability. The study was carried out in C.C. Kandriga, Busapalem and Jangalapalli villages of Venkatagiri mandal in Tirupathi District of Andhra Pradesh. The farm families were randomly selected and the study sample consisted of 36 farm families. The vegetable seed kits and Fruit plants were provided. Data were gathered using the 24-hour dietary recall method. General details were obtained through a structured questionnaire. Percentage adequacy was evaluated according to National Institute of Nutrition standards. It was found that, trainings, capacity building programs and demonstrations by KVK, Periyavaram on Nutri garden model helped to increase knowledge of respondents on every aspect of establishment of Nutri gardens. The findings showed an increase in the intake of various food groups, with improvements ranging from 4 to 34%. Additionally, the percentage adequacy of average nutrient consumption before and after the implementation of the nutrigarden indicated a rise in the intake of different nutrients, ranging from 1 to 5%. Therefore, it can be inferred that the Nutrigarden approach has not only enhanced the percentage intake of a variety of fruits and vegetables but has also improved the overall diversity and adequacy of nutrient consumption among the farm families.

Keywords: Nutri garden, sustainable approach, farm families, dietary diversity

Introduction

Despite being the world's second-largest producer of fruits and vegetables, India continues to face challenges in promoting their consumption among its population. This problem is largely attributed to deficiencies in the supply chain and distribution networks, along with limited awareness about the availability of locally grown produce (Sachdeva *et al.*, 2013) [8]. A more integrated strategy is required to strengthen the role of agriculture in promoting better nutrition and to make farming systems more nutrition-sensitive. India is ranked 102nd out of 123 countries in the 2025 Global Hunger Index, with a score of 25.8, indicating

a serious level of hunger. The country still experiences a high prevalence of malnutrition, making its prevention and management a significant ongoing challenge. The stunting level is 37.51% and underweight is 17.43% as reported in the National Family Health Survey 5 (NFHS-5). A review of research exploring the relationship between food security and malnutrition indicates a clear link between household food insecurity and undernutrition among children in middle-income countries. The findings suggest that conditions such as undernutrition and stunting are direct outcomes of inadequate access to sufficient and nutritious food at the household level.

Tackling food security challenges amid rising demand calls for a comprehensive and integrated strategy. One effective approach is the promotion of nutrition gardens, which contribute significantly to improving dietary diversity by ensuring a regular supply of fruits and vegetables rich in essential micronutrients. These gardens are specifically developed to fulfill the nutritional requirements of families, offering a sustainable solution to strengthen food security and enhance diet diversity, thereby helping to reduce malnutrition at both household and community levels.

Nutri-gardens or backyard Kitchen gardens are a sustainable, low-cost strategy for farm families to grow nutrient-rich fruits, vegetables, and herbs in their own backyards. By providing a consistent, year-round supply of fresh produce, they reduce malnutrition, enhance dietary diversity, boost household income, and promote self-reliance. They address "hidden hunger" (micronutrient deficiencies like iron and vitamin A) by increasing daily intake of vitamins and minerals, crucial for reducing anemia and malnutrition in rural women and children. Nutri-gardens promote organic farming practices, waste recycling (compost pits), and the use of indigenous/traditional crops. They reduce household expenditure on food, and the surplus produce can be sold for income. These gardens are often managed by women, strengthening their role in ensuring family food security.

Dietary diversity refers to the number of different food groups consumed by individuals or households over a specific period. At the household level, it reflects access to a variety of food groups, while at the individual level, it serves as an indicator of nutrient adequacy. Greater dietary diversity is associated with improved food security for both individuals and households.

