Nutrition Gardening: Empowering Women, Nourishing Families

Debarati Datta*, Sourav Ghosh, Sonali Paul Mazumdar, Shamna A., Nurnabi Meherul Alam and Gouranga Kar

ICAR-Central Research Institute for Jute and Allied Fibres, Barrackpore-700121

Corresponding Author
Debarati Datta
Email: myselfdebarati@gmail.com

OPEN ACCESS

Keywords

Nutrition Gardening, Women Empowerment, Sustainable

How to cite this article:

Datta, D., Ghosh, S., Mazumdar, S. P., Shamna, A., Alam, N. M. and Kar, G. 2026. Nutrition Gardening: Empowering Women, Nourishing Families. *Vigyan Varta* 7 (03): 80-88.

ABSTRACT

Rapid changes in food habits, urbanization, and increasing reliance on processed foods have contributed to widespread malnutrition and micronutrient deficiencies in India. Nutrition gardening, also known as kitchen or nutri-gardening, has emerged as a low-cost, sustainable, and household-level intervention to improve dietary diversity, food security, and overall well-being. Nutrition gardens involve the planned cultivation of diverse vegetables, fruits, leafy greens, herbs, and medicinal plants in available household spaces, ensuring year-round access to fresh and safe produce. Beyond nutritional benefits, nutrition gardening enhances women's empowerment, reduces household food expenditure, and strengthens livelihood resilience. Sustainability lies at the core of this approach, as nutrition gardens reduce food miles, conserve water through efficient use, enhance on-farm biodiversity, and promote circular resource use through composting and organic inputs. Supported by national programmes and extension systems, nutrition gardening integrates environmental, economic, and social dimensions, making it a scalable strategy for improving household nutrition, health, and community resilience.

INTRODUCTION

Rapid urbanization, changing food habits, and growing dependence on processed and ready-to-eat foods have profoundly altered traditional dietary patterns in India. For a large proportion of households, access to fresh, safe, and affordable fruits and

vegetables remains inadequate, compounded by rising concerns over pesticide residues and food safety. These shifts have contributed to persistent problems of undernutrition, micronutrient deficiencies or "hidden hunger," and a rising burden of lifestyle-related diseases such as obesity, diabetes, and cardiovascular disorders. India ranks 102 out of 123 countries in the 2025 Global Hunger Index and continues to face serious challenges of undernutrition. Despite recent improvements, India still has the largest number of stunted and wasted children globally. Poor nutrition during the first 1,000 days of life leads to stunting and perpetuates an intergenerational cycle of malnutrition, adversely affecting health, social, and economic development.

Modern diets are increasingly dominated by energy-rich but nutrient-poor foods, including refined cereals, fast foods, sugary snacks, and sweetened beverages. At the same time, consumption of pulses, fruits, vegetables, and traditional foods has declined sharply. This imbalance has resulted in poor dietary diversity, particularly among women and children, who are the most nutritionally vulnerable. Dietary guidelines recommend a daily intake of 400–500 g of fruits and vegetables per person. In India, the suggested intake is approximately 350 g of vegetables and 150 g of fruits per day. However, actual consumption in most households remains far below these recommendations. Nutrition gardens directly address this gap by ensuring year-round availability of diverse, fresh, and micronutrient-rich foods at the household level, thereby strengthening dietary adequacy.

In this context, nutrition gardening, also referred to as kitchen gardening or nutri-gardening, has emerged as a simple, cost-effective, and sustainable household-level intervention. Nutrition gardening involves the systematic cultivation of vegetables, fruits, leafy greens, herbs, and medicinal plants in available spaces around the home—such as backyards, terraces, rooftops, balconies, or even containers and grow bags (Selvarani and Subathra, 2024). Beyond improving access to nutritious food, nutrition gardens enhance household self-reliance, environmental sustainability, dietary diversity, and physical and mental well-being. Rural families, with greater access to land and agricultural knowledge, are well positioned to adopt kitchen gardens. However, the lack of systematic planning guidelines and limited technical capacity of frontline workers hinder effective implementation of nutrition-sensitive kitchen gardens.

Concept and Rationale of Nutrition Gardening

A nutrition garden refers to the planned and diversified cultivation of crops primarily for household consumption rather than for commercial sale. The central objective is to meet the daily nutritional requirements of family members through a continuous supply of fresh produce. A balanced diet requires the inclusion of at least five food groups each day. Seasonal fruits and vegetables produced in a nutrition garden contribute significantly to meeting these requirements, especially for pregnant and lactating women, children, adolescents, and the elderly. Nutrition gardens also reduce household expenditure on food and limit exposure to pesticide-laden market produce, making them both a health-promoting and economically viable option.

