



Nutri-Gardens: A Way to Manage Malnutrition and Ensure Food Security

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Aims: This opinion article aims to discuss about the origin of Nutri-garden and different designs of Nutri-garden and its major contributions on eradicating malnutrition/under nutrition and ensuring food security and diet diversity in India.

Origin: Nutri-garden is the advanced form of home/kitchen garden and the recent awareness on importance of Nutri-garden /Poshan Vatikas is created by Union Ministry of Women and Child Development and the Ministry of Ayush, Government of India.

Nutri-Garden Layout and Model: Generally, circular and rectangle designs are followed in Nutri-garden. Indian Institute of Horticultural Research (IIHR), Bengaluru, preferred rectangular shape Nutri-garden when compared to square shape garden.

Impacts of Nutri-Garden on Nutritional/Health Disorders: Fruits and vegetable are the important sources of micronutrients needed for disease and disorder free life. Healthier diets can be maintained by consuming fruits and vegetables, the supplementation of macro and micronutrients from fruits and vegetables maintain healthy blood pressure, fiber content in fruits and vegetables

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reduces blood cholesterol and lowers the risk of heart diseases.

Nutri-garden Design, Development and Dissemination: For individual family the Nutri-garden can be designed according to the family members requirements and the availability of land. If the garden designed and developed for particular location by KVKs and Research Institutes can be disseminated through various trainings and rural women and Self Help Groups (SHGs).

Nutri-garden for Self-sustainability under Climate Change: Global development practitioners have attempted to capture the diverse coping mechanisms and adaptive tactics used by the farming community. Kitchen gardening is one such strategy that improves farm-family resilience in the face of climate change

Conclusion: Nutri-garden is the efficient tool to combat against human malnutrition and health disorders. The low farm yield under climate change can be compensated through increasing number of self sustained Nutri-Gardens. Nutri-Garden shall be maintained also in School campus and public buildings. Nutri-garden ensures the house hold nutritional security and it is the cheapest strategy to maintain human health.

Keywords: Nutri-garden; malnutrition; food security; self-sustainability; nutri-garden designs.

1. INTRODUCTION

The home/Kitchen garden is the most ancient type of garden in India. Nutri-garden is the advanced form of home/kitchen garden and the recent awareness on importance of Nutri-garden /Poshan Vatikas is created by Union Ministry of Women and Child Development and the Ministry of Ayush, Government of India. Under their effort Nutri-gardens have been established in roughly 4.37 lakh Anganwadi Centers. Poshan Maah 2022 establishes Nutri-gardens or Poshan Vatikas with poultry/fishery units across the country. Poshan Vatikas, allow simple and inexpensive access to fruits, vegetables, medicinal plants, and herbs. It guarantees that women and children have access to fresh fruits, vegetables, and medicinal plants on a daily basis [1]. Nutri-gardens not only improve the nutritional status of rural households, but they also provide a small and consistent source of income for women [2]. <https://atariz1.icar.gov.in/pdf/Nutrigarden.pdf> [3]. The increased obesity, hyper tension and diabetes among the men and women in Tamil Nadu has been observed by National Family Health Survey (NFHS)-2019-2021 [4]. Nutri-garden will be the good solution to eradicate existing malnutrition, obesity, hypertension, diabetes, anemia and other nutritional disorders. Now a days the great awareness on Nutri-garden is being created among the rural and urban people through Krishi Vinghayan Kendras (KVKs), Non-Governmental Organizations (NGOs), Self Help Groups (SHGs), Anganwadi and various Agricultural, Horticultural Research Institutes. These organizations and institutes are standardizing the location specific Nutri-Garden layout. Recently, Indian Institute of Horticultural

Research (IIHR), Bengaluru preferred that rectangular shape Nutri-garden lay out when compared to square shape Nutri-garden [5]. And circle shape Nutri-garden and Rectangular Nutri-garden are preferred and followed by the organizations and common people because of its convenience in monitoring and cultivation practices. Nutri-garden is a multifaceted endeavor to combat malnutrition. A Nutri-garden is an environment from which we obtain nutritionally abundant fruits, vegetables, and food from cattle sources. Nutri-gardening is the growth of nutrient-rich crops in residential residences, their surroundings, or in community spaces to supply the dietary needs of the family all year [6]. Climate change is a worldwide phenomenon that poses a serious challenge in all aspects of life. Poverty exacerbates the link between food security and climate change, which must be addressed by strengthening the food production system's resilience. Global development practitioners have attempted to capture the diverse coping mechanisms and adaptive tactics used by the farming community. Kitchen gardening is one such strategy that improves farm-family resilience in the face of climate change [7]. Recognizing the significant nutritional benefits of fruits and vegetables, the World Health Organization (WHO) recommends a daily intake of 400 g to prevent chronic diseases (particularly heart disease, cancer, and diabetes) and to supply needed micronutrients (particularly calcium, iron, iodine, vitamin A, and zinc) [8,9]. Consumers today, especially those with higher salaries, are thought to be falling short of this goal. More emphasis must be paid to bridging this dietary gap and enabling people to benefit from the nutritious value of vegetables [10]. Nutri-garden is a method of planting, harvesting and

