

## 2. Sprinkler Irrigation

Sprinkler irrigation is a modern method where water is sprayed into the air and falls on crops like natural rainfall. This system uses pipes and rotating sprinkler heads to distribute water evenly across the field. It is highly suitable for vegetable crops such as cabbage, carrot, onion, and leafy greens. It is also useful in orchards like citrus and groundnut fields. Sprinklers provide uniform water distribution, ensuring all plants receive equal moisture. This method works well in sandy and uneven soils where traditional irrigation is difficult. It helps save labor, time, and improves irrigation efficiency. For example, farmers use portable sprinklers in vegetable farms for quick and effective watering. Sprinkler irrigation improves crop growth, maintains soil moisture, and increases overall productivity.



## 3. Mulching

Mulching is the practice of covering the soil surface with materials like plastic sheets, straw, dry leaves, or other organic matter. This cover acts as a protective layer that helps conserve soil moisture by reducing direct evaporation. It is widely used in vegetable crops such as tomato, chilli, and strawberry. In fruit crops like mango and pomegranate, mulching is applied around the tree basin to retain moisture. Plastic mulching is very effective in drip-irrigated crops, while straw mulch is commonly used in organic farming. Mulching also controls weed growth by blocking sunlight. It helps maintain proper soil temperature, keeping roots cool in summer and warm in winter. This creates a better environment for root development. As a result, mulching improves crop growth, yield, and water-use efficiency.

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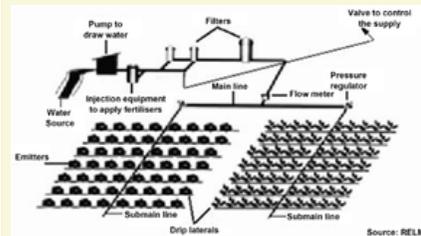
## INTRODUCTION

Water is one of the most valuable resources in fruit and vegetable production, as it directly affects crop growth and yield. However, irregular rainfall, climate change, and rising water demand have created serious water scarcity problems for farmers. Limited water availability can reduce productivity and increase production risks. Water-saving technologies help farmers use water more efficiently and avoid unnecessary wastage. Methods such as drip irrigation, mulching, and rainwater harvesting improve water use efficiency. These practices ensure that plants receive the right amount of water at the right time. They also help maintain soil moisture and improve crop quality. By conserving water, farmers can reduce costs and increase profitability. Therefore, water-saving technologies are essential for sustainable and successful horticulture.

### Major Water-Saving Technologies

#### 1. Drip Irrigation

Drip irrigation is a modern irrigation method that delivers water slowly and directly to the plant root zone through pipes and small emitters. This system provides precise watering, ensuring that plants receive the exact amount of moisture they need. It greatly reduces water loss caused by evaporation, runoff, and deep percolation. For example, in crops like tomato, chilli, and cucumber, drip irrigation improves plant growth and fruit quality. In fruit crops such as pomegranate, grapes, and mango, it helps produce bigger and better-quality fruits. This method can save about 40-70% of water compared to traditional irrigation. It also reduces weed growth because only the crop root area receives water. Fertilizers can be applied easily through drip (fertigation), increasing nutrient efficiency. Farmers benefit from higher yield, lower water use, and better profit. Therefore, drip irrigation is one of the best water-saving technologies for modern horticulture.



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कोटा, राजस्थान



## Water-Saving Technologies in Fruit and Vegetable Crops

संकलन

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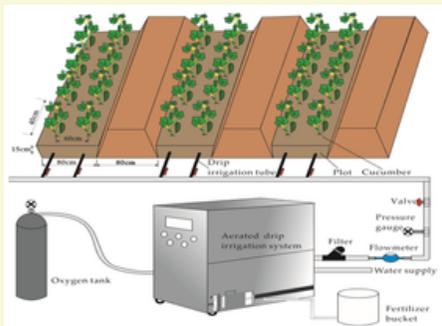
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#### 4. Fertigation

Fertigation is the method of applying fertilizers along with irrigation water, mainly through drip irrigation systems. In this technique, fertilizers are dissolved in water and supplied directly to the plant root zone. This ensures that plants receive nutrients in the right amount and at the right time. Fertigation is widely used in crops like tomato, cucumber, capsicum, grapes, and mango. It helps save both water and fertilizers by reducing losses. Nutrients are delivered directly to the roots, which improves nutrient absorption. This increases fertilizer use efficiency and reduces wastage. It also promotes faster plant growth, better yield, and improved crop quality. Fertigation is an important technology for efficient and profitable horticulture.



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#### 5. Rainwater Harvesting

Rainwater harvesting is the practice of collecting and storing rainwater in tanks, ponds, or farm reservoirs for future use. This stored water can be used for irrigation during dry periods or water shortage. Farmers commonly construct farm ponds or lined reservoirs to store rainwater. For example, orchard growers use stored rainwater for mango, pomegranate, and vegetable crops. This method provides a reliable water source during drought conditions. It also reduces dependence on groundwater and helps maintain water balance. Rainwater harvesting is a low-cost and eco-friendly technology. It improves water availability, supports crop growth, and promotes sustainable horticulture.



#### Importance in Fruit and Vegetable Crops

Water-saving technologies are highly beneficial in crops like mango, pomegranate, citrus, tomato, chilli, and cucumber. These methods ensure proper plant growth, early fruiting, higher yield, and better quality produce.

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#### CONCLUSION

Water-saving technologies are the future of modern horticulture as they help farmers use every drop of water efficiently. Methods like drip irrigation deliver water directly to roots, reducing wastage. Mulching helps conserve soil moisture and improves plant growth. Fertigation ensures efficient use of water and fertilizers together. Rainwater harvesting provides water during dry periods and reduces groundwater use. These technologies help farmers reduce production costs and increase income. They also protect valuable water resources and ensure sustainable farming for future generations.

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