

HYDROPONICS - Alternative to conservative farming

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Abstract : India now is exploring the concept of controlled environmental farming or Hydroponics not only because of economic feasibility but also as it can resolve the issues of dwindling availability of fertile soil, clean water and drought conditions faced by farmers. Conservation of water, improved quality and quantity of crops are some of the benefits of Hydroponics.

Keywords: hydroponics, controlled environmental agriculture, sustainable development, green house, inert medium

INTRODUCTION

For centuries, it has been the endeavor of scientists, agriculturalists and farmers to improve the quality and quantity of the yield against the inconsistencies of nature. William Frederick Gericke came to the aid of researchers in the field of agriculture, by growing 7 ft. long tomato vines by simply using minerals and nutrients in his backyard. This technique of growing plants in any inert medium other than soil is known as Hydroponics. The literal meaning of the word Hydroponics is *waterworks*, as it comprises of two Greek words- 'hydo' which means water and 'ponics' which means labor.

Hydroponic techniques encompass the methodology of cultivating plants in any inert media such as vermiculite, perlite, sand, clay, pebbles or horticulture rock-wool to provide necessary nutrients and physical support to plants, as opposed to the use of conventional medium of soil. Hydroponics offers an alternate means of food production wherein the nutritional requirements and optimum growth conditions are met by sound management. High yield and fine quality of crops can be produced with horticulture techniques in geographies where the climate and location are not ideal for conservative ways of farming. As the techniques have become more refined and commercially viable with time, the practice of hydroponic farming is being pursued by masses for commercial production, and not just as a hobby.

BENEFITS OF HYDROPONICS

- 1- Conservation of water, a scarce natural resource, can be achieved.
- 2-High yield can be obtained i.e. more crops can be grown and harvest per meter square is high.
- 3-Improvement in quality of yield is observed. Studies reveal that the crops grown hydroponically are more nutritious and tastes better.
- 4-Crops are observed to grow faster, hence high turnover in produce is observed.
- 5-Type of nutrient needed and quantity of nutrient needed can be controlled, hence healthier crops are obtained.
- 6-Less power, less water and less fuel is consumed leading to low production cost.
- 7-Crops can be grown and harvested in non-arable lands.
- 8-A good harvest can be obtained indoors too.
- 9-Large economic and social benefits are met.
- 10-Closed irrigation methods can be used. This leads to re-circulation and conservation of water.
- 11-Elimination of still borne diseases can be achieved, leading to healthier crop.
- 12-Re-use and re-cycling of growing mediums can be planned, leading to large economic benefits.
- 13-Consumption of artificial ripening agents can be eliminated.
- 14-pH balance is easier to maintain.
- 15-Soil pests and diseases are reduced significantly.
- 16-Due to smaller roots, spacing efficiency can be enhanced to a great extent.

MYTHS ASSOCIATED WITH HYDROPONIC FARMING

Myth No. 1- It is a new technology.....

Fact- In India and other parts of the world, plants were known to be grown in coconut husk directly. This is the most basic level of Hydroponics. The Hanging Gardens of Babylon, well known as one of the seven wonders of the ancient world is also a kind of hydroponic garden. While this technology is considered modern, but the same has existed for hundreds of years.

Myth No. 2- Hydroponics is harming the environment.....

Fact- In comparison to the conventional gardening, growing plant in Hydroponic setup is environment friendly to a great extent. Water is a precious resource and methods to conserve water should be adapted at all levels. Hydroponics provides a method to grow crops/ plants utilizing closed recirculation irrigation system, hence conserving water. Hydroponic growth utilizes limited pesticides and quality of soil is not compromised.

Myth No 3- The use of Hydroponics is limited

Fact- Globally the hydroponic technology is being used extensively. It can be used in areas and countries where climatic conditions become a limiting factor, retarding the growth of plants. This method can be used in areas where the quality of soil is poor to allow good turnover of crops. Sometimes fertile soil is abused by over-farming leading to the soil becoming toxic and degenerative for further farming. 90% of the greenhouse industry in British Columbia is Hydroponic.

