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Vegetable Production Using Zero Land for Food and Nutrition

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Abstract

Vegetables sold in cities nowadays are produced by the sides of the roads and railway tracks using polluted waste water which leads to ill health and malnutrition of the urban people. One of the ways to reduce the degree of illness and malnutrition in urban people is the production of vegetables in the cities itself using clean water and zero land. Ground lands have become very scarce in big cities nowadays and therefore big apartments are becoming the favorable places to live by the people. The terrace land of the apartments (The zero land) can be utilized for producing the vegetables as per the requirements of the people of apartment and also for selling to the surrounding people for economic returns. The management of vegetable production program can be handled by the management committee of the apartment itself. An effort has been made in this paper to present the various possible ways of producing flowers & vegetables using zero land & fresh water in the urban and peri-urban areas. Technical information regarding economically minimum zero land required per person for producing his daily vegetable requirement in all seasons, number of plants required to produce vegetables per person along with some other requirements have been presented in this paper which can be of great help to the users.

Introduction

20% of undernourished people live in cities. In these urban areas, many people are going hungry due to monetary factors such as unemployment and high housing costs (Mayors, 2010). Around the world, nonprofit organizations such as food banks are attempting to feed the hungry by directly giving them food as an immediate relief to under-nutrition. However, these organizations are not able to supply the growing demand from over 185 million hungry people (FAO, 2010 and Shaw, p 395). Urban agriculture can help supply food to undernourished populations in cities as one alternative to an increased import of produce.

Advantages of Rooftop Gardening (One Type of Zero Land Cultivation)

1. Green roofs can help in the absorption of carbon dioxide and help reduce air pollution.
2. Storm water runoff, flooding and water pollution can be reduced.
3. The building and surrounding area's aesthetics will be enhanced
4. Economically, there are no additional land costs.
5. Temperatures around the building can be lowered in the summer.
6. A building can be further insulated from the cold in the winter.
7. The roof life can be extended by protecting it from various weather conditions.
8. Heating and cooling bills will be reduced.
9. The rooftop garden space can be used for food production.

Rooftop Garden Types

There are two types of rooftop gardens and depending on the structural design of your roof,

1. Extensive rooftop gardens:

- a. Generally lightweight gardens.
- b. Require little or no maintenance.
- c. Vegetation acts like another layer of the roofing material and usually covers the entire roof can be installed on both flat and sloped roofs.
- d. Depending on climate and the amount of rainfall, can grow a variety of hardy grasses, wild flowers, mosses and sedums.
- e. Use drought-tolerant plants that will go into hibernation if exposed to harsh conditions like wind and sun exposure and/or under-watery condition.

f. Since they are not generally walked upon, guard rails, exit requirements and access need not be a concern. If they will be walked on, these aspects need to be considered.

2. Intensive rooftop gardens:

- a. Allow for a more diverse plant selection such as perennial flowers, trees and shrubs (all of which can remain in containers over the winter) and the potential to grow food.
- b. Generally installed on flat roofs with the vegetation either covering the entire area or in containers and raised beds.
- c. A stronger roof structure is required due to the added weight of people accessing the garden as well as higher soil and container weights, decking and trees all adding to the weight impact to the roof.

Things to Consider

1. Weight capacity.
2. Exposure.
3. Wind and sun protection.
4. Access and safety.
5. Roof properties and drainage.

What You'll Need

1. Soil:

- a. Light weight soil. Due to the weight of soil, especially wet soil, it is best to use lighter soils such as perlite, vermiculite, peat moss, coconut husk fibre and rockwool pad (a Danish product that can completely replace soil without harming the plant)—these add bulk without jeopardizing the stability of the plants.
- b. Fertilizers. If you use these types of soil, they need to be mixed with fertilizers, preferably organic ones, to ensure the survival of your plants.
- c. Minimum soil. Many plants do not need 12 inches of soil for healthy growth so use a minimum amount of soil as possible. Select plants that require less soil depth such as ones with shallow and spreading roots.

2. Water:

- a. Water access. Water on the roof is ideal—i.e., a water tap.
- b. Water pressure. Moderate to high water pressure is preferable. If the water pressure is low, there may not be enough force to have a long drip system or soaker hose. In this case, several shorter hoses on separate zones would get water to all the plants.
- c. Drip irrigation system. This is an effective way to get a steady amount of moisture to your plants and can be put on a timer for efficiency and lower maintenance.

3. Plants: Hardy or indigenous plants. Use plants of these varieties, as they are more capable of withstanding the harsh climate conditions of a rooftop such as sun, wind, rain fall & soil depth.

4. Containers:

- a. Appropriate containers. Although terra cotta pots look good, they are too porous to conserve water under rooftop conditions. Plastic pots do a much better job.
- b. Do not use anything smaller than 20 cm (8 inches) in diameter because there isn't enough soil mass relative to the exposed surface area in a small container to hold much moisture for very long.

References

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