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Balcony Gardening of Vegetable Crops

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Solanki Bal[1], Saheb Pal[2]

[1]Ph.D. Research Scholar, Department of Vegetable Science, Faculty of Horticulture, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal, India.

[2]Ph.D. Research Scholar, Division of Vegetable Crops, ICAR-Indian Institute of Horticultural Research (Outreach campus of ICAR-Indian Agricultural Research Institute, New Delhi) Hesaraghatta Lake Post, Bengaluru, Karnataka, India.

Introduction

Population explosion and migration of people towards urban areas have necessitated pressure on the basic requirements like food, water and shelter (Cohen 2006). The global population in urban areas has increased by more than 50% since 2010. Such uncontrolled population growth can also lead to hunger, poverty, malnutrition, social insecurity. These factors have spurred the development of peri-urban horticulture (Tacoli 2012; Van-Veenhuizen and Darso 2007) which is a form of gardening, be it either at the roof or balcony, helps in providing green spaces, improves the air-quality and mitigating urban heat (Saiz et al., 2006; Shashua-Bar et al., 2009). This kind of green urban architecture often regarded as 'Z Farming' i.e., Zero-acreage farming which synergies agriculture with a building (Specht et al., 2013). Z-farming helps in reducing pressure on agricultural land (Specht et al., 2013), urban energy footprint (De Zeeuw, 2011; Oberndorfer et al., 2007), serve as resource-saving system and a source climate change adaption (Specht et al., 2013). Thus Z-farming through balcony or roof gardening which is mostly prevalent in metropolitan regions provides sustainability in urban food production.

Since buildings in metropolitan cities are sparsely spaced, generally (Hui, 2011), balcony gardens provide green spaces, conceals unwanted pipelines and unappealing scenery of the buildings, boosts creativity and psychological benefits (Green 2004). Besides, it also uplifts the visual appearance of the buildings. But knowledge of such peri-urban production systems based on balcony gardens for vegetable crops are still lacking in India.

The Major reasons that drive the concept of such type of gardening are:
1. Recycling of city's wastes and using them as input
2. Production of food without the use of much chemical fertilizers and pesticides
3. Promotion of social learning.

Advantages of Balcony Vegetable Gardens

1. Enhancement in food security
2. Recycling of organic waste
3. Provides economic advantage for urban areas
4. Reduction of transportation emissions
5. Inspires planners and designers.

The Orientation of the Balcony Garden

The face of a balcony garden is the key factor as it modulates light conditions and the plants to be chosen. For any significant phase of time, in the northern hemisphere, south-facing balconies are likely to receive direct sunrays for the greater part of the day provided there are no obstructions of adjacent buildings, whereas, north-facing ones do not such necessary sunlight. East facing ones receives fairly intense sunlight from morning to till the noon. On the other side, west-facing one receives full afternoon sunrays.

Pots Required for Growing Vegetables on the Balcony

If one has to opt for balcony vegetable garden then earthen pots may be painted to ensure better aesthetic values. However, planting can also be done in barrels and modern designer containers. Seedlings of vegetables can be raised in a pro-tray or small containers and later can be transplanted in bigger containers to save space. Brinjal, pepper, peas and cherry tomatoes can be grown in medium-sized containers. Bigger containers can be used mainly for indeterminate tomatoes, cucumber and beans.

Vegetables Suitable for Balcony Garden

Under right conditions, any vegetable which can be grown in a backyard/kitchen garden can also thrive in a balcony

garden. However, the following crops are best suited:

1. Tomato: Tomatoes are one of the easiest one to grow in a balcony. If a balcony receives abundant sunlight for at least 6 hours, tomatoes can be grown. Seeds of tomatoes are to be sown in a pot with a minimum depth of 12 inches. If the aerial space is limited, a dwarf or determinate tomato variety can be chosen. Besides, cherry tomatoes can also be grown, as it is said to be nutritionally richer than the normal tomato and also fetches good yield.

2. Lettuce: Growing lettuce in the balconies is also easy. Lettuce plants grow very rapidly and the gardener has the opportunity to harvest them at regular intervals. It is a low temperature loving crop, so utmost care needs to be taken as per the climate. In warmer regions, one needs to start growing lettuce in the winter season. Seeds can be sown in pots with minimum 6 inches depth and spaces in between the plants should be 6 inches. Leaf lettuce can be grown closer as compared to head lettuce. It is to be kept in mind that, the soil should be well-drained and should be watered frequently.

3. Cucumber: Cucumber is a warm temperature loving crop that requires ample fertilizer and full sunight. If a good amount of space is available in the balconies then it is ideal to grow tall and climbing varieties rather than a dwarf and bushier ones to obtain a good yield. Tall varieties can be grown over a trellis in a container which is quite large in a space of 2 square feet.

4. Chilli and peppers: After tomatoes, chilli and peppers are also easier and also productive to grow in the balconies. It fetches good yield if they are placed properly in a sunny place with a perfect dose of fertilizer on time. Pots having at least 12 inches depth are best to grow chilli and pepper. As both of these crops are prone to diseases, it is required to monitor them regularly.

5. Carrot: The containers for growing carrots should sufficient depth to provide good space for the root growth. Choosing the right variety is of the utmost importance. The plants should be kept under slight to full sun along with regular watering to keep the soil moist. Excess watering should be avoided.

6. Radish: Radish can be grown in medium to even small-sized pots. While growing in the balcony, pots should be at a depth of 6 inches whereas for larger radish varieties pots having 10 inches depth should be used. Depending upon the container size, radish seeds are to be sown. Harvesting can be done within one or two months depending upon the varieties/types.

