

Hydroponics: Soil-less Farming Technique

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SUMMARY

Nowadays, hydroponic farming is very trendy because it gives us organic products. This can be very helpful in areas where water is scarce. In addition, the water can be reused to grow plants. The plants obtained from this technique are rich in nutrients and free from toxins.

INTRODUCTION

The word "Hydroponics" is derived from the words "hydros" meaning water and "ponos" meaning hard work or work. This is an agricultural technique where crops are grown in a nutrient solution completely without soil. Soilless agriculture can be defined as growing of plants in a controlled environment in different medium other than nutrient rich soil. Hydroponics is always a soilless method of growing, but not all soilless farming methods are hydroponic methods of growing plants. "Hydroponics" is growing plants without soil. The term soilless farming includes all types of soilless growing technology. With soilless growing, the plant is grown in an inert medium, where the plant receives nothing from the medium. Plants get only what you give them and nothing else. Have full control over pH, nutrient content, and nutrient strength. Hydroponic techniques are used to identify deficiency symptoms of various nutrients in plants and to find out which nutrients are essential for plant growth and development.

Objectives

- Create favourable conditions for agricultural management.
- Eliminate the waste of vegetables at harvest caused by pathogens.
- Increase the growth rate of the plant which increases the frequency of harvest and profit.
- Increased profits allow for reinvestment and expansion.
- Substantial expansion creates jobs and raises living standards.
- Eliminate seasonal dependence due to controlled climate inside the greenhouse. This increases profits because certain vegetables are not available in the market during certain seasons.

Types of Hydroponics

There are six basic types of hydroponic systems which are as follows-

Wick System: The wick system is probably the easiest type of hydroponic system to use and it requires very little effort to maintain. It's a completely passive system, so it doesn't have moving parts to keep up.

Drip System: Another popular and versatile type of hydroponic system is the drip system. It is similar to ebb and flow system, where the nutrient solution is placed separately in a reservoir and the plants are grown separately in a soilless medium. Unlike other types of hydroponic systems, drip systems distribute nutrients at a very slow rate, through nozzles. Any additional solution can be collected and recirculated or simply allowed to drain immediately. Since the flow rate of the dripper can be adjusted, it is possible to grow a number of plants using this technique.

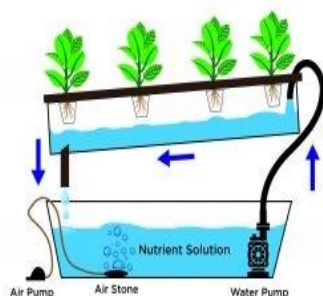
Ebb and Flow System: This type of hydroponic system uses growing trays and tanks filled with nutrient solution. A pump periodically floods the growing tray with nutrient solution, which then drains out slowly. This allows the plant to receive a regular infusion of nutrients without the need for special oxygen. Since plants do not tolerate waterlogging, they must be grown in a medium such as rockwool or gravel. Plants that require a lot of moisture can be grown in vermiculite or coir as they retain more moisture between floods.

Deep Water Culture System: The water culture system has a simple hydroponic setup where the plants are in direct contact with the nutrient solution. Just like in a drip system, air pumps and stones are used to keep oxygen circulating in the solution. Very thirsty plants, or fast-growing plants, work very well in this type of system.

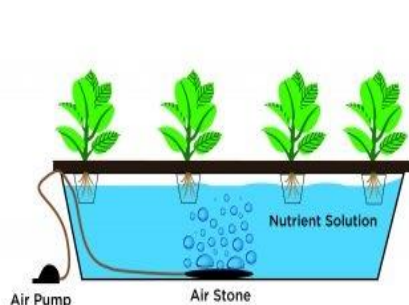
Nutrient Film Technique: This type of hydroponic system provides a steady stream of nutrient solution directly to exposed the plant roots, because the system uses a pump 24 hours/day, there is no need for a timer. In addition, no medium is required to support nutrient exposure. The plants are held in place by a basket.

Aeroponics: This is one of the most sophisticated and high-tech methods that involves hanging plants through special nozzles that spray a nutrient solution directly onto the roots. This provides the roots a light coating of nutrients in every few minutes. Similar to other pump-based systems, aeroponics systems need to be monitored for pump failures.

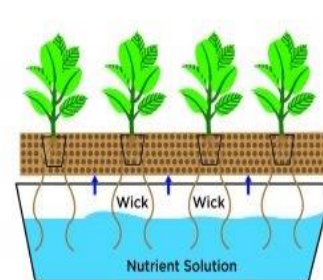
Nutrient Film Technique



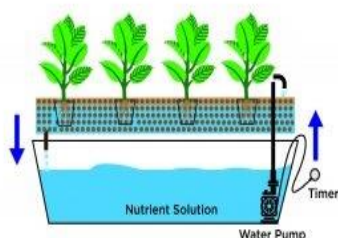
Deep Water Culture (DWC)



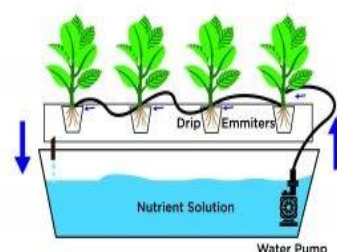
Wick System



Ebb and Flow



Drip System



Aeroponics

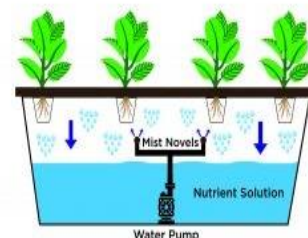


Fig.- Different Types of Hydroponic Systems

Advantages of Hydroponic Farming

Hydroponic farming techniques have been applied since ancient times. An example is the Hanging Gardens of Babylon. Growing plants hydroponically has many advantages such as-

- Plants grow faster so yields are high.
- Can be grown anywhere, like underground, on rooftops and in greenhouses.
- Can plant trees where traditional agriculture is not possible.
- Water and nutrients are recycled and reused.
- Organic food can be produced without the use of chemical fertilizers or pesticides.
- Hydroponics is widely used in space research programmes. Hydroponics can be used to grow food away from the ground where soil is not readily available.

Disadvantages of Hydroponic Farming

- High start-up investment.
- Requires expert technical knowledge.
- Waterborne diseases spread rapidly.

CONCLUSION

Plants can be grown anywhere with a small area, better control of plant growth, no tilling, less work with soilless farming, water and nutrients are conserved, reducing pest and disease problems, reducing shock when seedlings are transplanted *i.e.*, transplanting shock, are the benefits of no-land agriculture.

REFERENCES

- Resh, H. M. & Howard, M. (2012). Hydroponic Food Production: A Definitive Guidebook for the Advanced Home Gardener and the Commercial Hydroponic Grower.
- Texier, W. (2015). Hydroponics for Everybody - All about Home Horticulture. Mama Publishing, English Edition, Paris, pp. 235.