



HYDROPONICS - Farming without Land

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<https://doi.org/10.5281/zenodo.7516758>

Hydroponics

Our agricultural system has to meet a huge task by 2050. We need to increase the food production by about 70% to meet the caloric needs of the global population of 9.8 billion. Nearly 90% of the population are urban. The number of resources used by traditional agriculture is enormous where the crop production has also saturated sufficiently. Intensification and expansion of land for cultivation is the only viable option to meet the growing needs.

Globally 70% of water usage is for agriculture because of unsustainable irrigation practice. By 2050, nearly 593 million ha of land has to be transformed into agricultural land. This outlook places essential ecosystems at risk of being destroyed. One of the alternatives is Hydroponics, farming system without soil and land (which was earlier called water culture) which offers solutions to the detriments of current agricultural problems.

What is Hydroponics?

Hydroponic is an art of growing plants, without soil, utilizing solutions of mineral supplements in water. In hydroponic culture, supplements in the aqueous form is used to nourish the plants. It ensures the recurrence of providing the supplements to the plants. This technique can be applied in mixed farming also. This technique can also be classified as a protected cultivation technique. The substrates used are inert materials as, coir pith, rock wool, perlite, vermiculite etc. furl support of the roots of plants.

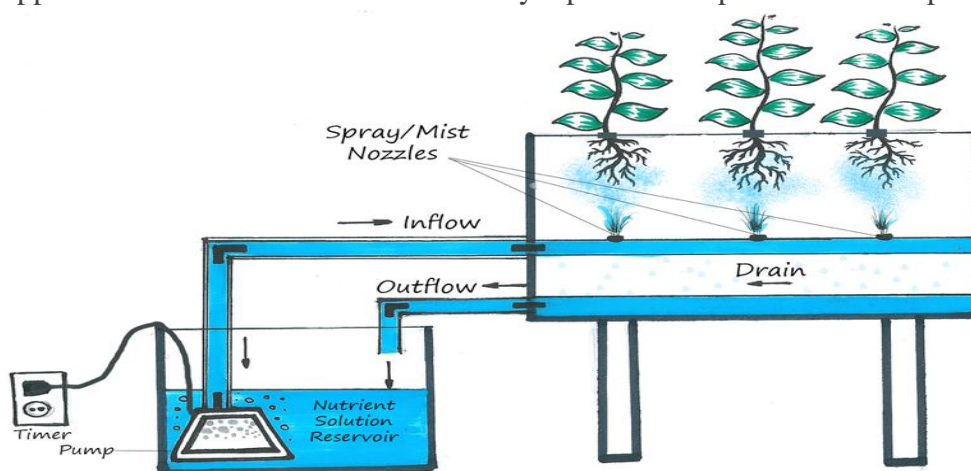


Types of Hydroponics Farming

1. Aeroponics System

With this type of system, the plants that we wish to grow will be suspended in air. A couple of mist nozzles are positioned below the plants. These nozzles will spray the nutrient solution onto the roots of each plant, which has proven to be a very effective hydroponic method.

The mist nozzles are connected directly to the water pump. When the pressure increases in the pump, the solution is sprayed with any excess falling down into the reservoir below. The plants are fed with supplement loaded mist; The roots are held in a soilless inert substrates like coco coir. Supplement loaded water is intermittently siphoned for plants to develop.



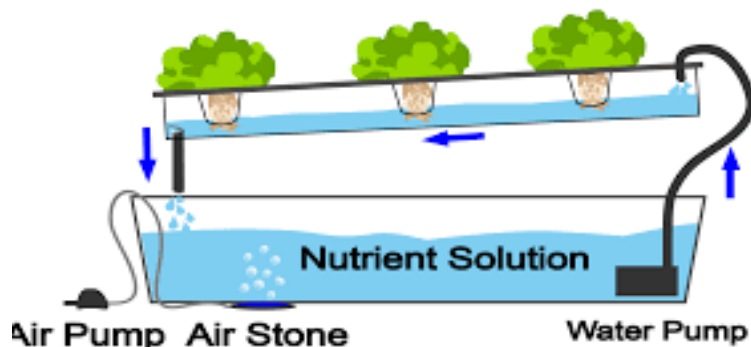
2. Nutrient Film Technique

The nutrient solution is placed into a large reservoir. From here, the solution is pumped into sloped channels that allow the excess nutrients to flow back into the reservoir. When the nutrient solution is sent into the channel, it flows down the slope and over the roots of each plant to provide the right amount of nutrients.

It is recommended with plants that have smaller roots. Even though this system can't readily accommodate larger plants, it does scale well, which means that you can alter it to allow for the growth of a large number of plants at the same time. Since it scales well, this system is commonly used by commercial growers alongside home growers.



