Impact of Demonstration of Nutrition Garden for Year-round Nutrition Security in Farm Families of Prakasam District

Abstract:

Malnutrition is a nationwide issue that is quickly getting worse. Malnutrition hinders social and mental development in addition to slowing down a child's growth and development and also pregnant, lactating women, adolescent girls. It also increases the likelihood and length of illness.Long-term consequences of under nutrition include cognitive and development deficiencies as well as lowered infection resistance.With the purpose of evaluating the nutritional security of farm households, the current study seeks to comprehend the value of nutrition gardens. The current study was carried out in Prakasam district, Andhra Pradesh, consecutively for two years.From the recipients of the KVK front line demonstration programme on nutrition security, 90 respondents (50 with nutrition gardens and 50 without) were chosen at random.The 200 m^2 area wasfound appropriate for the medium family group of five members. Among the vegetables cultivated in nutria garden, highest benefit was obtained from the cultivation of okra (1: 2.38) followed by spinach (1: 1.48). There was increase of 90g of consumption of vegetables after nutri garden. After nutri garden the normal weight percentage of individuals was 51.1% and underweight individuals were 35.5%.The nutritional garden encouraged families to include freshly picked vegetables in their daily diets, which helped to improve their families' nutritional condition.

Keywords: Benefits,consumption, livelihood, malnutrition, nutri garden, vegetables,

Introduction:

In India, hunger, food insecurity, and under nutrition are all very common. According to data on calorie intake at the household level, India's population has been consuming fewer calories on average during the past 20 years. According to economic and social development metrics, India's population is becoming more and more undernourished, and the issue has gotten worse as a result of the skyrocketing inflation in food prices. Even while India is making progress towards achieving food security thanks to government efforts, a sizable portion of the population still faces malnutrition and famine. Therefore, a concern for nutritional security is urgently needed.In recent years, there has been a growing interest in bolstering and expanding

local food production to lessen the negative effects of food shocks and price volatility. A study conducted by Rafael Perez-Escamilla (2017) showed that stunting is the result ofinsufficient food availability at homes.As a result, back yardnutria gardens are receiving a lot of attention as a strategy to improve household food and nutrition security.Early childhood malnutrition has a long-lasting impact on a child's cognitive development, physical growth, and immunity to many illnesses and diseases. The bulk of under-five deaths in our nation are caused by malnutrition (Shoba Suri, 2020).

In India, where food production is highest, malnutrition is a recurrent issue of equal proportions. Nutrition gardens were established as a readily accessible alternative, particularly in rural regions, to fight this issue of under nutrition among children and malnutrition in the broader population. The nutritional status of people in rural regions can be improved in a sustainable way thanks to nutrition gardens. The term "Nutrition Garden" refers to the methodical cultivation of fruits and vegetables on a small plot of land in a home. A family's year-round needs for fruits and vegetables can be completely satisfied by a professionally designed nutrition garden (Sheela *et al.,* 1998).The nutrition garden makes sure that a balanced meal with enough macro- and micronutrients is available just outside your door. A family's year-round needs for fruits and vegetables can be fully satisfied with the aid of a nutrition garden that has been designed scientifically.A low-cost, long-term strategy for lowering malnutrition, raising awareness of vegetable production, lengthening workdays, and ensuring food, nutrition, and economic stability for rural families is the establishment of a nutrition garden (Nandal, 2016).The idea behind a nutrition garden is to use home waste, including water and other organic materials, to grow a constant supply of vegetables to meet the family's daily needs (Indumathi *et al.,* 2012).

Every person should take at least 300 g of vegetables and 100 g of fresh fruit per day (green leafy vegetables should account for 50 g, other vegetables for 200 g, and roots and tubers for 50 g), according to the Indian Council of Medical Research's (ICMR) expert committee.Due to a lack of knowledge about the significance of fruits and vegetables in their meals, rural residents, particularly women in operating areas, suffer from acute malnutrition as well as numerous nutritional deficiency illnesses. During the kharif season, rural families would scatter seeds for their own consumption of okra, bottle gourds, ridge gourds andleafy vegetables in between rows of cereal crops. Knowing the significance of vegetables in addressing the issue of micronutrient deficiencies and the need to increase vegetable production by all means possible,

KVK has been conducting front line demonstrations over the past few years to determine how to increase vegetable production in rural livelihood.So, the study was designedto determine the proper area needed for the maintenance of a nutrition garden and to determine how domestic vegetable production affects the availability of food and nutrition.

