Hydroponic Systems for Beginners

Hydroponic Gardening Systems for Beginners :

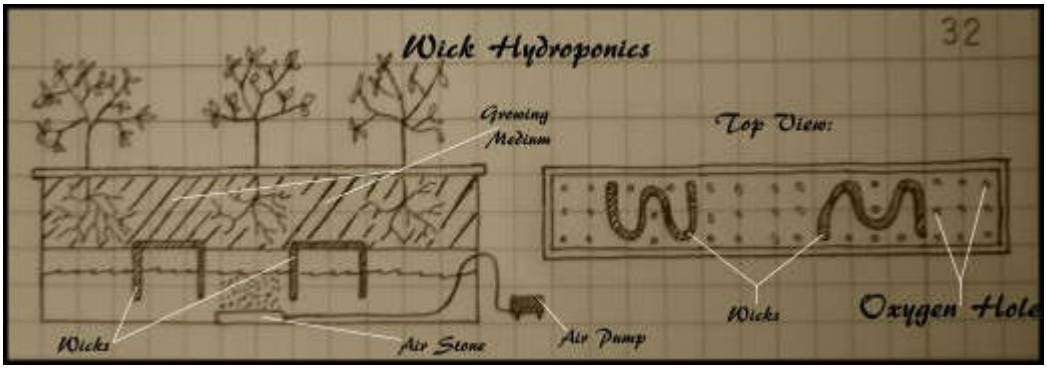
Hydroponic gardening is a technique used for growing fruits, vegetables and ornamentals in a soil-less environment. Since there is no soil involved, hydroponic gardens are perfect for gardeners who are limited by space, but still wish to achieve dense growth and large yields. Hydroponic systems are especially appealing to urban gardeners and greenhouse productions, but can be easily built on a small scale to fit any size garden. This article will overview the benefits of hydroponic gardening and will dig deep into the most recognized and popular hydroponic systems for beginners.

Benefits of Hydroponics:

1. Hydroponic gardens are perfect for those with limited space. These soil-less gardens allow the gardener to utilize rooftop, deck, patio and many other spaces where soil is not a reasonable option.
2. Cost efficiency is maximized using hydroponic systems. Most hydroponic systems recycle water and nutrients, allowing the user to less water per foot of garden than soil. Many of the growing mediums used in hydroponics can be recycled, unlike soil where it needs to be replenished yearly.
3. Urban gardeners are able to avoid toxins and pollutants that may exist in densely populated neighbourhoods. Even if you don't use chemical pesticides or fertilizers, neighbours may not feel the same way, leaving chemicals to leach into your garden.
4. Plants are freed from the pests and diseases commonly associated with soil.
5. Faster growth and higher yields can be achieved in hydroponics.
6. If the correct techniques and nutrients are used, vegetables and fruits grown in hydroponics are biologically and nutritionally equal to their soil grown counterparts.

Choosing a Hydroponic System:

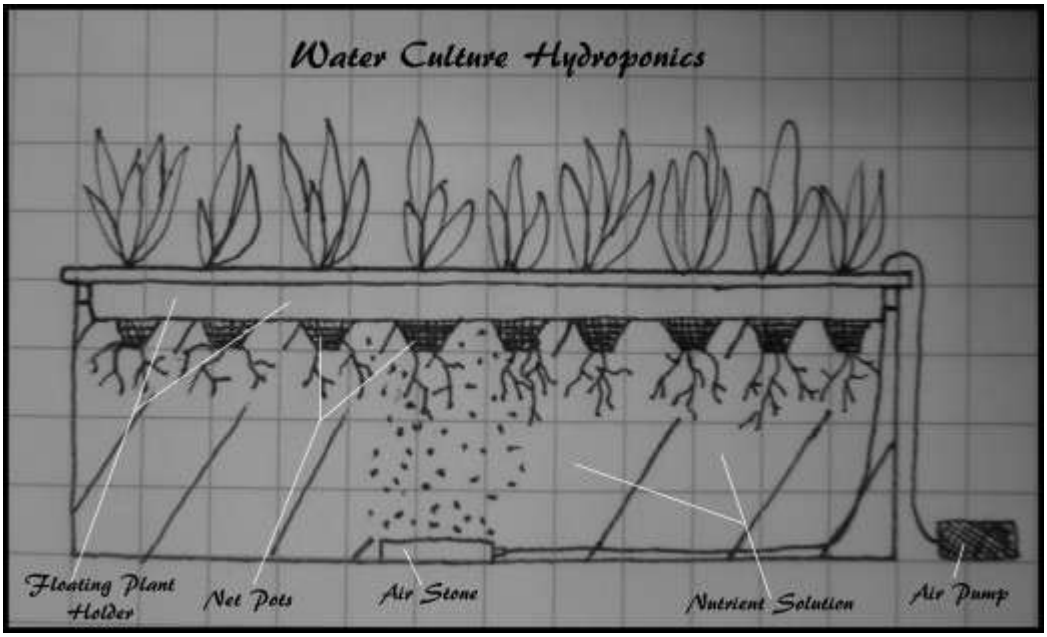
With so many **hydroponic systems for beginners**, its sometimes is overwhelming just starting off. Do not fear, hydroponic gardens are easily learned and enjoyable. Each system can be modified to fit individual specific plans. Here's a detailed look into the most recognized hydroponic systems:



Overall, wick hydroponic systems remain a tried and true form of growing soil-less crops. It is a low maintenance system that can be made to fit a variety of sizes. Even the smallest micro-garden can be setup using the wick method. The major drawback to using the wick system is the chance of the medium becoming too wet. Even using coco fibre, the roots can still risk the chance of becoming oversaturated. If moisture levels can be properly balanced, wick systems are a great way to grow herbs and lettuce

- Wick Hydroponics

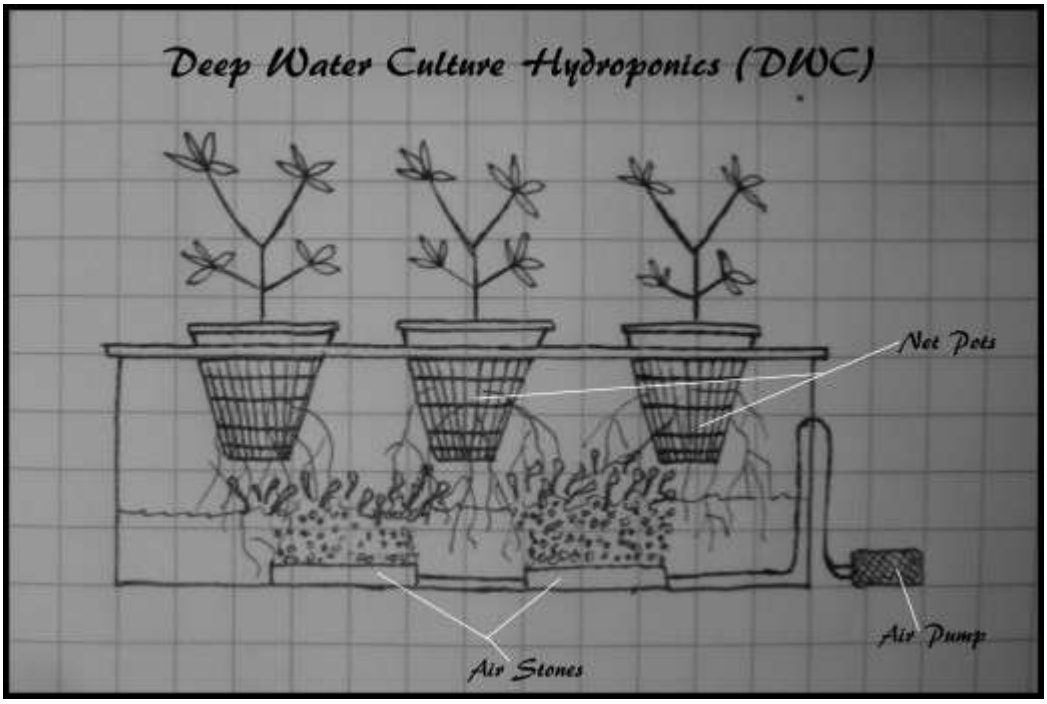
Hydroponics with a wick is known as a passive system. This means that there are no moving parts involved in the process of feeding water to the roots. In a wick system, a shallow (6-10") grow tray is placed on top of an equally sized reservoir. The bottom of the grow tray is drilled to allow wicks and oxygen to move freely between the grow medium and reservoir. The water wicks are placed so that the ends are suspended in the nutrient solution, keeping water constantly moving passively to the growing medium and roots. When considering wick systems, always be sure to use an air pump, placing an air stone inside of the reservoir. Not only will the air stone keep fresh oxygen moving towards the roots, it will also keep the reservoir water from becoming stagnant and anaerobic. The best medium to use in this system is expanded coconut fibre. This medium will distribute water evenly through capillary action as it comes from the wicks, but will not over saturate the roots. Other growing mediums such as sand, perlite and vermiculite can be utilized, but oftentimes, these mediums will saturate the roots, choking them of oxygen. The perfect wicks are called water wicks and can be purchased at hydroponic stores locally and online.