Importance and Benefits of Nutrition Gardening

❖ Nutritional and Health Benefits

Home-grown fruits and vegetables are harvested fresh and consumed at peak nutritional quality (Subha *et al.*, 2020). Regular intake improves the supply of essential vitamins, minerals, antioxidants, and dietary fibre, helping to address deficiencies of iron, vitamin A, calcium, and other

micronutrients. Improved dietary diversity strengthens immunity, supports child growth and development, and reduces the risk of nutrition-related disorders. They are particularly beneficial for small and marginal farmers, landless labourers, and rural households vulnerable to market price fluctuations and supply disruptions. During emergencies or seasonal shortages, household gardens act as an important safety net.

❖ **Economic Benefits**

Nutrition gardens significantly lower household expenditure on vegetables and fruits. Production costs are minimal, as inputs often include recycled kitchen waste, compost, and household wastewater. Surplus produce can be shared or sold locally, providing supplementary income and improving household economic resilience.

❖ **Environmental and Social Benefits**

Nutrition gardening promotes environmentally friendly practices such as composting, recycling of organic waste, and reduced reliance on chemical fertilizers and pesticides. It enhances soil health, increases green cover, and supports biodiversity, including pollinators. Gardening also serves as a stress-relieving activity, strengthens family bonding, and improves children's understanding of food systems and nature.

Planning and Management of Nutrition Garden

1. **Importance of Planning:** A well-planned nutrition garden ensures a continuous, diversified, and year-round supply of fresh vegetables and fruits for household consumption. Proper planning enhances efficient use of space, resources, and labour while improving nutritional security and household resilience.

2. **Selection of Site:** A nutrition garden is best established in the backyard or a nearby open space of the household where an assured water supply is available. The site should be fairly level, well drained, and receive at least 4–6 hours of direct sunlight daily to ensure healthy crop growth. In hilly regions, locating the garden close to the house helps in easy management and protection from stray animals. Good soil fertility, along with proper irrigation and drainage facilities and some space for composting, are essential for sustaining year-round vegetable production.

3. **Size and Shape of the Garden:** The size of a nutrition garden depends on the availability of land and the number of family members. Generally, an area of about 200 m^2 (around five cents) is adequate to meet the annual vegetable needs of a family of five. Rectangular plots are preferred, as they allow better utilization of space, easier intercultural operations, and smooth movement within the garden. In hilly or sloping areas, terrace gardening can be adopted to make effective use of land and prevent soil erosion.

4. **Layout and Crop Arrangement:** For efficient use of sunlight, vegetable crops should preferably be grown on the southern and western sides of the garden, while the northern side can be reserved for fruit crops. Perennial fruit and vegetable plants such as papaya, moringa (drumstick), curry leaf, guava, lemon, and amla are best planted along the borders or on one side to minimize shading and avoid interference with field operations. Shade-tolerant vegetables may be grown near perennial crops where suitable. After accommodating perennial plants, the remaining area should be divided into 6–10 equal plots for annual vegetables, which helps in crop rotation, sequential planting, and continuous supply of fresh produce.

5. **Seed Treatment:** Seed treatment is an important practice to improve germination,

seedling vigour, and protection against seed-borne diseases. Seeds or seedling roots may be dipped in a cow urine solution (1:10 dilution) or sour curd water (1:10 dilution) for 5–10 minutes before sowing or transplanting as an organic and eco-friendly approach. Where necessary, chemical seed treatment can be adopted using Thiram @ 1.5 g and Carbendazim @ 1.0 g per kg of seed to prevent fungal infections. Seeds can also be treated with bio-fertilizers such as *Rhizobium*, *Azotobacter*, *Azospirillum*, and phosphate-solubilizing bacteria (PSB) to enhance nutrient availability and early crop establishment. After treatment, seeds should be shade-dried briefly before sowing. Overnight soaking of seeds, wherever suitable, helps in faster and uniform germination. Treated seedlings should be transplanted immediately to avoid stress and damage.

6. **Crop Planning and Cropping Systems:** Proper crop planning is essential for ensuring year-round availability of vegetables while maintaining soil health. Crop selection and layout should strictly follow seasonality, crop compatibility, and principles of crop rotation. With systematic planning, two to three crops can be grown in the same plot each year through crop rotation, intercropping, mixed cropping, companion cropping, and succession planting. A judicious mix of direct-sown and transplanted crops allows staggered harvesting and a continuous supply of fresh vegetables.