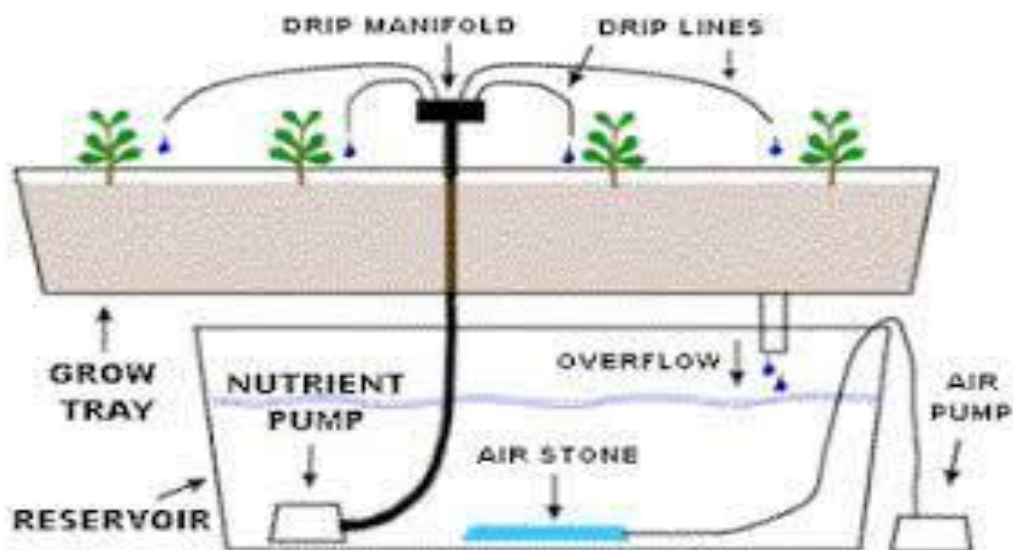
Nutrient Film Technique



3. Drip Hydroponic System

A drip system is an easy-to-use hydroponic system that can be quickly altered for different types of plants, which makes this a great system for any grower who plans to make regular changes. The nutrient solution that's used with a drip system is pumped into a tube that sends the solution straight to the plant base. At the end of each tube is a drip emitter that controls how much solution is placed into the plant. We can adjust the flow to meet the needs of each individual plant.

These systems can be as small or large as we want them to be. They can also be circulating or non-circulating systems.



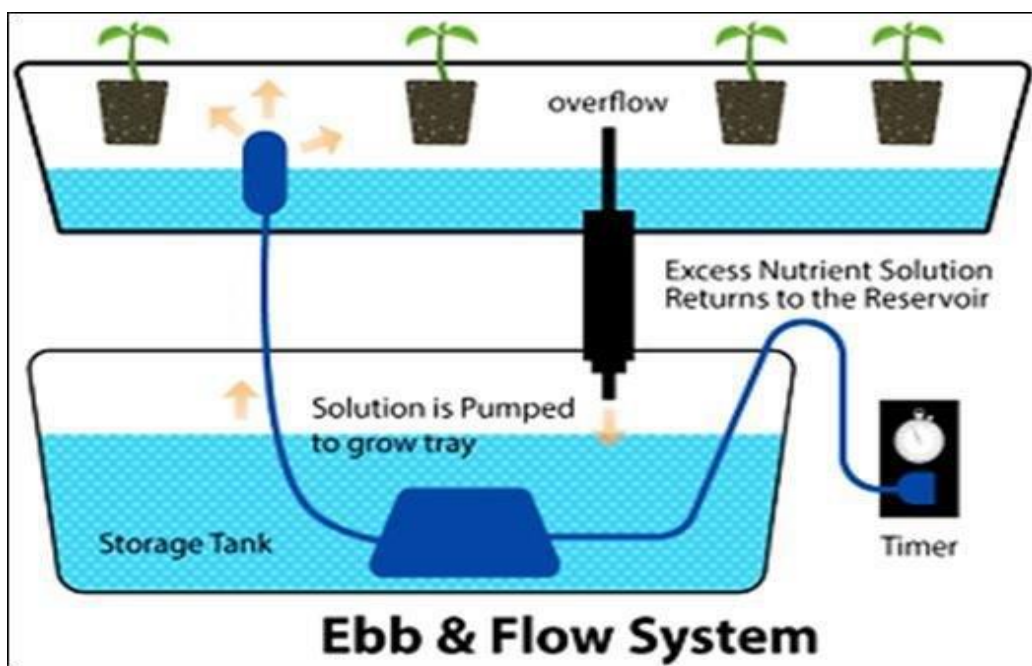
4. Ebb and Flow

The ebb and flow system is mainly used among home gardeners. With this type of system, the plants are positioned in a spacious grow bed that's packed with a grow medium like rockwool or perlite.