Overall, water culture systems are a great way to grow lettuce and other water loving plants, but they will not sustain larger vegetable crops.

- Water Culture Hydroponics

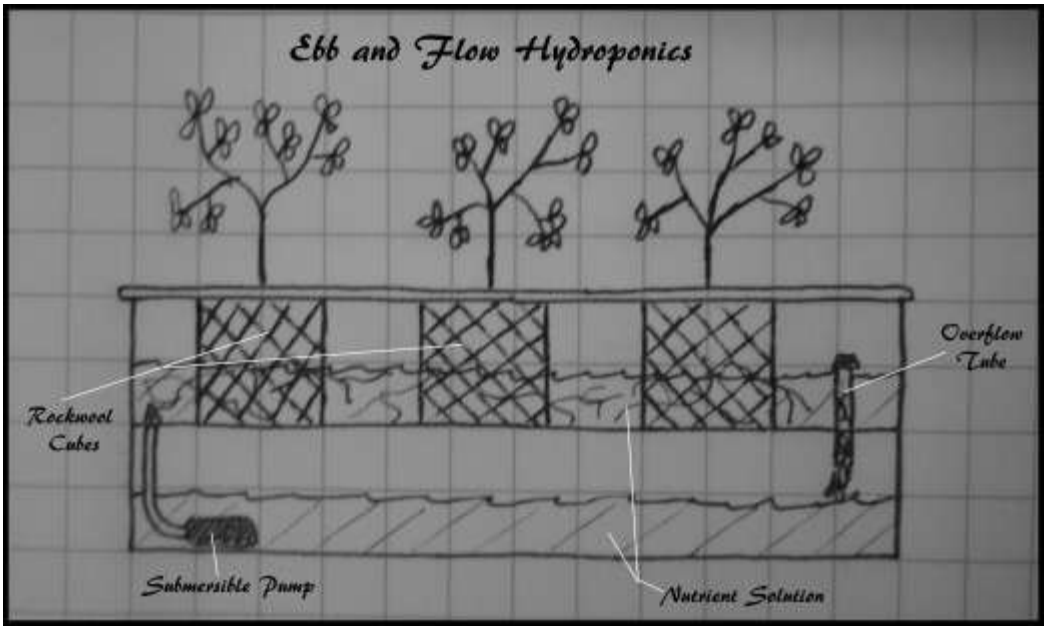
The water culture method is the simplest of all the active systems of hydroponics. Although water culture is limited mainly to lettuce growing, it remains a popular cultivation method. Plants are grown floating directly on top of the nutrient solution. This is achieved by using Styrofoam as the floating base, and net pots filled with hydroton or crushed shale to support the growing plants. Under the floating containers, in the nutrient solution is an air stone, powered by an air pump. Bubbles provided by the air stone will keep the nutrient solution constantly moving and provide optimum oxygen levels for growing root complexes.



Overall, deep water culture hydroponics is a very efficient system that enables the user to grow just about any flora desired. The only downside to the system is that the design is difficult to use on a large scale. In very large containers, it becomes increasingly difficult to provide enough air power to keep oxygen levels optimized. Beginners are encouraged to experiment with DWC, as the basics of hydroponics can be easily learned using this simplistic, but high yielding system.

- Deep Water Culture (DWC)