Food security is founded on four key pillars: availability, accessibility, utilization, and stability of food. In addition to food security, nutrition security is essential for maintaining good health. Nutrition security exists when all people, at all times, have physical, social, and economic access to adequate, safe, and nutritious food that satisfies their dietary requirements and preferences for an active and healthy life. Therefore, ensuring both food and nutrition security is crucial for achieving and sustaining overall well-being. Cultivating and managing a kitchen or nutrition garden is considered an effective strategy for advancing food and nutrition security, as it encourages the growth of green leafy vegetables, fruits, vegetables, and traditional crops in home gardens. This study examines the impact of the Nutrition gardens established, focusing on the following objectives:

1. To evaluate the socioeconomic conditions of the farm families.
2. To analyze the impact of Nutrigarden on nutrient intake and dietary diversity of the farm families after the intervention.

Materials and Methods

Present study on Nutri garden- A Sustainable Approach to Improve Nutritional Security & Dietary diversity of Farm Families was carried out in three villages namely C.C.Kandriga, Busapalem and Jangalapalli of Venkatagiri mandal in Tirupathi District of Andhra Pradesh. The study included a total of 36 farm women. The Vegetable Seeds of 13 types of vegetables including Solanaceous vegetables, Leafy vegetables, other vegetables, roots & tubers and seedlings of different fruits were given to the farm women. Front Line demonstrations and Trainings were conducted on

importance of nutri garden and its nutritional and economic benefits. Nutri garden was implemented in an area of 50-120 Sq mts per family based on availability of space. Data were gathered through a questionnaire and the 24-hour dietary recall method. Nutrient adequacy percentages were assessed based on National Institute of Nutrition standards.

Results and Discussion

The demographic analysis showed that most respondents were aged 30-39 years, followed by 30% in the 0-19 year's age group, 17% in the 40-59 years group, and only 11% aged 60 years and above. Regarding caste, 61% of the respondents belonged to the SC category, while 31% were from other categories. In terms of occupation, 90% of the farm women were homemakers, followed by those engaged in business (5%) and service (5%). Additionally, 50% of the respondents lived in joint families, 28 percent of them belonged to nuclear family and 22 percent of the sample belonged to extended family. Further 86 percent of the respondents had basic education, 28 percent completed primary & entered into secondary education and 14% of them were illiterate. Regarding farming experience, 67% of the farm women had less than five years of experience, 28% had more than five years, and only 5% had no farming experience. The primary reason for maintaining a nutrigarden varied: 33% of respondents cited family health, while 67% were motivated by financial benefits, with many unaware of the nutritional advantages. On average, more than half of the farm women (56%) spent about two hours per day tending to their nutrigarden, while 44% dedicated around one hour daily. Similar findings on the demographic characteristics of farm families in Karnataka were reported by Prema B. Patil (2020) [4].

The analysis of percentage adequacy for average food consumption before and after the introduction of the nutrigarden showed an increase across all food groups, ranging from 4% to 34%. However, the intake of roots and tubers still fell short of National Institute of Nutrition standards. Fruit consumption improved by only 2% relative to NIN recommendations. Additionally, sugar intake decreased by 8%, reflecting the impact of training sessions that raised awareness about the negative health effects of excessive sugar consumption. (Table-2). Similar findings were made by Mendez *et al.*, 2001 and Kumari *et al.*, 2019 in an interdisciplinary study of crops in home gardens which included a variety of fruit plants, veggies and perennials benefiting the farming families' health conditions. The study conducted by Pradhan *et al.* examined nutrition garden utilization data from 2015-16 and 2016-17, comparing it with baseline data. A representative sample of 190 households was selected at each study site, and changes in food consumption—both in quantity and frequency—were analyzed between the baseline year (2014) and the end line (2017). During 2015-17, nutrition gardens in Koraput and Wardha contained 43 and 28 varieties of plants, respectively, compared to only two or three types typically grown at baseline (2013-14). In Wardha, all produce from the nutrition gardens was used for household consumption, whereas in Koraput, 10-20% was shared with neighbours or sold. Monthly per capita consumption of fruits and vegetables, including both quantity and frequency, showed a significant increase from baseline to end line. The greater availability of diverse vegetable groups also helped meet the households' nutritional requirements.