Fig. 1. Diverse Food Crops Grown Under Nutrition Gardening

Preference should be given to stable, long-duration varieties that require less intensive management. Nutrient balance can be maintained by growing heavy feeders such as cabbage, maize, and potato along with light feeders like legumes and root crops. Leafy vegetables may be planted near legumes, root crops, or fruit vegetables for efficient use of space and nutrients. Recommended spacing should always be followed, and crop arrangement should consider plant architecture, combining tall or narrow crops with spreading or low-growing ones. Crops should also be planned according to the duration of bed occupancy, as some crops remain for extended harvesting periods while others vacate the beds early. To enhance productivity, pollination support should be encouraged. Installation of one beehive in a 200 m² garden can significantly improve pollination efficiency, increase vegetable yields, and provide additional income through honey production. Season-wise Vegetables Suitable for a Nutrition Garden has been summarized in Table 1.

Table 1 : Season-wise Vegetables Suitable for a Nutrition Garden

Category / Plot	Season	Crops Grown
Main Plots	Kharif (May/June–Sep/Oct)	Brinjal, chilli, bitter gourd, ash gourd, cucumber, trailing cowpea, okra, maize (corn), cluster bean
	Rabi (Sep/Oct–Dec/Jan)	Tomato, brinjal, cauliflower, cabbage, knol-khol, garden pea, French bean, okra, spinach, leafy vegetables, radish, potato, onion, garlic, beetroot, carrot, turnip, broccoli
	Summer (Dec/Jan–May/June)	Okra, pumpkin, watermelon, cucumber, amaranthus, yard-long bean, chilli, brinjal, poi (basella)

Perennial Vegetables	Throughout the year	Papaya, drumstick (moringa), banana, curry leaf, pointed gourd
Fruits	Throughout the year	Papaya, banana, lime, guava, rose apple, mango, aonla, carambola, dragon fruit, passion fruit, pomegranate
Intercrops (Fruits)	Throughout the year	Pineapple
Tuber & Root Crops	Seasonal	Taro, elephant foot yam, yam, tapioca
Spices & Condiments	Seasonal / Perennial	Ginger, turmeric, mango ginger, coriander, mint (pudina)
Borders & Paths	Seasonal	Amaranthus, cowpea, dolichos bean
Fence Crops	Perennial	Agasthi (Sesbania), drumstick, bael
Rainy Season (Fence/ Climbers)	Rainy	Beans, other vine and trailing vegetables
Rainy / Summer	Rainy & Summer	Dolichos bean, winged bean

7. **Vertical Gardening and Space Utilization:** When horizontal space is limited, vertical gardening is an efficient way to maximize production by using boundary walls, house walls, fences, and rooftops. Climbing and trailing vegetables such as bitter gourd, ridge gourd, bottle gourd, pumpkin, and other cucurbits can be trained on trellises or fences. Vertical cultivation saves space, improves light interception and air circulation, reduces pest and disease incidence, facilitates easy harvesting, and improves fruit quality. Training climbers along walls and thatched roofs is a traditional and cost-effective practice in rural households, enhancing overall space-use efficiency.

8. **Raised Bed Cultivation:** Raised beds are highly recommended, especially in areas prone to waterlogging, as they improve drainage and prevent soil compaction (Fig. 2). Beds of 5–6 ft length, 2–3 ft width, and 1–1.5 ft height are ideal for accommodating crops with varying root depths and light requirements. Application of rice husk/hull and vermicompost enhances soil structure and nutrient availability. Raised beds, constructed using bricks or timber (where termite risk is low), allow easier crop management, better root growth, and convenient harvesting, while clean inter-bed pathways maintained with gravel or cement improve hygiene and accessibility.

Fig. 2. Vegetables grown on raised beds and ridges

9. **Soil Fertility and Nutrient Management:** Since nutrition gardens involve intensive and continuous cropping, maintaining soil fertility is crucial. Regular application of farm compost and organic manures helps sustain soil structure and nutrient supply. Locally available organic formulations such as Beejamrit, Jeevamrit, Amritpani, and vermiwash should be encouraged, particularly in rural households. Ridges

between plots can be effectively utilized for root and tuber crops, improving space use. Establishing one or two compost pits in a corner of the garden enables recycling of kitchen and farm waste, reduces dependence on external inputs, and enhances long-term soil health.