Materials and methods:

The goal of the study was to establish how much nutria garden production could contribute to food security and livelihood for the rural farmers.The study was conducted in five villages (Darsi,yerragondapalem, Tripurantakam, Donakonda, Podili) of Prakasam district of Andhra Pradesh, during 2019-2020.By delivering the necessary seeds, saplings, plants, and technology, KVK chose these villages to build a nutritional garden as part of the Front Line Demonstration programme.A List of nutrition garden demonstration farmers of study area was prepared for selection of the population of the study.In each hamlet, 25 families were chosen, including 10 big, 16 medium, and 24 small agricultural families. These families were chosen at random from the entire farming society population and categorized according to the size of their houses into three groups: Large (6–8 individuals), Medium (4-6), and Small (2-4). The total number of participants was 90, of which 40 were men and 50 were women.

Based on the availability of the space for a garden and the water for irrigation, a segmented farm plan was afterwards framed.Understanding the dietary needs of the families was of particular importance. The interest and readiness of farm women to care for the garden all year.The garden kit included 11 different vegetable seed varieties, including 4 green leafy vegetable varieties, four different types of gourd's and also beans. It included specialized food species like amaranthus. It was all meant to provide minerals like iron, calcium, phosphorus, and zinc as well as vitamins A, B, and C.For training reasons, a pamphlet containing information was created. It contained information on the value of a nutrition garden as well as its scientific structure and maintenance schedule for all four seasons.Parameters with respect to total productionof vegetables, amount of money saved over the period, B: C Ratio, anthropometric measurements& BMI, health and nutritional problems wererecorded.

Results and discussion:

Area needed to set up a nutrition garden

According to the RDA, adults should consume 300g of vegetables each day. Therefore, a household of four to six people would need to purchase 36 to 54 kilogram's of vegetables annually, or 108 to 162 kg every three months. Since vegetable crops typically last 90 to 120 years, the three-month period is used as the benchmark.Analysis of the data in the table 1 showed that the average vegetable production from 150 square meters was 289.60 kg, while production from 200 square meters was 340.40 kg, and production from 250 square meters was about 403.10 kg.According to the RDA, each person should have 300g of vegetables per day. Based on the results, it can be said that although a 200 sq. m. area is sufficient to meet the minimal vegetable needs for a household of six people, any surplus vegetable production from the surrounding area may be sold or used to help rural families maintain their economic security.

The size of each nutrition garden varies since it depends on the local natural ecology, the family's labour resources, the members' abilities, preferences, and enthusiasm, as well as the location's natural ecology, functionality, composition, and beauty.Findings of Sharma *et al.* (2018), Singh *et al.* (2018) also supported the study.

Economic Evaluation of Nutrition Garden

The nutrition gardens support entrepreneurship and rural development as well as income production, bettering livelihoods, and household economic welfare. According to the table 2, growing vegetables can be a profitable business because the B:C ratio for each vegetable is almost 1:2, which includes the cost of work whether farming is done by family members alone or with the aid of labour.The economic analysis demonstrates unequivocally how nutrition gardens improved social involvement among rural residents as more than 50–60 kg of vegetables were donated to neighbours for their consumption. The selling of the food from the family's nutrition garden helps the family's finances by increasing their income and fostering social and cultural advancement. Among the vegetables cultivated in nutria garden, highest benefit was obtained from the cultivation of okra (1: 2.38) followed by spinach (1: 1.48). Karuppaswamy (2021) reported that after the establishment of the nutri garden, the level of per capita consumption of vegetables increased while also ensuring access to greater economic value and a healthy diet at the doorstep.