Table 1: Socio-demographic profile of the respondents

S. No.	Particulars	Classification	Number	Percent
1	Age	0-19	11	30
		20-39	15	42
		40-59	6	17
		60 and above	4	11
2	Caste	SC	22	61
		ST	3	8
		Others	11	31
3	Occupation	Home maker	32	90
		Business	2	5
		Service	2	5
4	Family Size	Nuclear	10	28
		Joint	18	50
		Extended	8	22
5	Education	Primary school	21	58
		Secondary school	10	28
		Degree	-	-
		Illiterate	5	14
6	Experience in Farming/Nutrigarden	< 5 Years	24	67
		>5 Years	10	28
		No experience	2	5
7	Purpose of Nutrigarden	Social or recreational	-	-
		Family health	12	33
		Financial benefit	24	67
8	Average person hours spent in Nutrigarden	One	16	44
		Two	20	56

Table 2: Food group consumption and percentage adequacy before and after implementation of Nutrigarden

Food group	Standard Value	Average Food Consumption		Percentage adequacy	
		Before	After	Before	After
Pulses	75 (g)	79.2	82.7	105.6	110.26
Milk and milk products	300 (ml)	189.5	201.5	63.16	67.16
Roots and tubers	200 (g)	152.6	187.5	76.3	93.75
GLV	100 (g)	88.9	122.3	88.9	122.3
Other vegetables	200 (g)	193.2	220.8	96.6	110.4
Fruits	100 (g)	92.6	102.2	92.6	102.2
Sugar	30 (g)	42.8	40.3	142.66	134.33
Fat	25 (g)	21.7	23.5	86.8	94.0

The analysis of percentage adequacy for average nutrient consumption before and after the introduction of the nutrigarden showed an increase in the intake of various nutrients, ranging from 1% to 5% (Table 3). According to Suri, unbalanced diets and insufficient food are directly associated with high rates of stunting, overweight, and

mortality among children under five. Addressing food security effectively requires multiple strategies, and community and nutrition gardens can play a significant role in improving dietary diversity and strengthening national food security to help reduce malnutrition.

Table 3: Nutrient intake and percentage adequacy before and after implementation of utrigarden

Food group	Standard Value	Average Food Consumption		Percentage adequacy	
		Before	After	Before	After
E (kcal)	2230	1869	1882	84	84
P (gm)	55	44	46	80	84
Fat (gm)	25	24	25	96	96
Fibre (gm)	30	24	25	80	83
Fe (mg)	21	17	18	81	86
Ca (mg)	600	584	585	97	98
Carotene (µg)	4800	1707	1721	36	36
Vit C (mg)	40	14	16	35	40

Regarding profit analysis, a family typically spends Rs. 10,200 over six months, averaging Rs. 1,700 per month. However, with the implementation of a nutrigarden, a family was able to save Rs. 4,000 by spending only Rs.

2,200 for the same six-month period, in addition to meeting household consumption needs (Table 4). According to Shubha *et al.*, nutrigardens not only improve the nutritional status of rural households but also provide a small yet

constant source of income, particularly benefiting women.

Table 4: Economics (Benefit-Cost ratio)

Gross cost (Rs.)	Gross return (Rs.)	Net profit (Rs.)	B:C ratio
2200	6200	4000	2.8

Conclusion

The present study has emphasized the contribution of Nutri-garden towards achieving the sustainable development goals. In conclusion, the nutrition education provided through Trainings and demonstrations conducted by KVK, Nellore 2 (Periyavaram) to the Farm women about the importance of nutrigarden and its role in improving the nutritional status of entire family has positive impact on farm families and improved the availability, accessibility, utilisation and consumption percentage of different food groups and also the diversification of farm-grown vegetables and fruits has enhanced the family's overall nutrient intake. The farm women gave the feedback that availability of nutrigarden improved the frequency of consumption which would not have been possible if they had to purchase it from outside which gave them the satisfaction that they were consuming the self -grown, pesticide free Organic vegetables. It also allows families to redirect the money saved from buying fruits and vegetables toward other food items, contributing to overall well-being.

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