Myth No. 4- Hydroponics is used to produce Super plants.....

Fact- It is a known fact that seeds have a genetic code which determines its yield potential, size of the fruits/ flowers and taste. hydroponics can't turn peas into beefsteak peas but can definitely turn it into the best peas that can be. It is difficult to grow a plant to its highest potential in soil as there are number of variables in soil which influence the growth of plant. In Hydroponic setup these variables can be controlled, so Hydroponics is a superior technique in comparison to conventional farming. In conventional methods a large amount of energy of plant is used in working up for its food, which is not the case in Hydroponics and this extra energy is diverted towards the faster growth, larger yields and tastier and flavorful crop. Hydroponic food production increases the yield exponentially. Identical cucumber plants in soil produced 3175 kgs per acre, and in Hydroponic setup the yield was noted to be 12700 kgs per acre. Yield of tomato in soil was reported to be 5 to 10 tonnes per acre which through the process of Hydroponics yielded 60 to 300 tonnes.

Myth No. 5- Hydroponics is un- natural and artificial.....

Fact- Growth of the plant is natural and real. For normal growth the plants require some basic natural inputs. In Hydroponic system these basic inputs required for growth are supplied when required and in appropriate quantities. No genetic modifications are made nor any chemical or steroids given to the plant setup. It is just refined nutrients in the right quantities that are supplied to the plant so that it grows to its full potential.

Myth No. 7- Hydroponics is an expensive technique.....

Fact- While it is a fact that any up-gradation in technique or process will involve certain amount of capital infusion, however, the technique is simple and amazingly easy to adopt. The results are easily visible. The result outweighs the investment. The adoption of the Hydroponic system, results in saving of a critical resource that is water. Apart from this the nutrients can be provided in a controlled manner while increasing the yield. This technique also leads to exploiting the vacant/ vertical space which can be utilized for the purpose of extending green cover and produce flower/ vegetables.

Myth No 8- Hydroponic system has to be set up ' Indoors'.....

Fact- Hydroponic system is a flexible system which can be put in place both indoors and outdoors. The advantage of growing the plants indoors is on account of the ability to control the light required for photosynthesis, thereby making the growing seasons last longer or shorter as per the need.

India is showing interest in controlled environmental farming or Hydroponics not only because of economic feasibility but also as it can resolve the issues of dwindling availability of fertile soil, clean water and drought conditions faced by farmers.

India has a high percentage of women farmers. Hydroponics involves less physical labour is promising and beneficial for women farmers. This technique can be operated by mere use of switches and is labor friendly.

In India covered cultivation through loop houses or polyhouse structures was only 30,000hectares hectare in 2016 which is low in comparison to other developing countries. The national average for vegetable yields is 17 tons/hectare where as it is more than 40 tons/hectare in developed countries. this large disparity needs to be worked upon and the challenges faced by conventional farming can be overcome by Hydroponics. In a study and survey performed by National Restaurant Association of India along with Technopak have placed on record that India's food service market is estimated to increase two folds in next five years. To meet this projected increase better technologies need to be put in place and Hydroponics is a viable option available.

Vegetables like lettuce, imported cherry tomatoes, caribbean peppers, golden beetroots, asparagus and other exotic vegetables are highly suitable for Hydroponic farming. Certainly Controlled Environment Agriculture or Hydroponic Farming can bring down the prices of these otherwise expensive vegetables. High price of these vegetables is due to the fact that 85% of these vegetables produced in India are exported to other countries. It is worth mentioning that in the first year of purchase of greenhouse 80% of the depreciation is available to the buyers under income tax and bank finance is available upto 75% through agricultural loans. National Horticultural Board (NHB) provides 20% subsidy on greenhouses. Portable greenhouses can also be insured. In nutshell this journey towards sustainable food system through Hydroponics is viable and worthwhile.

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