# Water Resource Engineering

# Report

*Review 3*

J-Component

# ROOFTOP FARMING USING CAPILLARY IRRIGATION TECHNIQUE

-Presented By


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# INTRODUCTION

The practice of cultivating food on the rooftop of buildings is sometimes referred to as rooftop farming. In this project we explore Capillary Watering Systems that take advantage of the capillary action from Capillary Matting to ensure the plants have access to a controlled supply of water.

# PROJECT OBJECTIVES:-

In this current era some of the major problems that we face in the world are pollution, food shortages and water scarcity. As a simple solution to this we think rooftop farming or gardening might be a great answer, as rooftops are one of the most non-utilised spaces and to think the positive impact on the environment that this could have if more people adopt rooftop farming or gardening. To remove the stigma against rooftop farming and make an irrigation method by using house hold materials to make an affordable capillary mat so as to make gardening in rooftops cheap and convenient. Also case studies and research papers will be studied to determine and analyse viability of capillary matsin large scale.

# METHODOLOGY:-

## SUPPLIES NEEDED

- Plastic tray
- 1-inch-thick piece of Styrofoam
- Scissors or utility knife
- Wool/Cotton/Felt blanket, sweater or scarf
- Nails or thumbtacks
- Pots or seed trays with drainage holes in the bottom
- Water

## BUILDING THE CAPILLARY MATTING

- Cut Styrofoam to fit inside plastic tray, with about 1 inch on all sides to spare.
- Cut wool to fit Styrofoam but leave the wool long enough on two ends to hang down under so it can absorb the water.
- Use nails or tacks to fasten the wool to the Styrofoam.
- Place wool-covered Styrofoam in the tray, wool side up.
- Fill the tray with water, making sure that the blanket is saturated without being totally submersed in the water. The wool will absorb the water as needed, provided it is hanging down on the ends and touching the water.
- Place pots and/or seed trays on top of wool-covered Styrofoam and let them absorb the proper amount of water.

Place a bucket or pot of water near the capillary matting setup and dip the part of wool hanging out of the setup so as for capillary action to take place.

# DISCUSSION AND RESULTS:-

Based on the data reviewed from case studies and research, water availability is clearly not a problem in current irrigation methods nor are the current watering methods that involve a mix of overhead and hand watering. This contention is supported by the fact that very little plant material is discarded because of inappropriate watering. In addition, in most cases do not anticipate water to be a problem in the future, and the suitability of the capillary mat can be affected by the lack of standardized plant material. Since in the case of large scale capillary mat irrigation they might contain materials from a variety of nurseries, types of containers and soil mixtures will have a high degree of variability. If containers do not have bottom holes and/or the soil mixture is too coarse, the capillary mat will not work effectively. Therefore, using the capillary mat must be simple, enhance displays, and not cause major operating changes that would raise the cost of doing business. The cost of the mat itself is another factor.

Whereas capillary mats are popular in the small scale retail nursery and with many home gardeners. The uniquely designed mats provide automated irrigation to a variety of plants, conserve water, and reduce the need for labour-intensive hand-watering. The mats help minimize evaporation while allowing water to move from the bottom of the mat up into the containers on top. Also studies show that capillary mats required 71% less water in summer and 62% less in winter compared to the plants watered using overhead irrigation systems.

One advantage of capillary mats is that plants of different size and water requirement can be placed on the same mat without under- or over- watering individual containers. Other reasons mats are preferred to overhead sprinklers are that mats leave less water on the floor that’s wasted, and people don't have to spend as much time watering plants. Also use of this highly convenient because of the fact that you don’t have to water the plant regularly and only need to fill the water source almost only once a week.

The major downside is capillary mats can be an expensive system to set up and maintain in response to which we made an affordable capillary mat watering system which is suitable for rooftop/home gardening

# CONCLUSION:-

The use of capillary mats for large scale and business purposes is defiantly not a viable option but its use in regular house hold is for gardening, growing vegetables is recommended as these improve the convenience and improves ease of maintenance of plants while in the same time being sustainable by saving water.