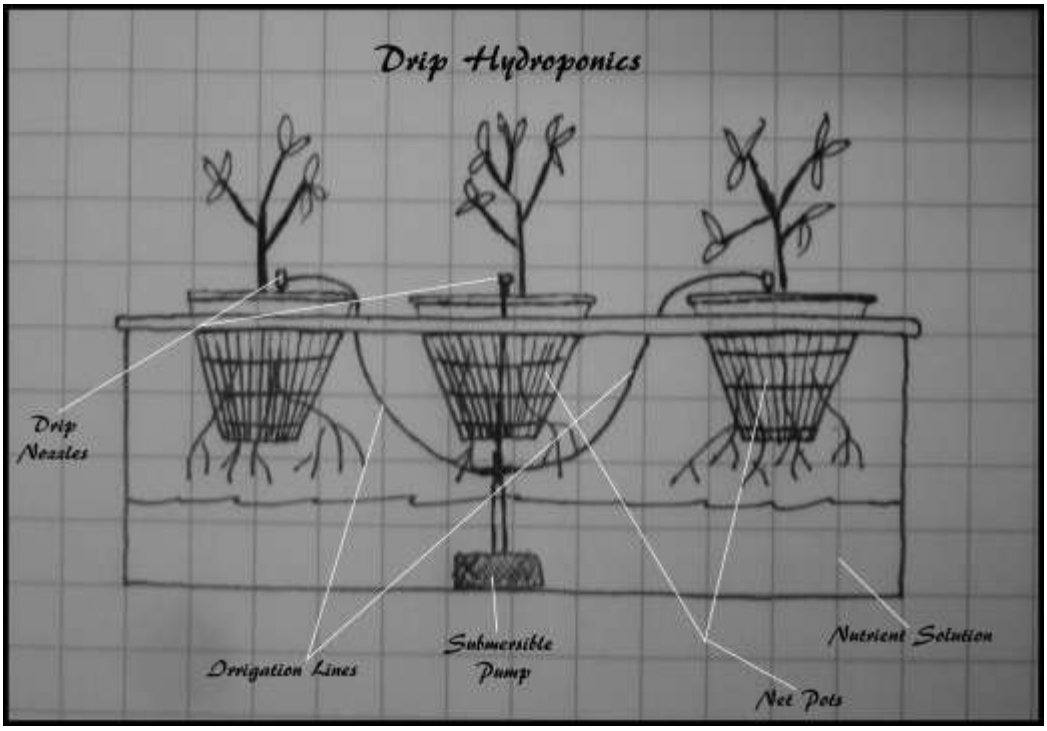
A technique derived from water culture, deep water hydroponics has become one of the most accepted and widely used systems today. DWC systems suspend plants in net cups over a nutrient solution in the reservoir. Heavily powered air stones create an oxygen rich, humid environment, perfect for roots. As plants mature in DWC, their roots will reach down into the oxygenated reservoir water. Deep water systems are very easy to build, making them inexpensive do-it-yourself projects. The key to making the most of this system is to have an air pump or pumps that really get the water moving. The air stones in the water should be releasing enough air to disturb the surface enough to consistently splash root systems. If the pump is too weak, plants will not receive the oxygen they need for optimized growth. Once the correct current is reached, DWC systems are perfect for growing herbs, fruits, vegetables and a multitude of other flora.



Overall ebb and flow systems offer the user the ability to have a hands free system that requires very little maintenance once up and running. The technique can be adapted to micro and large-scale gardens alike. The only downside to this technique is that the initial costs can be more expensive than other systems. A submersible pump(s), and a multifunctional timer add additional costs, making it much more expensive than wick and DWC systems. If the initial costs can be afforded, ebb and flow hydroponic systems are very rewarding!