consuming the Nutri rich crops in residential houses, schools, anganvadies and common places of villages. In urban the Nutri-garden can be in the form of roof top garden, terrace garden and vertical garden. The ultimate aim of different types of Nutri-garden is in addition to nutritional security, it acts as a source of supplementary income and people can consume chemical free fruits and vegetables.

2. NUTRIGARDEN LAYOUT AND MODEL

The Size and shape of the Nutri-garden can be designed based on the family /Individual need. The choice of crops in Nutri-garden can also be based on the type of health disorders or nutrition disorders of the individuals or family members. Now a days industrialization has emerged in all sectors and increasing population leads to increased number of buildings and conversion of farming area into industry or house buildings. So, we are in need to increase the productivity (yield per unit area) either commercially or through practicing Nutri-garden in the front or backyard at

established and already existing buildings. It is recommended that development of organic manure pit at one corner to nourish the garden in the organic way. The organic pits can be Farm Yard Manure (FYM), Vermi Compost and Enriched organic manure pits with biofertilizers and micronutrients. The research studies are proved that Nutri-garden increased the societal status of the people and it will manage the nutritional disorders in the children, women and aged ones. The Nutri-garden can be designed or modified based on the land availability, nutrient requirement, the choice of crops, climatic conditions, varieties' adaptation, etc., The mostly recommended shape of the Nutri-gardens are circle (Fig. 1) and rectangle (Fig. 2 & 3). Choice of the crops depends on season, location and people requirement.

The Coalition for Food and Nutrition Security (CFNS) have published three types of Nutri-garden models after successfully completing various projects. The three types are Level 1, Level 2 and Level 3.

Table 1. Types of nutri-garden

Category	Activity
Level 1	Fruits/Seeds/Vegetables
Level 2	Vegetarian + Poultry
Level 3	Vegetarian + Poultry + Other (Livestock, fisheries, sericulture, apiculture etc.,)

(Source: Compendium of Nutri-Garden Interventions in India, 2021)

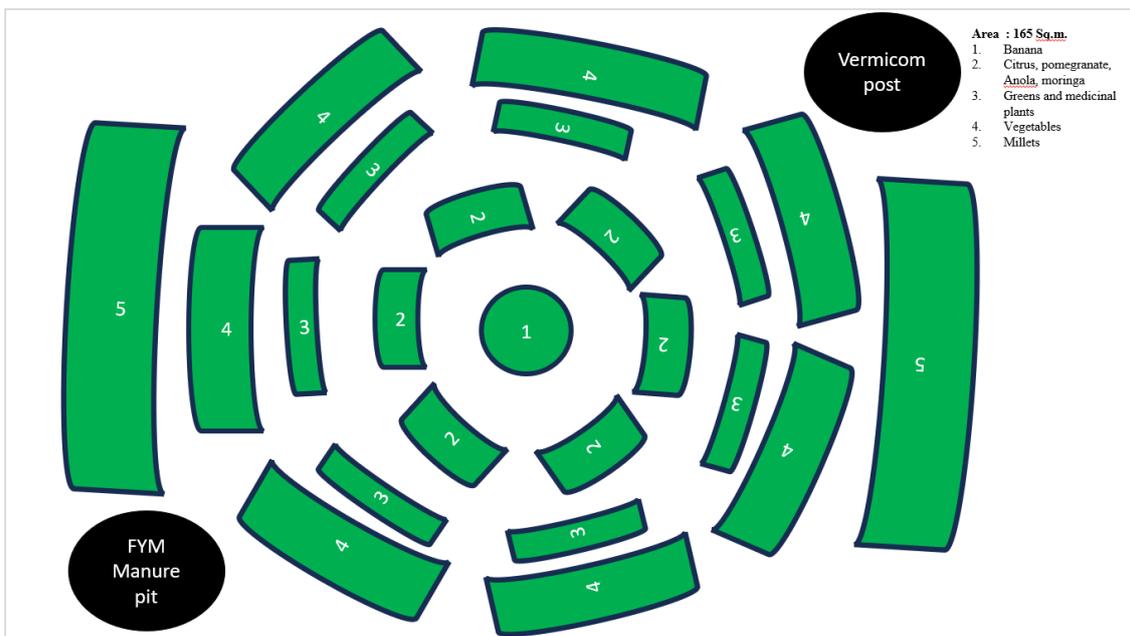


Fig 1. Circle model (area, crop choice depends on land availability, nutrient requirements and climatic condition)

