



Nutrigarden - A Way Forward for Enhancing Farmer's Income and Household Nutritional Security

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ABSTRACT

The study was carried out by the active participation of five farmers with the objective to demonstrate the nutrigarden in terrace for organic vegetable production in an area of 25 square meter using various organic materials with continuous observation and management practices. The results showed that the bhendi equivalent yield of multi vegetables was 276.6 q/ha and 49 per cent more yield over check yield (186 q/ha). The farmer's average income was increased from Rs.509/-d/ha (land-check) to Rs.758 /d/ha (terrace-demo). Per capita consumption level of vegetables increased from 100g to 310g per day per family. The nutrition garden ensured access to increase economic value and healthy diet at doorstep.

Key Words: Impact, FLD, Nutrigarden, Terrace, Vegetable crops.

INTRODUCTION

Community and nutrition gardens can play an important role in enhancing national food security and dietary diversity to combat malnutrition (Suri, 2020). India ranks 102 out of 117 countries in the 2019 Global Hunger Index, and suffers from a serious level of hunger with a score of 30.3 (GHI, 2019). Nutrition gardens enhance dietary diversity by providing micronutrients through constant supply of fruits and vegetables sufficient to meet the family 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.

The health benefits of vegetables are well recognized by nutritional and medical communities. Nutrition garden is an important strategy to increase the production as well as the consumption of fruits and vegetables. (Kalloo, 1998). The multitude of phytochemicals present in vegetables acts as anti-oxidant, anti-allergic, anti-carcinogenic, anti-inflammatory, anti-viral and anti-proliferative (Singh, 2012). National family health survey statistic

revealed that every second Indian woman is anemic and one in every five maternal death is directly due to anemia (Kaur, 2014). Kitchen garden can provide year-round availability, access and consumption of adequate amount and varieties fruits and vegetables (Rani *et al*, 2015). Vegetables play a major role in human's diet and rural generation should get the awareness about the importance of vegetables (Jain, 2017). Vegetables and green leafy vegetables are rich sources of macro and micro-nutrients helps to control malnutrition in underdeveloped and developing countries (Aziz *et al*, 2019). Vijalakshmi *et al* (2020) reported that the average vegetable consumption of households was about 18.5 ± 0.52 kg / month and after the experiment vegetable consumption was increased and ranged between 34 to 38kg/month. Hence, the study was carried out by the active participation of five farmers with the objective to demonstrate the nutrigarden in terrace for organic vegetable production in an area of 25 square meter using various organic materials with continuous observation and management practices.

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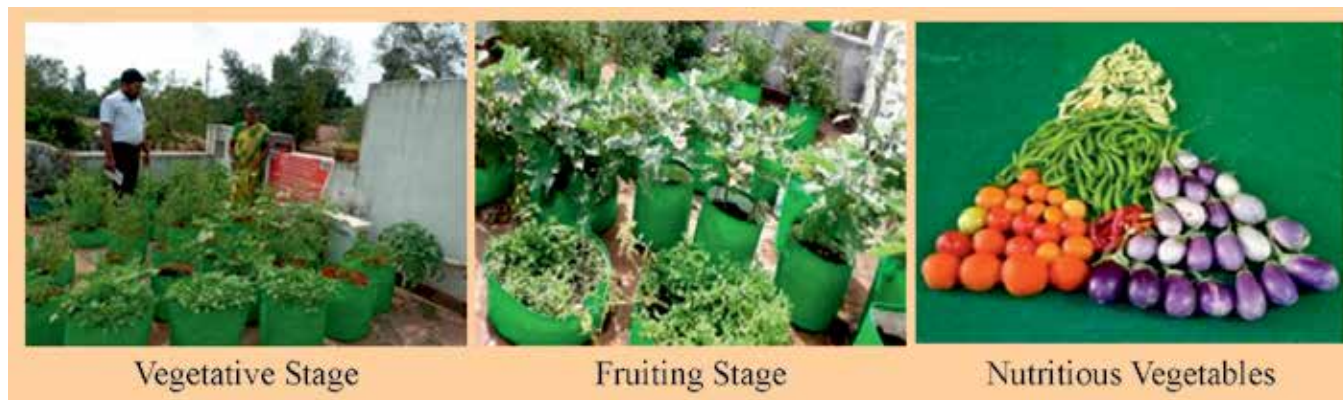
Table 1. Inputs required for conducting FLD per 25 square meter terrace garden.

