

Soilless Gardening

Demystifying Hydroponics farming

Since the Garden of Eden, farming has been a fundamental component of man's psyche. However, I would like to pose a bit and ask a simple question, is it really possible to grow crops without soil?

The answer is a resounding YES! This technology of soilless gardening is otherwise referred to as Hydroponics farming. By definition, Hydroponics is a subset of hydro culture and is a method of growing plants using mineral nutrient solutions, in water, without soil. Terrestrial plants may be grown with their roots in the mineral nutrient solution only or in an inert medium, such as perlite, gravel, mineral wool, expanded clay pebbles or coconut husk. (<http://en.wikipedia.org/wiki/Hydroponics>)

Many different civilizations from the beginning of time have

relied on hydroponics for growing plants, such as the early Mexican and Egyptian civilizations. However, recently growing hydroponically has grown in popularity and use across many different markets.

Researchers discovered in the 18th century that plants absorb essential mineral nutrients as inorganic ions in water. In natural conditions, soil acts as a mineral nutrient reservoir but the soil itself is not essential to plant growth. When the mineral nutrients in the soil dissolve in water, plant roots are able to absorb them. When the required mineral nutrients are introduced into a plant's water supply artificially, soil is no longer required for the plant to thrive. Almost any terrestrial plant will grow with hydroponics. Hydroponics is also a standard technique in biology research and teaching.



Types of Hydroponic growing Systems

There are six different types of hydroponic growing systems, they are: Aeroponic, Drip, Ebb and Flow, N.F.T, Water Culture and Wick.

Aeroponic Growing System

It is one of the most high tech growing systems whose growing medium is primarily air. The roots hang in the air and are misted with nutrients every few minutes. For you to practice aeroponics favourably you will need: Reservoir Pump and Spray Nozzles Grow Media Nutrient Solutions pH and EC/TDS controller. A TDS meter is really just an electrical conductivity (EC) meter that has a built-in conversion factor that displays the output in parts per million (ppm) of total dissolved solids (TDS). The trouble is that the relationship between the conductivity of a solution and its content varies not only by the concentration of the dissolved ions, but is also based upon the charge and mobility of the dissolved ionic species.'

Hydroponic Drip Growing System

This is the most widely used type of hydroponic

systems. A timer controls a submersed pump that releases a nutrient solution onto the base of each plant. In a Recovery Drip System, the excess nutrient solution is collected and reused; it is more sustainable; however the pH and nutrient strength levels may vary because the nutrient solution is reused.

On the other hand, a Non-Recovery Drip System does not collect the excess solution and must have a precise timer to ensure that the least amount of nutrient solution is wasted.

Requirement: you will need a water reservoir for example a tank, a Pump for fertilized water, enough Drip manifold and lines with Grow tray and media. You will also need nutrient solution an air pump and diffuser in addition to a pH and EC/TDS controller.

Ebb and Flow Growing System

This system works by temporarily flooding the grow tray with nutrient solution and then draining the solution back into the reservoir, which is controlled by a submersed pump on a timer. Several times a day, the timer comes



on and allows the pump to release the nutrient solution into the grow tray, when the timer shuts off the nutrient solution is collected back into the reservoir. The system can be modified in many ways such as filling the grow tray with grow rocks or gravel.

One main disadvantage of this system is the possibility of a power outage and/or pump timer failures, due to the growing medium that is used

For a successful Ebb and Flow system a farmer requires; A Water reservoir and pump for fertilized water, grow tray and median nutrient solutions, air pump and diffuser in addition to a pH and EC/TDS Monitor.

Nutrient Film Technique (N.F.T.) Growing is the most commonly thought of hydroponic system because it has a constant flow of nutrients, therefore no timer is needed for the submerged pump. The nutrient solution is pumped into the grow tray over the plant roots and is then drained into the reservoir. The

only grow medium that is used is air and the plants are typically supported in small plastic baskets, with the roots dangling into the nutrient solution

As a disadvantage too, this system faces the possibility of power outages and pump failures

The requirements for this system resemble those for Ebb and Flow hydroponics.

Water Culture Growing System is a very simple to use hydroponic system with a Styrofoam platform typically holds the plants and floats on the nutrient solution. Similarly, an air pump is used to supply air to a bubbling stone that releases the nutrient solution and supplies oxygen to the plant roots

Leaf lettuce is the predominant plant grown in this type of system; very few other plants grow well in the Water Culture System.

Wick Growing System is perceived to be the simplest of all hydroponic systems, being a passive system, meaning it has no moving parts where the nutrient solution is released into the grow tray

through a wick. There are several different growing mediums that can be used in this hydroponic system

What you'll need: Water reservoir, Grow tray and media, Air pump and diffuser, Nutrient solutions, pH and EC/TDS testers (<http://www.hannainst.com/hydroponics/>)

Today, hydroponics is an established branch of agronomy. Progress has been rapid, and results obtained in various countries have proved it to be thoroughly practical and to have very definite advantages over conventional methods of horticulture.

There are two chief merits of the soil-less cultivation of plants. First, hydroponics may potentially produce much higher crop yields. Also, hydroponics can be used in places where in-ground agriculture or gardening is not possible.

Disadvantages

Without soil as a buffer, any failure to the hydroponic system leads to rapid plant death. Other disadvantages include pathogen attacks such as damp-off due to *Verticillium* wilt caused by the high moisture levels associated with hydroponics and over watering of soil based plants. Also, many hydroponic plants require different fertilizers and containment systems.

Revolutionary Hydroponics in Kenya: A recently introduced fodder growing technology is fast rising in the country, offering farmers year round supply of nutritious green fodder, grown for just eight days and producing up to 50 kgs of the fodder in a 20 by 10 feet space, enough to feed 20 mature cows or 120 goats all year round.

Dubbed hydroponics technology for its ability to grow fodder and other crops without the soil, the project has been hailed as a revolutionary way of farming coming at a time when land is continually becoming limited thanks to population pressure and the ever rising cost of commercial feeds that is locking hundreds of farmers from accessing the much needed feed.

Though having been in existence for the last 50 years in the world, the country is just warming up to the technology with majority of the over 2 million livestock farmers yet to try it. The technology entails the germination of seeds in nutrient rich solutions instead of soil to produce a grass and root combination that is very high in nutrition.

<http://ictville.com/2013/01/kenyan-farmers-grow-livestock-fodder-in-8-days/#sthash.7kaZnRQp.dpuf>

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