Contribution of vegetables produced from nutrition garden

Food accessibility is assured when a person can access food without facing any physical, social, or financial obstacles. Food availability is the supply of food made available through domestic production. Through a variety of biological and non-biological processes that guarantee an adequate intake of nutrients and energy, food sufficiency or utilization is achieved. Homestead vegetable production helps ensure household food security by giving family members easy access to food that can be gathered, prepared, and eaten frequently.

Average vegetable production in nutrition garden was 340.40 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. 5895 per month by selling of different kinds of leafy vegetables and other vegetables and also the consumption was improved from 250g to 340.40g. Similar results werealso reported by Galhena*et al.*(2013) and Bhardwaj *et al.*(2013).Nutrition gardens have social benefits because they directly improve household food security by increasing the availability, accessibility, and consumption of food goods (FAO, 2003). Intake of energy, protein, and iron increased following the implementation of kitchen gardening, according to Chayal*et al.* (2013).

Anthropometric measurements (Body Mass Index)

In order to classify subjects into the five Body Mass Index categories of underweight, normal, overweight, obese grade I and obese grade II, measurements of subjects' height and weight were taken. Body mass index (BMI), which is based on a person's height and weight, is a measurement of body fat.

The evaluation of all 90people before and after the implementation of the nutrition garden revealed that the majority of those before the establishment of the nutrition garden were malnourished, with underweight rates of 57.8 %, overweight rates of 13.8 %, grade I obesity rates of 4.40% and grade II obesity of 2.2%.Malnutrition affected 77.80% of the population as a whole, which suggests that the subjects' nutritional habits were off. Of the participants, only 22.20 had normal weight. Awareness of healthy eating practices and the value of a balanced diet in daily life may have aided in achieving a healthy body mass index (Table 4).After nutri garden the normal weight percentage of individuals was 51.1% and underweight individuals were 35.5%. According to Sunwar*et al.* (2006), there have been several substantial obstacles to awareness-raising efforts among rural residents about the value of proportionate consumption of

food groups in daily life. His study's findings are consistent with those of the current study. Further, Sumner *et al.* (2010), also concluded that the diversity of local and indigenous foods had a significant positive impact on health and helped the agricultural community recover some minor health conditions.For the farming families in chosen villages, implementing nutrition gardens has been a fantastic intervention strategy. They were delighted to give their neighbours any extra vegetables. Additionally, they stated that they felt quite content to share and eat free fresh vegetables throughout the study period. The inclusion of fresh veggies and nutritious foods in their regular diet has been quite beneficial.

Conclusion:

Every family should have a garden in their backyard or other available space as a convenient supply of fresh vegetables and plants with beneficial and medicinal qualities.The importance of improving and developing local food systems has grown in the face of a worldwide food crisis and skyrocketing food prices.In order to address the issue of malnutrition and micronutrient deficiencies in rural regions, kitchen gardens must be established. The cheapest and simplest strategy to maintain excellent health is to eat more fruits and veggies. Backyard kitchen gardening provides direct access to food that can be gathered, prepared, and given to family members on a daily basis, which helps ensure the food security of the home.

References:

Bhardwaj R. L. 2013. Benchmark survey on effect of Kitchen Garden on nutritional and socio-economic development of trial's Sirohi, MPU&T Udaipur.pp. 12-15.

Chayal, K,, Dhaka, B. L., Poonia, M. K and Bairwa, R. K. 2013. Improving nutritional security through kitchen gardening in rural areas. *Asian Journal of Home Science* **8**(2):607-609.

Galhena D.H, Freed R, and Maredia K.M (2013), Home gardens: a promising approach to enhance household food security and wellbeing, Agriculture and food security. pp. 2-8

Indumati, K., Shanmugam, P. S., Tamilselvan N. 2012. Nutrition garden as a valuable intervention to fight malnutrition in rural India. Abstract. Global conference on Horticulture for food, nutrition and livelihood options, Bhubaneswar, Odisha, India. p. 19.

Karuppasamy P. 2021. Nutri garden: A way forward for enhancing farmers income and household nutritional security, *Journal Krishi Vigyan*.9(2):159-162

Nandal, U. 2016. Food security through homestead vegetable production. *Indian J Ext. Edu. Rural Devel.*24:170-177.