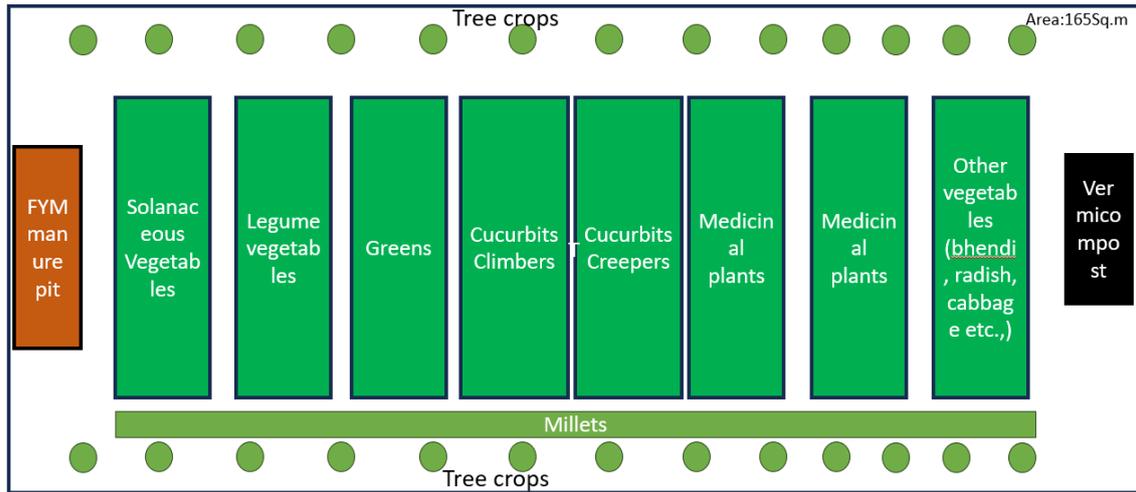


Fig. 2. Rectangle model (area, crop choice depends on land availability, nutrient requirements and climatic condition)

