

Terrace Gardening of Horticulture Crops for Household Food Security in Urban Areas

Ms. K. Navya¹, Dr. Jessie Suneetha. W^{2*}, Dr. J. Hemantha Kumar², Dr. B. Anila Kumari¹, Dr. V. Chaitanya² and Ms. B. Tulasi¹

¹PGRC, PJTS Agricultural University, Rajendranagar, Hyderabad 500030

²Krishi Vigyan Kendra, PJTS Agricultural University, Wyra 507165, Khammam Dt.

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Introduction

The ever-increasing numbers often drive-up the demand for food which typically adds to forest lands being converted to arable land and on water resources which effect the ecosystems. This is especially true in the absence of adequate food production technology and integrated programs that simultaneously address community needs for food and reproductive health. A country's ability to feed itself very much depends on three factors: availability of arable land, accessible water and population pressures. The more people there are, especially in poor countries with limited amounts of land and water, the fewer resources there are to meet basic needs. The problem of food insecurity is expected to worsen due to, among others, rapid population growth and other emerging challenges such as climate change and rising demand for bio-fuels.

Climate change poses complex challenges in terms of increased variability and risk for food producers and the energy and water sectors. Food security is strongly influenced by intricate social, cultural, political, economic and environmental factors. Food security can be disrupted by many things such as climate change, disempowerment, poverty, natural disasters and conflict. A growing population means more mouths to feed. The expanding global population is getting wealthier, and richer people tend to eat more and demand food that is resource intensive to produce, particularly meat and dairy.

Malthusian hypothesis that human population increases by geometric progression whereas food production increases in arithmetic progression is an indication that relationship exists between population and food supply. At some point therefore, population will outgrow the supply of food and population growth will stop at one point. For most countries, population growth rate is approximately 2 – 3% per annum which should translate to an annual increase of 3 – 5% in agriculture production levels.



Food security exists when all people at all times have physical, social and economic access to sufficient, safe and nutritious food that meets their daily dietary needs and food preferences for an active and healthy life. The four pillars of food security are availability, access, utilization and stability. The main threats to food security are include ever increasing world population leading to increased demand for food that influence the food price and lead to the disappearance of variety of agricultural plant species. It also causes increased use of water leading to its scarcity and limitation of available land for cultivation along with the regular food losses and food waste. In this context, the idea of developing terrace gardens takes precedence in urban areas where land is not available.

Terrace gardening:

It is the practice of growing a garden on a building's roof or terrace rather than on the ground. It can be practical with vegetable and fruit plants or decorative / ornamental plants that beautify the homes. It has grown highly popular in metropolitan areas where there is little ground space to plant a garden. Rooftop agriculture has the potential to improve a variety of ecosystem services, increase urban biodiversity and reduce food poverty there helping to combat micronutrient deficiencies. Cuba is a unique country with vast areas of urban gardening providing viable options for achieving self-sufficiency and food security. The lack of inputs like fertilizers, pesticides and gasoline for food transportation into the city, Cuban food production became labor-intensive and chemical-free in urban areas resulting in Cuba becoming the world leader in urban agriculture.

Basic requirements for terrace gardening:

It should be started with a few plants like perennial fruit trees and leafy greens as these thrive in planters, grow-bags and even plastic drums. They are a great place to start urban farming for first timers.

- **Making it organic:** To begin with planting should be done on coco-peat and then progress to soil mix for more advanced gardening with experience. The cultivation of fresh salad greens and seasonal potted flowers on a rooftop or terrace garden is easy enough, but growing trees requires a lot more attention especially with the soil. The soil must be light but nourishing, and it must not become waterlogged. As a result, a porous addition such as coco-peat and perlite is required to promote draining of excess water from pots.

