



Key Role of Vertical Farming in Horticulture

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Vertical Farms is a multi-story building with an environment suitable for growing non-food crops such as fruits, vegetables, biofuels, medicines and vaccines. Vertical farms use the same technology that makes high-tech greenhouses successful. Vertical farming (VF) is a form of controlled environment agriculture (CEA).

Vertical Farming is a modern form of farming. New technologies are also gradually being introduced to increase productivity and improve product quality. There is no doubt that these technologies will boost agriculture.

Vertical Farming is a unique concept of growing food in harmony with indoor, urban and managed farming. Vertical farming involves constant monitoring and adjustment of production factors such as temperature, lighting, nutrients, irrigation and air circulation.

Vertical farming is the cultivation of crops in vertically stacked layers. Vertical farming soils can use hydroponics or aeroponics cultivation methods. Vertical farming is used when the available arable land is scarce. Such places are mountain towns, deserts, and cities that grow different kinds of fruits and vegetables. Most commercial vertical farms are made inside buildings, some inside greenhouses, and crop shading produces unique crops

Methods Used in Vertical Farming

There are three methods of vertical farming in India: hydroponics, aeroponics and aquaponics. These three terms are explained below. So let's see.

Hydroponics - Hydroponics uses the nutrients in water to grow food without soil. This method protects food from soil-related problems such as pests, insects and diseases.

Aeroponics - Aeroponics uses very little water. Food grows with moisture and nutrients. As you know, in vertical farming, the plates are connected to the supports, so water and nutrients are sprayed on the roots.

Aquaponics – Aquaponics is a method of combining plants and fish in the same ecosystem. In this method, fish are raised in indoor ponds fed with nutrient-rich waste.



Advantages of Vertical Farming

- The first advantage of vertical farming is that all areas are properly utilized for food production.
 - As you know, in traditional agriculture, food is grown seasonally. And in vertical farming, food is produced all year round.
 - Vertical farming reduces transportation costs.
 - At least 70-95% more water is used compared to traditional farming
 - Vertical farming uses 90% soil or no soil, so there are no problems with pests or other diseases.
 - 's organic food is produced using vertical farming as it is free of pesticides and air pollution.
1. **Year-round crop production:** Unaffected by the weather, you can achieve stable crop production all year round without being affected by bad weather. Cultivation in a safe, climate-controlled environment allows for repeatable and programmable crop production. Technology enables automation to shorten harvest times and improve yields without compromising taste or quality.
 2. **Better Use of Space:** Traditional farms require fertile farmland and lots of it. Vertical farms can be designed and built in any climate and location, regardless of weather conditions and temperature extremes. Vertical cultivation allows higher productivity in a relatively small space. One hectare of vertical farm is equivalent to 10 to 20 hectares on a soil basis, depending on the crops grown.
 3. **More Sustainable Than Underfloor Farming:** Indoor farming is greener because it reduces the amount of fossil fuels needed for farm equipment. And while utility bills can be expensive, solar power helps reduce costs to the environment. Vertical farming improves biodiversity without disturbing the land surface and helps increase the population of native animals that live on and around farms.
 4. **Reducing Resource Waste:** With proper management and practices, growing crops in vertical farms can eliminate the need for pesticides. Pests cannot easily enter a controlled environment to cause parasitism, and fungal diseases cannot survive when humidity is regulated. Farms use much less water than traditional farms. Water is reused and very little water is wasted.
 5. **Reduced transportation costs:** Being able to grow crops closer to the customer's place of residence is a major advantage of vertical farming



Disadvantages of Vertical Farming

- Vertical farming setup costs are very high.
- Since traditional agriculture grows crops with natural light, the cost of producing artificial light is higher than traditional agriculture.
- Vertical farming requires trained personnel.
- Vertical farming requires proper disposal of waste.
- Vertical farming presents a problem of temperature maintenance in summer due to the large amount of heat generated by the LED lights.

Crops Suitable for Vertical Farming in India

As a farmer, you need to decide which crops to grow. Therefore, it is necessary to study market demand and production costs to select crops.

There are some small vertical plants.

- Lettuce
- Broccoli
- Amaranthus
- Tubers, etc.

Medium-sized vertical plants include:

- Cabbage
- Cauliflower
- Tomato
- Eggplant, etc.

Some Big Size Vertical Crops

- Corn
- Corn, etc.

Conclusion

Vertical Farms is a multi-story building with an environment suitable for growing non-food crops such as fruits, vegetables, biofuels, medicines and vaccines. Vertical farms use the same technology that makes high-tech greenhouses successful. Vertical farming (VF) is a form of controlled environment agriculture (CEA). Unaffected by the weather, you can achieve stable crop production all year round without being affected by bad weather. Cultivation in a safe, climate-controlled environment allows for repeatable and programmable crop production. Technology enables automation to shorten harvest times and improve yields without compromising taste or quality.

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