



# Your terrace could be your farm too

Tired of stepping out for veggies and fruits? Well, then maybe you should consider soil-less cultivation. It isn't just hygienic, but also an ideal technology for "home farming" and helps you grow your own vegetables, fruits, flowers and herbs, **Sapna Gopal** informs



It sounds scary, but the fact remains that most of our vegetables are laced with pesticides and artificial colours. Some like the greens, are grown in sewage water. Coriander, such a must for garnishing, is full of lead. At the outset, it may appear like there is no

escape, but look further, the solution is on hand. And, that is 'hydroponics', an Italian term that connotes water working and was coined in the 1930s.

Even William Gerieke, a professor at the University of California Davis, who coined the word, would not have

realised that it would gain immense popularity in the years to come. Following its inception in the early 1980s in Colombia, it has been implemented in 22 Latin American and African countries, mostly funded by the United Nations Development Programme (UNDP) and the United Nations Food and Agriculture Organisation (UNFAO). Initially designed for people with limited resources and inputs such as land space, water, nutrients and grower infrastructure, it has now evolved to incorporate low inputs and concentrates on utilising recycled materials or agricultural wastes.

However, it took a full 22 years to arrive in India, mainly because as founder of the country's first hydroponics garden at the Sandra Ricketts Public School in Bangalore Lt Cdr (retd) C V Prakash puts it, "Hitherto, there was no dearth of land for cultivation which is why the method was not implemented. But now, paucity of land, reduced soil fertility, use of chemicals, pesticides and lack of water have only added to an agriculturist's woes."

"In fact, the art of soil-less cultivation is gaining popularity, because it can be grown on the rooftop and a number of professionals like doctors, engineers and software engineers are practicing it. Till now, 126 people have been trained in the technique," he adds.

So, what is hydroponics all about? It is a method in which plants are grown in nutrient-enriched water instead of soil and this leads to

## Who said we need soil to cultivate?

Hydroponics technology is a green technology that makes use of the natural plant growth phenomena in obtaining better results from plants. Industries such as the airlines and fast-food chains use hydroponically grown vegetables. The cut flower industry, nurseries and the pharmaceutical industry are other sectors where this technology is being practiced successfully.

The smallest unit measures 20 sq m and costs approximately Rs 9,000 to build a garden and another Rs 9,000 to maintain it. As far as the recurring costs goes, it comes up to Rs 10,000. The garden produces 2 kg of pesticide-free produce every day.

A simplified garden can be as small as one bed grower of 1sq m and even up to 1000 sq m which is a full-scale commercial operation. It has been estimated from empirical evidences that a family production unit that includes 20 bed growers of (40 sq m growing space) can generate an income of about US\$ 101 per month.

The project was launched in the country in October last year and an awareness programme was mooted in Bangalore. Till now, 126 students from Jabalpur, Jamshedpur, Gujarat, Nagaland and Delhi have been trained in the practice.

Peggy Bradley explains the art of hydroponics to children.



clearer, purer and more transparent scents. "Unlike conventional cultivation, where the conditions are less than ideal due to the surface, contamination and biological imbalances, with hydroponics water is enriched with these very same nutrient salts creating a solution that is perfectly balanced. Very little water is lost to evaporation in a hydroponic system owing to its application in drought-hit areas," elaborates the former naval officer.

Also, using this technique, vegetables are grown with water or low-cost natural substrates (sand, rice hulls and pumice stone for instance). This facilitates the growth of vegetables such as lettuce, tomatoes, carrots, garlic, watercress, aubergine, beans, parsley, radish, leek, strawberries, melons, flowers and aromatic and medicinal plants. "It promotes the use of recycled materials, thus making low-cost materials such as wood and disposable containers, useful," avers Prakash.



"Unlike conventional cultivation, where the conditions are less than ideal due to the surface, contamination and biological imbalances, with hydroponics water is enriched with these very same nutrient salts creating a solution that is perfectly balanced. Also, very little water is lost to evaporation in a hydroponic system owing to its application in drought-hit areas," says C V Prakash



Lt Cdr (retd) C.V. Prakash waters one of the plants, (left and bottom) Some of the vegetables that have been cultivated in pots and other used cans.



Concurs Peggy Bradley, the director of the Institute of Simplified Hydroponics ([www.carbon.org](http://www.carbon.org)) who has been associated with the field of simple hydroponics for the past 25 years and helped Prakash in his venture, "The aim is to bring this technology to those in need. And, our work is to transfer the technology where we can. People in poverty who start gardens can establish food security."