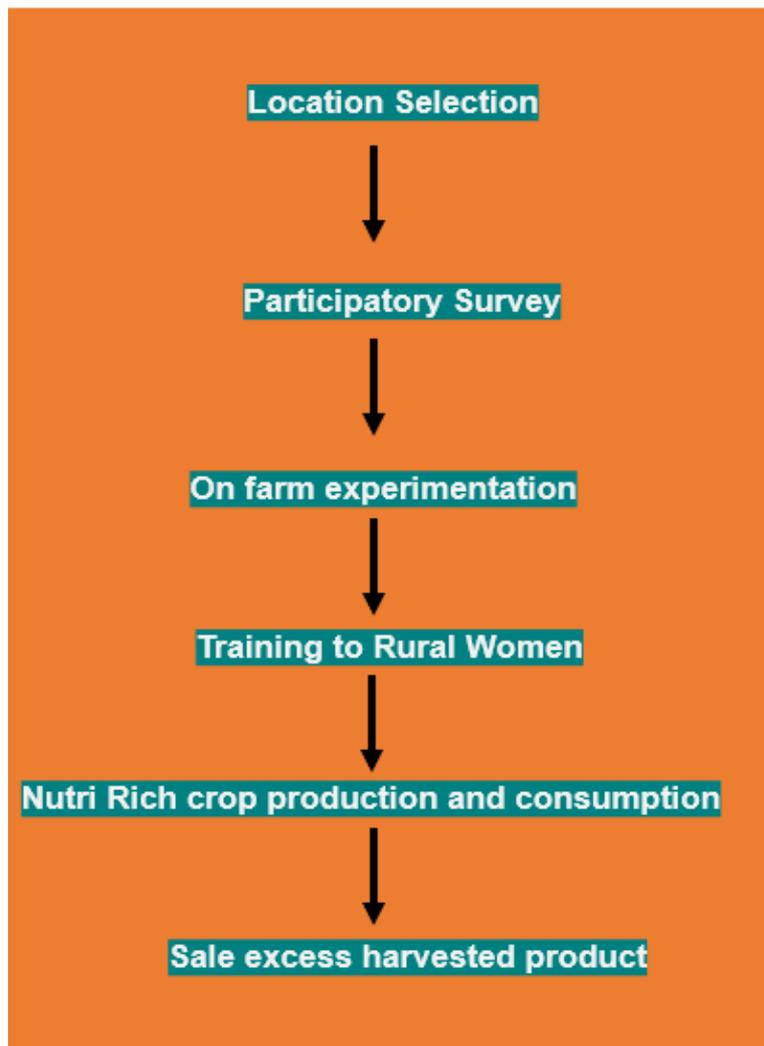


Fig. 3. Nutri-garden development and dissemination

3. IMPACTS OF NUTRI-GARDEN ON NUTRITIONAL/HEALTH DISORDERS

Ghassan et al. [11] observed that home gardens are an easy, adaptable, and frequently utilized tool to experiment with. It improves household access, provides micronutrients, and makes community level impacts. Chadha [12], explained the importance of vegetables in food items in managing food security and malnutrition. Pepijn et al. [10] suggested that to fully tap the economic and nutritional benefits of veggies, governments and donors must prioritize them far more than they do now. Now is the time to prioritize vegetable investments, increasing economic opportunities for smallholder farmers and ensuring healthy diets for all. Fruits and vegetable are the important sources of micronutrients needed for disease and disorder free life. Healthier diets can be maintained by consuming fruits and vegetables, the supplementation of macro and micronutrients from fruits and vegetables maintain healthy blood pressure, fiber content in fruits and vegetables reduces blood cholesterol and lowers the risk of heart diseases. A study conducted by Rafael Perez-Escamilla [13], revealed that stunting is caused by a lack of adequate food availability at home. As a result, back yard nutria gardens are gaining popularity as a way to improve household food and nutrition security. Malnutrition in childhood has a long-term impact on a child's cognitive development, physical growth, and immunity to many illnesses and diseases. Malnutrition is the leading cause of death among children under the age of five in our country [14]. Suneetha and Durga Prasad [15] studied the impacts of two year training on Nutri-garden at Andhra Pradesh and observed the size of each nutrition garden varies due to the local natural ecology, the family's labour resources, the members' abilities, preferences, and excitement, as well as the natural ecology, functionality and composition. In their study the evaluation of all 90 people before and after the nutrition garden's implementation revealed that the majority of those before the nutrition garden's establishment were malnourished, with underweight rates of 57.8%, overweight rates of 13.8%, grade I obesity rates of 4.40%, and grade II obesity rates of 2.2%. Malnutrition impacted 77.80% of the population overall. Following Nutri-garden, the normal weight proportion of individuals was increased to 51.1% from 20% and the underweight percentage was decreased to 35.5% from 52%.

4. NUTRI-GARDEN DESIGN, DEVELOPMENT AND DISSEMINATION

For individual family the Nutri-garden can be designed according to the family members requirements and the availability of land. If the garden designed and developed for particular location can be disseminate through various trainings and rural women and Self Help Groups (SHGs) can get job opportunity through this training and selling the additional produce harvested from Nutri-garden.

5. NUTRI-GARDEN FOR SELF-SUSTAINABILITY UNDER CLIMATE CHANGE

Global development practitioners have attempted to capture the diverse coping mechanisms and adaptive tactics used by the farming community. Kitchen gardening is one such strategy that improves farm-family resilience in the face of climate change. Increasing vegetable production and consumption is an obvious strategy to enhance dietary diversity and quality, particularly in diets dominated by high-energy, low-micronutrient foods. However, vegetables are generally sensitive to environmental extremes, and thus high temperatures and limited soil moisture are the leading causes of low yields because they have a significant impact on several physiological and biochemical processes such as reduced photosynthetic activity, altered metabolism and enzymatic activity, thermal injury to tissues, reduced pollination and fruit set, and so on, which will be exacerbated by climate change [16]. Nutri-garden provides a holistic approach to maintaining health, minimizing pollution, fostering community, and expanding knowledge. Additionally, minimizing carbon emissions from food waste and fertiliser use helps prevent climate change [17,18].

6. CONCLUSION

Agri Nutri-gardens are the advanced form of kitchen garden and it acts as an easy and effective tool to combat against malnutrition and nutritional disorders in both rural and urban families. Nutri-gardens also promotes employment opportunity for the youths and women. Awareness on the importance, design and development of the Agri Nutri-garden is disseminated through Krishi Vigyan Kendras (KVKs), Agricultural and Horticultural state and central institutes, Anganvadies and private and

public schools. Agri Nutri-garden is one of the ways to fulfil the objective of Athmanirbhar Krishi. The low farm yield under climate change can be compensated through increasing number of self sustained Nutri-gardens. Nutri-garden ensures the house hold nutritional security and it is the cheapest strategy to maintain human health.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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