- **Potting mix:** The potting mix can be prepared by taking equal portions of red sand, organic compost and coco peat. They are to be mixed well and left for a week or two to settle before using it in containers. The texture of potting mixture should be balanced and to keep the soil healthy organic fertilizers can be applied every now and then. It should be rich in nutrients as the roots have limited space to grow, adequate water retention due to limited size of pots, proper drainage of water to avoid logging, the soil should be of light weight to avoid excess weight on buildings, good microbial activity to keeps the plants healthy, help them to grow well and give good yields, free of pests and other pathogens and maintain optimum pH level between 6.0 to 7.0 in most cases.
- **Gardening tools:** These five gardening tools come in handy to start working on terrace garden and they are pocket friendly also. They include trowel, hose pipe or watering can, shovel, gardening rake and pruning scissor.
- **Sufficient access to water:** A terrace built at ground level should be simple enough to water with access to a hose or the ability to bring water to the containers. The utilization self-watering pots might be more carefree if your terrace is at an elevation. The other option is to build a drip irrigation system that will provide water to the plants. The plants are to be watered one to two times during summer months whereas during rainy season water can be avoided as excess water can drain the soil of its nutrients.
- **Perennial fruit Trees:** These should be planted in large grow-bags or durable plastic drums with 100 L capacity. The trees that can be grown in terrace gardens include sapota, guava, custard apple, citrus fruits like orange, lime and sweet lime, star fruit, gooseberry, bananas, rose apple, purple jamun, dragon fruit, mango, litchi and Indian jujube.
- **Tuberous plants and leafy greens:** The tuberous plants include sweet potatoes, potatoes, turmeric and ginger can all be grown separately in deep enough grow bags to accommodate tubers. The conventional spinach, mustard, coriander, methi, mint, amaran thus and lettuce along with Malabar spinach and Brazilian spinach.
- **Seasonal vegetables:** The regular seasonal plants can be placed in 3 X 4 rectangle feet with three to four feet depth. The wooden planks can be layered with plastic

roofing sheets to make these beds. Beans, brinjals, tomatoes, lady's finger, sponge gourd, ridge gourd, snake gourd, bitter gourd and bottle gourd can be cultivated in these beds. Curry leaf, as well as gourds, can be grown in small crates of 1 X 1 foot with depth of 2 feet.

- Vegetables should always be grown on the southern or western side of your terrace where they will receive enough of sunlight and thrive.

Benefits of terrace gardening:

These gardens provide us with fresh, pesticide-free fruits and vegetables. It helps to save money as 15-20 years before, 1 Kg of tomato costed Rs.5 and today its cost is around Rs.50/Kg. Similarly other vegetables cost too increased thereby causing increasing the expenditure of a family on vegetables and when grown on terrace this cost can be reduced. It aids in the collection of rainwater and produce medical plants and herbs, which adds to the aesthetic appeal of homes.

It helps us to keep in touch with nature and spending 15 – 20 min on terrace garden might help you relax and de-stress. Building a terrace garden helps in keeping the home cool specially for those living in tropical areas. All the plants growing on your terrace will create a micro-environment and will lower the temperature of the surroundings and save up on big bills from using ACs.

They help to reduce carbon footprint by improving the air quality. The farming done using chemicals may deteriorate the soil quality, pollute air and water bodies. It helps to stay fit as gardening is a great exercise, the number of efforts put into maintaining the garden will help to stay fit and active. The taking care of plants, watering them and other activities will keep you physically active and away from your everyday boring exercising routine.

Disadvantages of terrace gardening

When compared to the benefits, terrace gardening has very few drawbacks. Yet, there are certain problems in setting up a terrace garden which are as follows:

- Before starting the terrace garden, the terrace must be adequately water proofed, otherwise, the roof may leak causing severe damage to the roof.
- During rains, if the terrace does not have appropriate slope, water may become stagnant in between the plants thereby damaging the roof.

- Because the wind speed on the terrace is much higher than on ground level, suitable protection for plants is required to prevent them from being damaged.
- Due to the shedding of dry leaves, regular maintenance and cleaning is required.
- Pests and rodents are a real possibility if proper sanitation is not maintained.

Conclusion

Food and nutrition security can be increased by producing food at home or in a community garden, regardless of economic level for self-consumption. A greater level of food security could be obtained by introducing urban terrace gardening in future cities. However, both urban and rural agriculture must be considered in order to achieve global food security. Global food security cannot be attained just through urban horticulture. However, large-scale urban food production can relieve some of the pressure on rural agriculture. Urban horticulture could also aid in achieving a balance between rural and urban food availability. Although the importance rural agriculture can never be replaced, the globally developing urban horticulture can reduce burden to a certain extent and bring urban people to nature.