-Ebb and Flow

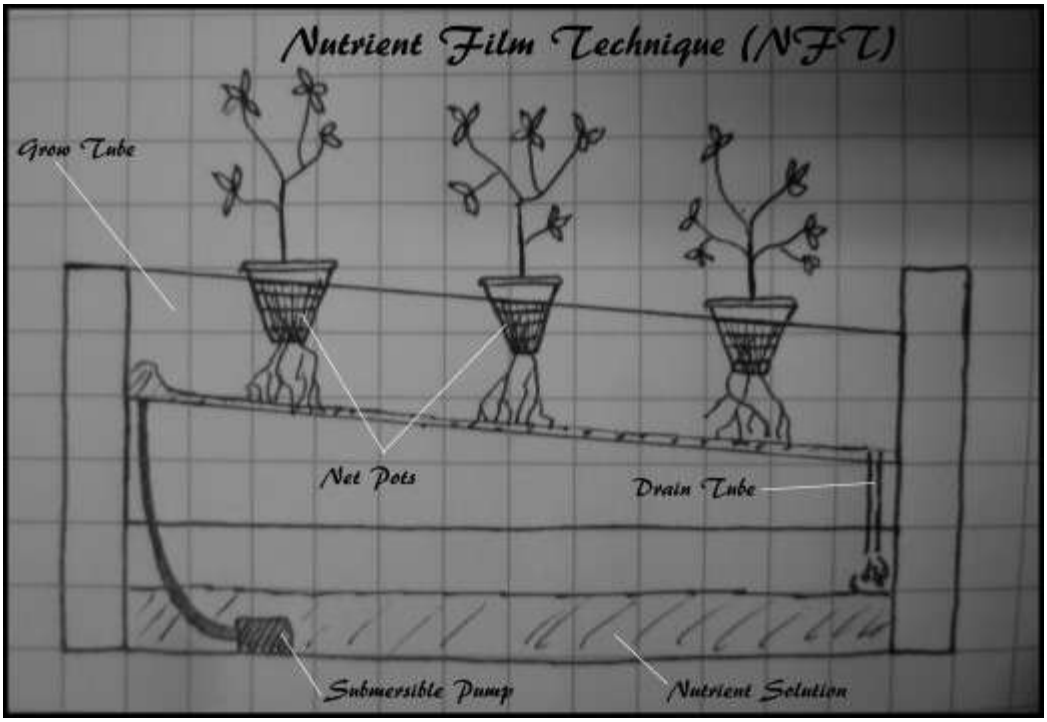
Ebb and flow systems are the first of the active-recovery techniques. These systems are very popular among indoor gardeners because they are ideal for growing plants under 30" in height. In an ebb and flow system, plants are grown in Rockwool cubes or net pots filled with hydroton. The cubes or net pots are positioned in a flood tray above the reservoir. A submersible pump located in the reservoir is run for a short period a few times daily, flooding the tray to the level set forth by the overflow tube. After the pump has run for 10-15 minutes, the nutrient solution will drain back into the reservoir, pulling fresh oxygen to the roots in the process. The amount of times you will need to run the pump daily will depend on species grown, medium used and humidity levels. It will take some experimenting before you get the right flooding schedule. The key is to keep the growing medium moist at all times, but never drying out or remaining too saturated. One important principle to having a smoothly running system is having a submersible pump with power capable of moving water out of the reservoir and into the flood tray. Most aquarium pumps are perfect for small ebb and flow systems, while pond pumps may be needed to power larger outdoor gardens. Make sure to look at the capable “head” on the pump. This is the estimated number of feet the submersible pump is able to move water upwards. The head should be rated 2-3 times the length used for the nutrient solution supply line. *Tip: If the pump is rated in psi, multiply by 2.31 to find the head length. In order to keep the flood tray from actually flooding over, a recovery overflow tube is used to direct flow back into the reservoir. The height of the overflow tube will determine the height of the nutrient solution in the flood tray. For example, if using 4" Rockwool cubes, you will want an overflow tube height of 2 inches.



Overall, drip hydroponics allows the user more freedom to adjust and fine tune to any plant specifications. The rate of dripping can be controlled to maintain both water loving and finicky feeding plants. The disadvantage to using the drip system is the routine maintenance. Users of the drip system will find out for themselves that irrigation lines and drip nozzles will have to be cleaned regularly in order to avoid nutrient build-up and clogs. Compared to ebb and flow systems, drip hydroponics will allow the user greater control over watering and will allow gardeners to grow larger crops.

- Drip Hydroponics

The drip system technique of hydroponics is very similar in design to a deep water culture system. Similarly, the plants are suspended over a reservoir filled with nutrient solution. The main difference is that plants are top fed through the use of a submersible pump, irrigation lines and drip nozzles. Once the roots reach the nutrient solution, an air stone can be placed into the reservoir, creating a mixture of deep water culture and drip hydroponics. Drip systems are perfect for larger plants, as they are able to supply crops with constant moisture and oxygen running through the growing medium. Since roots are not flooded, the submersible pump is allowed to run all the time, eliminating the use of an expensive timer. The water moving up the pump is controlled by the drip nozzles. The drip nozzles are usually located near the base of each plant stem. Adjusting nozzles to the right drip speed will ensure plants receive just the right amount of nutrient solution. When using the drip system, the most trusted growing mediums are hydroton and expanded coconut fibre. These mediums will stay moist under the constant dripping, but also maintain the proper aeration properties for optimized growth.



Overall, the NFT hydroponic system is a great, less expensive option to other hydroponic methods. Since only a pump is involved, NFT is a low maintenance and hands free system of growing on a large scale. The downfall to the NFT system comes in the form of electrical outages. If the shallow stream in the grow tube is not kept constant, roots can quickly dry out. Most large scale operations will have a backup generator, but the small indoor gardener may not have the luxury. If the unexpected electrical outage can be covered, NFT systems are an efficient way to growing a large amount of crops.

- Nutrient Film Technique (NFT)

This is the hydroponic system that most people imagine when they are asked to think of hydroponics. There is a good reason for this too, as the nutrient film technique is the most popular hydroponic system used in large-scale outdoor and greenhouse productions. Plants are suspended in a grow tube where the roots are allowed to dangle into the shallow, but steady nutrient stream provided from a submersible pump in the reservoir below. When constructing the NFT system, the grow tubs are built to be slightly slanted so that water is always moving downwards back into the reservoir for recycling. The grow tube will provide the roots with an oxygen rich environment perfect for root growth.