Rafael Perez-Escamilla (2017). "Food security and the sustainable development goals: From human to planetary health: Perspectives and opinions. *Current developments in nutrition*, 7: e000513.

Sharma A, Vishwakarma N, Kumar A, Singh M and Tripathi PN.2018. Impact of nutritional kitchen garden trainings impartedby Krishi Vigyan Kendra. *International Journal of Farm Sciences.* 8(1):13-16.

Sheela, K.B., Peter, K.V. and Krishnakumari, K.1998. Nutrition garden, Directorate of Extension, Kerala Agricultural University, Vellanikkara, Thrissur, p. 86

Shoba Suri. 2020. Nutrition Gardens: A SustainableModel for Food Security and Diversity," ORF Issue Brief No.369, June 2020, Observer Research Foundation.

Singh V, Yadav K and Tripathi A. K. 2018. Kitchen gardening:a promising approach towards improving nutritional securityin rural households. *International Journal of MicrobiologyResearch.*10(5):1216-1219.

Sumner, J., Mair, H., Nelson, E. 2010. Putting the cultureback intoagriculture: civic engagement, community, and thecelebration of local food. *International Journal ofAgricultural Sustainability*, 8(2), 54-61.

Sunwar, S., Thornstrom, C. G., Subedi, A, Bystrom, M. 2006. Home gardens in western Nepal: Opportunities andchallenges for on farm management of agrobiodiversity.*Biodiversity and Conservation*, *15*: 4211-4238

Table 1. Appropriate area required for nutrition garden

Name of the vegetable	Crop Area (Sq. m)		
	150	**200**	**250**
Amaranthus	29.50	34.20	40.50
Red sorrel	36.50	41.20	46.50

Palak	33.20	37.50	44.50
Clusterbean	7.50	10.30	14.60
Spinach	30.60	34.80	44.50
Okra	35.20	39.00	46.20
Dolichas	5.20	8.80	12.50
Bittergourd	25.50	30.60	34.00
Bottlegourd	31.50	38.30	46.30
Ridge gourd	28.5	34.2	36.3
Snackgourd	23.7	31.5	37.2
Total Season	**286.90**	**340.40**	**403.10**

Table.2. Economic Evaluation of Nutrition Garden planned in 200 square meter area

Crop	Yield (200 sq. m)	Gross cost	Gross returns	Net returns	B:C ratio
Amaranthus	34.20	210	445	235	1:1.12
Red sorrel	41.20	200	410	210	1:1.05
Palak	37.50	170	390	220	1:1.29
Clusterbean	10.30	275	570	295	1:1.07
Spinach	34.80	218	540	322	1:1.48
Okra	39.00	235	795	560	1:2.38
Dolichas	8.80	330	730	400	1:1.21
Bittergourd	30.60	225	535	310	1:1.38
Bottlegourd	38.30	245	520	275	1:1.12
Ridge gourd	34.20	230	485	255	1:1.11
Snackgourd	31.50	215	475	260	1:1.21
Total	**340.40**	--	--	--	--

Table.3. Contribution of vegetables produced from nutrition garden

Name of vegetable	Average Production	Market value (Rs)	Average Consumption	Consumption via nutri garden	Consumption improved
Amaranthus, Red sorrel, Palak,	340.4	5895	250.00 kg	340.4 kg	90.00 kg

Clusterbean, Spinach, Okra, Dolichas, Bittergourd, Bottlegourd Ridge gourd, Snackgourd					

Table 4. Anthropometric assessment of farm families (Men and women)

BMI	Category	Before Nutri garden		After Nutri garden	
		n=90	Percentage	n=90	Percentage
< 18.5	**Under weight**	52	57.8	32	35.5
18.5 to 22.9	**Normal**	20	22.2	46	51.1
23.0 to 24.9	**Over weight**	12	13.4	9	10.0
25.0 to 29.9	**Obesity –I**	4	4.4	3	3.4
> 29.9	**Obesity-II**	2	2.2	0	0