Once the plants are carefully planted, the grow bed will be flooded with a nutrient-rich solution until the water reaches a couple inches below the top layer of the grow medium, which ensures that the solution doesn't overflow.

The ebb and flow system has been found to be effective at growing nearly all types of plants, which includes certain root vegetables like carrots and radishes. However, With the Ebb and Flow framework type, you position the plants in an extensive developing bed. This bed is loaded with a developing medium like perlite or Rockwool.



5. Wick Hydroponic System

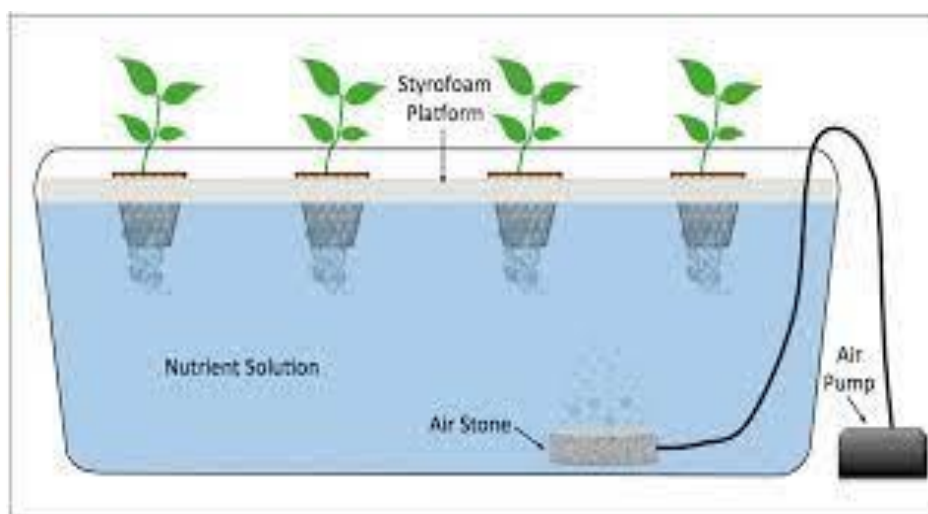
The wick system is the simplest type of hydroponic system to grow plants, The plants are placed directly within an absorbent substance like perlite or vermiculite. Nylon wicks are positioned around the plants before being sent straight down into the nutrient solution. The system is ideal for small garden plants and herbs. Any plant that doesn't require a substantial amount of water will grow well in this specific system.





6. Deep Water Culture

In water culture system the roots of the plant are placed directly into the nutrient solution. The best aspect of the water culture system is that as the plant roots are placed directly into the nutrient system, that the nutrients can be easily absorbed by the plants. Because of the direct access to nutrients and oxygen, plants that are grown with the water culture method will grow very quickly. It is very easy to make and works well with any kind of plant. Even large plants with sizable foot systems will grow quickly with this method. The only potential issue with this hydroponic system is the development of root diseases, which is caused by dirty growing conditions.



Hydroponic farming in the backyard.

- 1. Wick hydroponics** the plants are placed directly within an absorbent substance like perlite or vermiculite. Nylon wicks are positioned around the plants before being sent straight down into the nutrient solution. The system is ideal for small garden plants and herbs





- 2. Vertical Hydroponics** Vertical hydroponic frameworks give an incredible choice to nursery workers lacking space. Attempt to utilize reused materials to assemble the framework and hydroponics framework can be made.



- 3. Aquaponics** A small corner garden or an unused space can be transformed into a flourishing aquaponics farm for vegetables and fish. An aquaponics framework joins components of hydroponics and aquaculture in a cooperative climate.

Benefits of Hydroponic Farming

1. Less Space Utilization

A hydroponic plantation needs less space than plants filled in soil. When hydroponic farming joins with vertical cultivating strategies, they can utilize close to 100% less ground than regular cultivating processes.

2. Less Labor force

Cultural operations like ploughing, herbicide, weeding and insect poison application, and other work concentrated farmer occupations are not needed. Hydroponics farming offers a lighter burden for workers. It can be done with far fewer worker hours. This reduces the expense of



delivering harvests and saves time for different pursuits. Hydroponic farming can be done with less maintenance of labor force.

3. No Soil

With new hydroponic technology, farmers can develop whatever harvests would be generally useful to their local area without worrying about soil degradation.

4. Faster Growth

With hydroponic farming, supplements are all the more effectively accessible for the plant to assimilate. The cultivator can handle light, heat, supplements, hydration, bugs, and any remaining parts of the developing system. 3-10 times more crops obtained. 7 -14 times more growth cycles achieved.

5. Nutrient rich crops

Hydroponics can be grown year long. Food that ages typically, on the plant, more supplements and better taste. Produce High biomass and protein