

ROOFTOP ORGANIC VEGETABLE GARDEN: A SUSTAINABLE STEP TOWARDS FOOD AND NUTRITIONAL SECURITY

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ABSTRACT

Health risks are increasing at an alarming rate due to the consumption of commercial inorganic treated vegetables. The only way to avoid this is to maintain the right quality and nutritional levels in our daily diet by growing vegetables organically at home. Producing vegetables on terraces or rooftops is very important for city dwellers to get quality products free from harmful agrochemicals and poison. It is a replica of regular vegetable cultivation under well-controlled management. Nowadays, the popularity of these rooftop gardens is increasing among city dwellers due to various health benefits.



INTRODUCTION

Every year the population of our country is increasing, but there is a shortage of land to provide nutritious food for this growing population. Again, due to the lack of sufficient quality food, the people of our country have to face various health problems. However, it is possible to maintain the nutritional value of food by meeting daily needs by organically growing vegetables on the house's roof. According to ICMR, we should eat 300 grams of vegetables per day which consists of 125 grams of leafy vegetables, 100 grams of root vegetables and 75 grams of other vegetables. However, on average, we get 230 grams of vegetables every day. In order to fulfil this vegetable shortage, farmers are adopting strategies to increase yields by using more commercial inorganic fertilizers and pesticides to increase vegetable production. However, since large consumption of these agrochemicals is determinantal to human health, deadly diseases like cancer are increasing at an alarming rate.

The only way to avoid this is to maintain good quality and nutritional levels in our daily diet by growing vegetables organically at home. It will maintain our health and secure our food

demand. However, environmental pollution will decrease due to the use of pesticides and chemicals at lower levels.

In urban areas, households lack sufficient land within their boundaries to grow crops. One way is to use the house's roof to produce as many vegetables as possible to maintain the quality of food in the daily diet. It is a replica of normal vegetable cultivation, which is done through well-controlled management. Nowadays, the popularity of these rooftop gardens is increasing among city dwellers.



Fig 1: View of the rooftop vegetable garden

BENEFITS OF ROOFTOP VEGETABLE PRODUCTION

- 1) In the green roof garden, we can grow vegetables of our choice for our daily needs.
- 2) These crops help maintain our food's nutritional value by being wholly healthy and organically produced.
- 3) We have complete control over the application of fertilizers and various chemicals.
- 4) By this, we get good food materials at a very reasonable price and also reduce dependence on the market.
- 5) Vegetables from our controlled rooftop garden have the highest nutritional quality due to their freshness.
- 6) The biodiversity of the environment is preserved.
- 7) Our physical and mental health is well controlled due to spending our leisure time in garden activities.

8) Rooftop greenery makes the environment beautiful as well as healthy for the eyes.

DEMERITS OF ROOFTOP VEGETABLE PRODUCTION

- 1) Building a roof garden without prior planning puts extra pressure on the roof, which may damage the roof structure.
- 2) Irrigation water in the roof garden can cause damage to the roof and building due to a wet roof. Therefore, a proper water management approach should be adopted through proper planning in advance, and waterproofing should be done.
- 3) Starting a roof garden requires high financial planning and support.
- 4) In addition to daily work, additional labour must be invested in the roof garden for proper maintenance.

TYPES OF ROOFTOP GARDENS

1. Cultivation of crops directly on the house roof.
2. Growing crops in tubs and pots of different shapes and sizes.
3. A hydroponic system where cultivation of crops in water with dissolved plant nutrients.

PREPARATION OF ENRICHED SOIL FOR ROOFTOP GARDEN

To grow quality vegetables, we need fertile soil. So it is better to use light soil rich in good quality organic nutrients for the roof garden. Manure, compost, vermicompost, green manure and cocoa dust can be used. A mixture of three parts of loam soil, five parts of cow dung, one part of vermicompost and one part of cocoa dust is prepared to make fertile soil. Sometimes soilless media, such as *sphagnum* moss, vermiculite, coco dust, etc., can also be used for heavy-weight soil or organic matter. However, growing media with soil and compost has been found to be more profitable.

SELECTION OF TUB OR CONTAINER

In this case, different types of tubs or containers are used in the roof garden based on the size and shape of the crops. Among them, clay tubs, plastic or wooden boxes, half drums, multilayer boxes, etc. are more commonly used. In any case, the tub or other container must have a bottom hole to drain the excess water.