7. Beet: Beet root is the crop which grows rapidly and does not require large containers to grow. Containers having medium size with 10 inches depth are enough for growth. The soil to be used should be rich in compost and must be permeable.

8. Peas: Almost all the pea varieties are suitable for growing in containers in the balcony but the dwarf and bushy types are better. The containers should have 10 inches depth. The winter season should be selected for this crop for its proper growth and yield. The pot soil should be friable and moist.

9. Garlic: For garlic, at least four cloves are to be planted in a medium sized-pot and the pot should be left as such in a sunny area with slight watering. The garlic greens will start growing in a week or two. However, for harvesting the bulb, it takes around 5-6 months.

10. Brinjal: For growing brinjal in the balcony, large pot with 12 inches depth and enough space is required. It gives good yield if the pots are kept under 8 hours of sunlight.

Soil for Planting Balcony Vegetable Garden

Soil should be loose, fertile, well-drained and rich in nutrient elements. Sometimes ready-made potting mixture can be used. This may be perlite, vermiculite, peat moss and compost.

Mixing of slow-release organic fertilizer and hydrogel crystals give good results. Hydrogel crystals help to absorb excess water and later supplies the excess water to the plant root directly. These crystals are very much useful for this type of gardening as it saves both time and area. If possible, soil testing can be done to determine the soil type and their amendment. Soil pH is an important factor for plant growth. Generally, vegetables grow preferably at a pH of 6 to 7.

Preparation of Seedlings

For a balcony garden, vegetable seeds can be sown in the seed tray. After the germination process is accomplished, seedlings are to be transplanted when two real leaves are seen. Vegetable seedlings which do not transplant, it is

essential to transfer them on the separate pot. For the cucurbitaceous vegetables namely cucumber, squashes, gourds, melons which cannot bear damage to their roots on transplanting needs to plant them at the right location.

The depth of planting varies among crops. Tomatoes should be planted deeper as it fetches adventitious roots and strengthens plants. Lettuce or other leafy vegetables planted too deep cannot develop heads, whereas in case of celery too deep planting may impair roots.

Fertilization

There is no need to frequently fertilize the plants. Slow-release natural fertilizers if given once or twice in a season, plants grow gradually. Sometimes, the application of organic manure and compost to soil helps to boost the activity of micro-organisms.

Watering and Aftercare of a Balcony Vegetable Garden

Generally, no schedule for watering is required for the balcony vegetable gardens. In hot and dry weather conditions regular watering is recommended. Sometimes, a combination of sun and dry wind may dry out pots. For this purpose, installing a drip irrigation system will be helpful. Watering at night aggravates insect-pests and phyto-pathogens, so it is recommended to water the plants during the morning hours. The plants can be saved from different pests by apraying an organic pesticide like neem seed kernel extract @ 0.5%.

Disadvantages of Balcony Vegetable Gardens

1. Use of untreated wastewater can contaminate the vegetables and thus can lead to serious health hazards.
2. Technical issues while setting up the garden.

Additional Benefits

Gardens of such concept help to maintain micro-climate for bees, butterflies, birds and spiders. Besides, it helps in mitigating climate change, recreation and valuable leisure time for inhabitants in urban areas. It encourages local production and balances family expenditure on vegetables (Vazhacharickal and Gangopadhyay 2014).

Conclusion

The high density of buildings in urban and peri-urban areas has diminished greenery and has substantially enhanced anthropogenic heat. Urban or peri-urban horticulture, especially in the form of balcony gardening of vegetable crops will effectively contribute to evapotranspiration resulting in cooling effect and reduces urban heat. Such production systems in an integrated, community-based approach would not only feed the population and prevent malnutrition but would also have a great impact on the environmental, economic and social aspects.

References

1. Cohen B (2006). Urbanization in developing countries: current trends, future projections, and key challenges for sustainability. *Technology in Society*.**28**(1) 63-80.
2. De Zeeuw H (2011). Cities, climate change and urban agriculture. *Urban Agriculture Magazine* **25:**39- 42.
3. Green B (2004). *A guide to using plants on roofs, walls and pavements* (Greater London Authority, London).
4. Hui SC (2011). Green roof urban farming for buildings in high-density urban cities. In Hainan China World Green Roof Conference, Hainan China World Green Roof, Hainan, China.
5. Oberndorfer E, Lundholm J, Bass B, Coffman RR, Doshi H, Dunnett N, Gaffin S, Köhler M, Lui KKY and Rowe B (2007). Green roofs as urban ecosystems: ecological structures, functions, and services. *BioScience*. **57**(10):823-833.
6. Saiz S, Kennedy C, Bass B and Pressnail K (2006). Comparative life cycle assessment of standard and green roofs. *Environmental Science & Technology*.**40**(13):4312-4316.
7. Shashua-Bar L, Pearlmutter D and Erell E (2009). The cooling efficiency of urban landscape strategies in a hot dry climate. *Landscape and Urban Planning*.**92**(3):179-186.
8. Specht K, Siebert R, Hartmann I, Freisinger UB, Sawicka M, Werner A, Thomaier S, Henckel D, Walk H and Dierich A (2013). Urban agriculture of the future: an overview of sustainability aspects of food production in and on buildings. *Agriculture and Human Values* **31**(1):33-51.
9. Tacoli C (2012). Urbanization, gender and urban poverty: paid work and unpaid care work in the city. Human Settlement Group, *International Institute for Environment and Development* (IIED), London, UK.