In terms of food production too, places that have not previously been considered appropriate for food

production such as courtyards, small gardens, walls, balconies and rooftops, are used. Pritham D'Souza, who has taken to the method in his rooftop terrace, recalls how he came across the word hydroponics when he was browsing for tomatoes grown in green houses in Israel. The owner of a 110-acre farm in Mangalore, he and his family grow over 20 types of crops, mostly vegetables. He reveals that one can start a basic garden with an investment as low as Rs 500. "For instance, if one person grows tomatoes and the other brinjals, they can trade the produce or sell it in the local market. And, the containers that are used to grow the plants can either be new plastic tubs or discarded vegetable boxes. Why,

even discarded plastic bottles can be used to grow vegetables such as bhindi and cowpea. What's more, everything is conserved and there is no wastage," he suggests.

Agrees Peggy Bradley, who began her first garden in 1966 as a method to produce high-quality food with very little investment, "I realised that I could produce US\$ 400 worth of food with US\$ 4 of nutrient costs. Also, to bring the most affordable technology for a family (4 to 6 people), it costs less than US\$ 110 for building a small 20-square metre micro-garden that produces 2 kilos of nutritious, pesticide-free food per day."

Though Pritham has not taken up soil-less cultivation on a commercial level yet, he plans to do so in the future. Especially during the rains when vegetable production takes a beating and prices skyrocket, getting quality vegetables is a challenge.

## Hydroponics explained

Developed in Latin America, it can be easily adapted in urban areas in the following ways:

- The production system is isolated from the soil. Planting takes place at a convenient height, where soil pollution has no impact. It allows for vegetables to be produced "without land" and in small physical spaces.
- Plants are grown in water containers or in low-cost natural substrates (sand, rice husk, pumice etc.). With this system, it is possible to grow a vast range of vegetables, for example, lettuce, tomatoes, carrots, celery, watercress, eggplants, beans, parsley, wild radish, leeks, strawberries, melons, aromatic and medicinal plants.
- One of its main advantages is the possibility of using urban spaces which until now had not been considered adequate for growing food (patios, small gardens, party walls, balconies, rooftops).
- High efficiency in the use of irrigation water, where water is recycled and does not pollute the environment.
- Pest, disease and weed control by natural herbal methods.
- Higher yields and shorter duration between harvests. Hence, total output is greater than the case of conventional soil systems.



## Pest control

In this system, neem and garlic sprays are used. Mechanical insect traps made of old plywood are anointed with used engine/motor oil or light waste grease that attracts flying predators and these insects get stuck to the traps. The common colours used are yellow or blue as jackets over the plywood. These traps are kept beside the table growers.

Another natural method used is by trap cropping or catch cropping or companion cropping. For instance, when mint is cultivated, cabbage and tomatoes are grown alongside it. This causes a conflict as insects get confused by the pheromones in the vicinity and are safely vectored to look for another area of interest. Also, small length strips of old cassette tapes are hung on the periphery of the garden that can ward off predator birds. Beneficial insects are also used to attack and kill unwanted pests.

## Designer garden

- Find a space with adequate sunlight and then test the water source.
- Identify the recyclable materials locally available to start the garden.
- Identify seed companies in the area and buy just a few grams of seeds of say one or two vegetables at first.
- Keep a log book to record everything you do from seeding to harvest.
- Start by using small grower tubs and only after getting a hang of the system one must scale up production.

"We grow vegetables in rains, but our production is reduced to one-fourth. At that time, if I can grow hydroponic vegetables, I could make more money selling lesser amount of vegetables."

So, is this the new age farming? Pritham believes that it "definitely is the future in the country. It's just that people need to believe in what they are doing." Adds Peggy, "People using hydroponics tend to be doing better since it is a more modern method. And, of all the options available, hydroponics is one of the best we have found."

At a time when the world is combating global warming and climate change, how can hydroponics help? "By returning a lot of our farm land to forests, we can combat global warming. Also, hydroponics offers a method of growing food that can be much less land and water-intensive," explains Peggy.

Prakash feels that once more and more people start growing their own requirements at home, there will be lesser dependence on trucking food through

large distances thus reducing pollution by vehicles. This will definitely reduce carbon footprints. Soil-less cultivation will also give time to the land to rejuvenate and help restore soil fertility. The use of recyclable materials will only contribute to reduction of carbon footprints.

So far so good, but what about the belief that it encourages mosquitoes? "If the instructions in preparing the nutrient solution and maintaining their concentration in the hydroponics systems are followed, mosquitoes will never breed. This is because the ionic concentration in the solution is too strong for the wrigglers to survive." And, it isn't only households, even farmers can cultivate more vegetables in lesser spaces and grow produce that fetches a better price, reasons Prakash.

With the impending food crisis on hand and global warming on the rise, hydroponics seems a solution most apt. Just like the world, for India too, the concept couldn't have come at a better time than this. 🌍