10. **Irrigation:** Efficient water use is a key component of nutrition gardens. Pitcher irrigation, a traditional and low-cost method, is highly suitable for home gardens and water-scarce areas, as it supplies slow and continuous moisture directly to the root zone with minimal evaporation losses. Where possible, dug wells or bore wells may be linked to drip or sprinkler systems, while low-cost devices such as treadle pumps, chain washer pumps, or solar pumps can also be used. Soil moisture retention can be further improved through mulching, addition of organic matter, clay pot or bottle irrigation, and gentle soil forking, all of which enhance water-use efficiency.

11. **Weed management:** Weeds can be effectively managed through thick organic mulching, which suppresses weed growth by blocking sunlight. Intercropping tall crops with spreading or low-growing crops provides natural ground cover and reduces weed spread. In addition to weed suppression, mulching conserves soil moisture, moderates soil temperature, and improves soil health, making it a key practice in nutrition gardens.

12. **Plant Protection Measures:** Plant protection should rely primarily on organic and eco-friendly methods, including mechanical removal of affected plants, use of resistant varieties, biological control agents, and neem-based bio-pesticides or bio-fungicides. Chemical pesticides, if unavoidable, should be used judiciously and in minimal quantities. Pheromone traps are effective for monitoring and mass-trapping pests such as tomato fruit borer, armyworms, fruit flies, pod borers, diamondback moth, and fruit and shoot borers of brinjal and okra. Yellow sticky traps help manage whiteflies, aphids, leafhoppers, and leaf miners, while blue sticky traps are effective against thrips. Smearing a ring of cooking oil or petroleum jelly on plant stems prevents crawling insects from reaching tender plant parts. Cut plastic containers or tin cans pressed into the soil protect young plants from cutworms, caterpillars, mice, and grasshoppers. Barriers around plants reduce damage from crawling pests. Adopting pest- and disease-resistant varieties is an effective preventive strategy, particularly in endemic areas. Homemade remedies such as sticky baits made from sawdust and molasses can trap cutworms. Dusting leaves with ash, lime, clay, or rock dust helps control thrips, aphids, mites, and whiteflies. Chilli and garlic powders repel ants and crawling insects and also help manage some fungal infections. There are specific inter-crop combinations too for pest control, like Cabbage + Carrot against Diamond Black Moth, Okra + Cowpea against Yellow Vein Mosaic Virus, and Cucumber + Radish against cucumber beetles.

14. **Garden Infrastructure, Protection and Harvest Management:** A well-planned nutrition garden should have clearly defined pathways along the central axis and around the periphery to ensure easy movement, timely intercultural operations, and convenient harvesting. Proper fencing on all sides using barbed wire or live fencing is essential to protect the garden from animal damage and pilferage; live fences can be strengthened by planting Agasthi (*Sesbania grandiflora*) at about 1.0 m spacing along the boundary.

Harvesting and post-harvest handling must follow strict hygiene practices. Vegetables should be harvested at the optimum tender stage—root crops before becoming fibrous, fruit and pod vegetables at proper size, and leafy vegetables through frequent cuttings to promote continuous growth. Crops like pumpkin, chilli, colocasia, and onion may be harvested at immature or mature stages depending on use, while melons, tomatoes, and ash gourd may be allowed to ripen fully on the vine for better flavour and nutrition. After harvest, produce should be cleaned, sorted, and consumed promptly, as nutrient losses occur rapidly. Root and tuber crops may be stored temporarily in pits or preserved through drying to extend their usability and nutritional value.

Women Empowerment through Nutrition Gardening

Nutrition gardening is a powerful tool for women's economic, social, and nutritional empowerment. By managing household nutrition gardens, women gain greater control over food production, improve family dietary diversity, reduce expenditure on vegetables, and earn supplementary income from surplus produce. Active participation enhances women's skills in crop cultivation, resource management, and nutrition awareness, strengthening their decision-making role at household and community levels. As primary caregivers, women use nutrition gardens to ensure regular access to fresh, diverse, and nutrient-rich foods, particularly benefiting children, pregnant and lactating women, and other vulnerable family members. Collective and group-based gardening further promotes skill development, social cohesion, and leadership, while challenging traditional gender roles by recognizing women as key contributors to household food security and local livelihoods.

