



# Vertical Farming: A Way Toward Smart Agriculture

**Mahendra Jadia<sup>1\*</sup>, Nidhi Singh<sup>2</sup>, Ajay Singh<sup>3</sup> and Namita Singh<sup>4</sup>**

<sup>1,2,3,4</sup>SOAS, LNCTU, Bhopal

**Corresponding Author:** [mahendrajadia89@gmail.com](mailto:mahendrajadia89@gmail.com)

## Introduction

Term “vertical farming” coined by Gilbert Ellis Bailey in 1915 and its modern concept was proposed in 1999 by Professor Dickson Despommier. The major concept was growing vegetables in urban areas as this technique utilized less space. Vertical farming means growing or cultivating crop plants vertically in stacked layers and in vertically inclined surfaces. This vertical stacking reduces land requirement for cultivation. This technique also gives rises to other modern techniques of cultivation like hydroponics, aeroponics, aquaponics etc.

This method is also a way toward sustainable agriculture as efficiency of cultivation has been increased and also confers recycling of water. Additionally it has more potential to face climate change environmental degradation. Hence, this technique is more sustainable in compare to other technique and also provides a better platform to meet rising food demand.

Traditional farming is associated with pollution and environmental degradation. With the expanding human population, demand for food consumption is also increasing side by side. To meet this demand, dependency on farming has been increased. Hence, there is a need to improve farming techniques such as use of green house, poly-house, terrace farming, urban agriculture, soil less cultivation

and vertical farming. These modern farming techniques are associated with plenty number of advantages over traditional methods. Vertical farming provides better platform to move toward smart agriculture especially in urban areas, as plantation is done vertically stacked in layers, which not only minimize space but also save energy and water requirement. In this article, we are discussing various techniques of vertical farming and advantages associated with this innovative method.

## Methods

Various techniques of vertical farming includes hydroponics, aeroponics, aquaponics etc.

### A. Hydroponics

It is a method of soil-less cultivation. Growing medium is provided to plants. This method is associated with plenty number of advantages. Soil related problem associated with cultivation is also reduced.

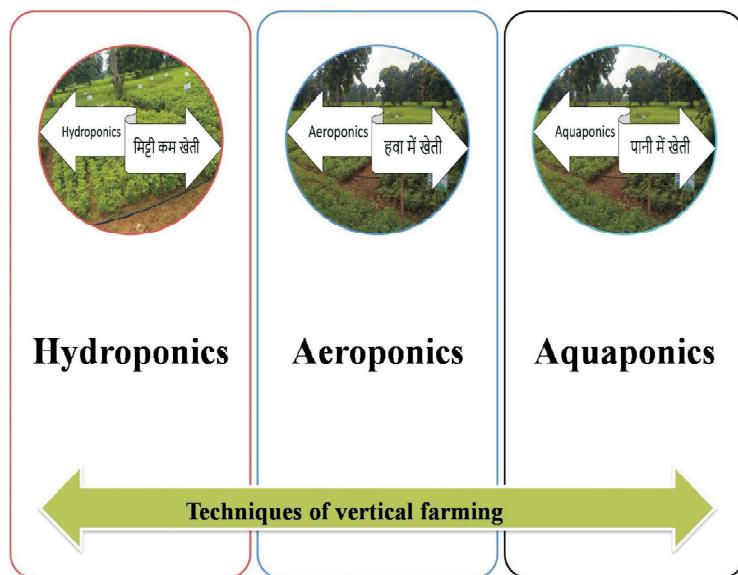
### B. Aeroponics

Method of growing plants in air. Nutrient solution provides growth medium to plants. This method also requires less space, less water. It is also one of the kind of soil-less cultivation.

### C. Aquaponics

In this method both aquaculture and hydroponics is combined. Both plants and fish are cultured symbiotically. Nutrient-rich waste

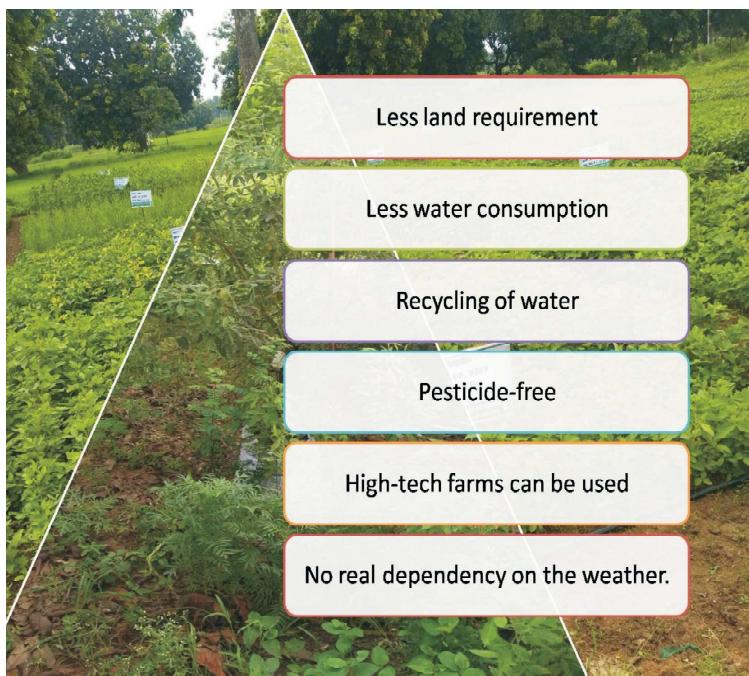
from fish tank is used as hydroponic fertilizer.



**Figure 1: Technique of Vertical farming**

### Benefits of Vertical Farming

Vertical Farming has several advantages like less land requirement; water consumption is 80 percent less, recycling of water, pesticide-free.



**Figure 2: Advantages of Vertical farming**

### Drawbacks of vertical farming

- a. Investment for establishing the vertical farming system is very high.
- b. Requires highly automated and remote controlled system.
- c. Skilled labor is required.

### Conclusion

Vertical farming system provides better platform to city people to carry out urban agriculture. Not only it helps in meeting increasing food demand but also help in facing environmental degradation problem. Several innovative models can be initiated using this farming technique and major issues related with cultivation can be solved. Cultivation of fruits, vegetables, flowers can be achieved efficiently via vertical farming.

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