SELECTION OF VEGETABLES

Vegetables should be selected according to the consumer's preference and cultivation season. This vegetable cultivation continues throughout the year. While selecting the crops, keep in mind that vegetables like eggplant, tomato, gourd, cabbage, chilli, pumpkin, ridge gourd

and even cauliflower, broccoli, spinach, coriander, red amaranths, etc., are most suitable for the roof garden.



Fig 2: Ripened capsicum on a plastic pot

IRRIGATION AND POST-CARE MANAGEMENT

The irrigation process of a rooftop garden is very important. It needs to be controlled properly and with the right amount. High ventilation levels on the roof can lead to water shortages in the soil. So we have to be aware of using moderate irrigation in the rooftop garden. If there is a lack of water in the soil, crop plants cannot take up nutrients. As a result, nutritional deficiency symptoms are seen in crops. Generally, rose cans should be used for irrigation in roof gardens. Immediately after planting the seedlings in pots or tubs, the seedlings should be watered regularly for a few days for proper seedling establishment.

Excess water is also harmful to crops. Excess water prevents soil aeration and also increases fungal attacks. Hence additional water drainage system is of utmost necessity. However, regular irrigation compacts the soil, which reduces aeration around the plant's roots. As a result, the roots of the plants get destroyed, so every time after irrigation, the soil should be lightly mulched.

In the case of creeping plants like a gourd, cowpea, ridge gourd, bitter gourd, pointed gourd and other cucurbits, etc., support for climbing and spreading should be provided by making a bamboo loft. If creeping plants touch the soil, pollination may be inhibited and may even induce rotting. As a result, productivity is reduced.

Since rooftop gardens are located on the roof of the house, the presence or visit of bees or beneficial insects is very low, so low natural pollination occurs, resulting in yield reduction, so there is a need to pollinate the plants artificially.

NUTRIENT APPLICATION IN ROOFTOP VEGETABLE GARDEN

To provide nutrients to the rooftop garden, we can easily make a small amount of organic liquid manure at home like *panchagavya*, *sasyagavya*, *sanjeevani* etc. *Panchagavya*, requires five ingredients produced by cows, such as cow dung, cow urine, cow milk, cow curd and cow ghee, to be mixed in a specific ratio (5:3:2:2:1) and kept in an earthen pot or plastic bucket in the shade for 7-9 days for fermentation and mouth of the pot should be covered. Stir the mixture ten times in the morning and evening with a stick. Once prepared, it should be applied to the soil with irrigation water.

Green manure, vermicompost, and compost made from kitchen waste are excellent sources of nutrients and organic matter which can also be applied. These organic manures contain plant nutrients that plants can easily absorb

PEST AND DISEASE MANAGEMENT OF ROOFTOP ORGANIC GARDEN

Sticky yellow traps, sticky white traps and sex pheromone traps can be used to control insects. Also, homemade organic agro poisons like *dasaparni*, *nimastra*, *lohastra*, *bramastra*, *dasgavya*, neem/karanj leaf extract, wood ash, and kerosene oil can also be used to prevent plant diseases. To prepare *dasaparni*, the leaves of various plants that are not eaten by any animal, such as neem, karanji, papaya, lantana, jatropha, custard apple, oleander, negundo, etc., are taken in equal quantities and purified twice as much of the mixture. Add water and boil the mixture to half the amount. Grind the leaves well, mix them with cow urine 4-5 times, and keep them for 8-10 days. Strain this liquid mixture well and put it in a glass container, and the lid should be closed. This mixture can be mixed with ten times water and used as an insecticide when needed.

CONCLUSION

Under rooftop gardening, any vegetable can be produced as per season, which will be healthy and safe for consumption. Furthermore, these vegetables will be free from agrochemicals, so they will not cause harmful diseases among humans. In addition, the quality of the product will be great as they will be of high nutritive value.

BIBLIOGRAPHY

Cotthem. W.V.(2005). 'Rooftop gardening, a big step to the future'. Presentation at first international summit for afforestation roof gardens in China.

Dhar, Anannya.(2022). '*Barir chade shak-sobji*'(in Bengali). *Samajsiksha: Krishi sonkhya* (in Bengali). Pp: 152-154, 02/06/2022

Kumar, V., Ansari. MT, Ramjan. And Angami. (2019). 'Rooftop Vegetable Garden-A new concept of urban agriculture'. *Agriculture and Food: e-newsletter*: 1(4): 109-112.