Maa Ganga Nutrition Garden Model

The Maa Ganga Nutrition Garden Model, developed by Mahadev Gomare, a natural farming expert associated with The Art of Living, is an innovative approach to sustainable vegetable production in Maharashtra's Latur district (Fig.3). The model is designed with seven concentric circles, each allocated to grow different vegetables for the seven days of the week (Dwivedi, 2024; Reddy *et al*., 2021). The innermost circle is used for fruit plants like papaya and banana or as a compost pit, while the outer circles accommodate various vegetables, with the outermost ring suitable for larger plants. Bamboo canopies between the circles support climbing crops, enhancing space utilization and productivity. This model promotes natural, chemical-free vegetable cultivation for household nutrition and has also provided livelihood opportunities, with tribal women in Jharkhand reportedly earning up to ₹50,000 annually through its adoption.

Fig. 3. Maa Ganga Nutrition Garden Model

Institutional Support and Evidence of Impact

In India, nutrition gardening is strongly supported through a convergence of national programmes addressing nutrition, livelihoods, and sustainable agriculture. The Government of India has actively promoted nutri-gardens under initiatives such as the National Rural Livelihood Mission (NRLM) and the Mahatma Gandhi National Rural Employment Guarantee

Scheme (MGNREGS), which aim to improve dietary diversity while generating income opportunities, particularly for women and smallholders. POSHAN Abhiyaan provides an integrated framework linking agriculture, health, and nutrition, while the Integrated Child Development Services (ICDS) promotes community nutrition gardens through Anganwadi Centres. Technical backstopping is provided by Krishi Vigyan Kendras (KVKs) through training, demonstrations, and field guidance. Additional institutional support is extended through the National Horticulture Mission and the Mission for Integrated Development of Horticulture (MIDH) for quality planting material, Pradhan Mantri Krishi Sinchayee Yojana for efficient water management, and Paramparagat Krishi Vikas Yojana for promoting low-input, chemical-free cultivation practices.

These coordinated efforts have translated into measurable field-level impacts. Successful implementation in states such as Chhattisgarh and Odisha has demonstrated improved household vegetable consumption and reduced malnutrition indicators. During POSHAN Maah 2020, several states further strengthened these initiatives by expanding nutrition gardens at Anganwadi Centres and in rural households. Jammu and Kashmir promoted gardens in upper belt rural regions, while Uttarakhand combined awareness campaigns with the introduction of hydroponic-based kitchen gardens at selected centres. Maharashtra undertook a large-scale plantation drive, establishing approximately 92,000 kitchen gardens through the State Rural Livelihood Mission. In Sikkim, the campaign "Grow Organic, Eat Organic" was advanced through door-to-door awareness, whereas Telangana mobilized Anganwadi workers, self-help groups, and Panchayati Raj Institutions for statewide promotion. Manipur complemented plantation drives with POSHAN Panchayats to encourage healthy dietary practices at the community level.

Field experiences across these states indicate that nutrition gardens led by women's self-help groups and community institutions have enhanced year-round availability of nutrient-dense foods, reduced household expenditure on vegetables, and strengthened livelihood opportunities. The convergence of nutrition gardening with agriculture, nutrition, horticulture, and livelihood schemes underscores its role as a scalable, cost-effective, and evidence-based intervention contributing to food and nutrition security, gender empowerment, and sustainable rural development.

CONCLUSION

Nutrition gardening is a practical, inclusive, and sustainable approach to improving household nutrition, health, and livelihoods. With minimal investment and effective use of available space, families can ensure year-round access to diverse, safe, and nutritious food. Reviving and strengthening nutrition gardening—especially in rural, remote, and nutritionally vulnerable areas—can play a vital role in improving women's nutrition, enhancing immunity, and achieving food and nutrition security. Integrating nutrition gardens into development programmes and awareness campaigns will contribute significantly to a healthier population and a greener future.

REFERENCES

Dwivedi, S. (2024). *Maharashtra farmer grows 7 types of vegetables for each day of week with this nutrition garden model*. Krishi Jagran. https://krishijagran.com/success-story/maharashtra-farmer-grows-7-types-of-vegetables-for-each-day-of-week-with-this-nutrition-garden-model/

Reddy, S. S., Naik, B. S. S., & Pramanick, B. (2021). *Ganga Ma Mandal model: A nutri-garden model for household nutrition*. Just Agriculture, 38–41.

Selvarani, K., & Subathra, B. (2024). Nutri-gardens: A way to manage malnutrition and ensure food security. *International Journal of Environment and Climate Change, 14*(2), 23–29. https://doi.org/10.9734/ijecc/2024/v14i23916

Shubha, K., Mukherjee, A., Anand, S., Koley, T. K., & Kumar, U. (2020). *Nutri-garden for achieving Sustainable Development Goals (SDGs)*. Volume 1, Article 8.