Vegetables		Green Grow Bag		Other Inputs
Seeds	Variety	Qty	Size	
Okra	Arka Anamika	5 Nos.	12x12	Pro tray for seedlings
Brinjal	PLR 2	5 Nos.	12x12	Coir pith
Tomato	CO 1	5 Nos.	9x12	Vermicompost and soil
Chilli	CO 1	5 Nos.	9x12	Neem cake
Amaranthus	PLR 1	5 Nos.	18x6	Azospirillum and Phospobacterium
Drumstick	PKM 1	5 Nos.	15x15	Pseudomonas and <i>Tricoderma viridie</i>

Table 2. Technologies Demonstrated (FLDs) On Crops .

2.1. Demonstration (Terrace)							
Crop	Plant Population (per ha)		Average Yield (kg/ha)		Market Price / kg	Net Return (Rs)	
	Brinjal	5/25x10000	2000	2000 x 1.3		2600	17
Okra	5/25x10000	2000	2000 x 1.5	3000	10	3000 x 10	30000
Green chillies	5/25x10000	2000	2000 x 0.9	1800	19	1800 x 19	34200
Tomato	5/25x10000	2000	2000 x 0.9	1800	13	1800 x 13	23400
Amaranthus	5/25x10000	2000	2000 x 0.8	1600	28	1600 x 28	44800
Moringa greens	5/25x10000	2000	2000 x 2.0	4000	25	4000 x 25	100000
			Total	15200		Total	276600
2.2. Check (farmers land)							
Crop	Plant population / ha		Yield (Kg/ha)		Market Price / kg	Net Return (Rs)	
Okra	30/25x10000	12000	12000x1.55	18600		10	18600 x 10
Earning per day for land (check)			186000/365= Rs. 509/-				
2.3. Cost, Returns and Yield							
Particular					Demon.	Check	% increase in yield
Gross cost (Rs./ha)					120000	120000	-
Net returns (Rs./ha)					276600	186000	-
BCR					1:3.31	1:2.55	-
Yield (q/ha)					276.6	186	49 %
Bhendi Equivalent yield					276600/10= 27660 Kg / ha (276.60 q/ha)		
Cost of cultivation					2000 x 60 = 1, 20,000/-		
Earning per day for terrace (demo)					276600/365= Rs. 758/-		
Earning per day for land (check)					186000/365= Rs. 509/-		

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Pic. 1. Outputs for Establishment of Nutri Garden (Terrace)

MATERIALS AND METHODS

The study was conducted at five farmer's field (Terrace) in Vadakadu Village of Pudukkottai District, Tamil Nadu. The farmer sowing was done in rabi season during October-2019 and harvesting was done from February 2020 onwards. In each farmer's field, the grow bags (30 Nos.) were placed within the terrace area of 25 m² for 6 type of vegetable plantation and given experts suggestions to the farmer for organic cultivation practices. The follow-up visits were done in weekly for four months (one season) to obtain data such as vegetables yield and worked out Okra equivalent yield, cost of cultivation, net income and benefit cost ratio. And also the quantity of vegetables consumed per day per family before and after establishment of nutrigarden was assessed. The required inputs were supplied by the KVK to the farmers for conducting FLDs (Table 1).

RESULTS AND DISCUSSION

Impact of nutrigarden (terrace) on Economic Empowerment

The study revealed that the production point of view, the total vegetable yield was 37 kg in the area of 25 square meter of terrace garden for the period of rabi season only. As per Okra equivalent calculation 49 per cent yield was increased in demonstration (terrace) compared to check (farmers land). Also net returns and BC ratio was higher than check. Okra Equivalent yield was calculated as

276.60 q/ha. Finally Rs. 2,76,600/- was earned per annum per hectare. The farmer's average income was Rs.758 / day / hectare (Table 2).

Studies reported that the health point of view, According to FAO and WHO the average per capita consumption of fruits and vegetables is 400g per day per person. Before the experiment, the average vegetable consumption of households was 100g per day per family (2 adult). After the experiment, the average vegetable availability and consumption of households was increased to 310g per day per family. There was a significant difference in vegetable consumption in households before and after the establishment of vegetable nutrigarden. (Table 2 and Pic. 1). These results showed that the nutritional security was attained with increased availability of vegetables and green leafy vegetables in households with reasonable price rates.

Gangama mandal Nutri-garden model, farmers could cultivate up to 32 crops, maximum increase in average production (134 %), average annual income (Rs.23,745/-), average consumption (54%) and it reduced purchase (60%) from outside market compared VADI Model and traditional method (Thakor *et al*, 2020).

CONCLUSION

This study concluded that regularly four to five species of vegetables can be made available at village point throughout the year. The farmer's average income was also increased from Rs.509/- to Rs.758