SIMPLIFIED HYDROPONICS IN Uruguay

Simplified Hydroponics has provided real solutions for low-income families and impoverished communities in many parts of the world. MARTIN CALDEYRO describes one innovative project in Uruguay that has improved family health and living standards, and is a model for other communities in Latin America to follow.

1 . Simplified Hydroponics is used by low-income families to improve their living standards.

Simplified Hydroponics (SH) has interesting, albeit little known advantages for vulnerable populations such as low-income people, pre-school and school children, the elderly and handicapped, prison inmates, small farmers, and others. It is currently practised in Latin America, and over the next few issues, I will outline specific cases.

In this article, I present an example of how SH has been used by low-income families in urban and peri-urban areas of Uruguay to improve their living standards. These simple growing techniques can be easily replicated in other developing countries.

The problems

Urbanisation is an acute trend in Latin America, involving mass movements of people from the countryside to marginal and peripheral neighbourhoods in urban centres. These migrants dream of improving their living standards, but are usually confronted by a lack of jobs and remain destitute under conditions of abject poverty. In such areas, urban infrastructure facilities providing community services such as potable water, electricity, public transportation, housing and health care services, have not been significantly developed.

Increases in the number of poor people living under such conditions implies serious under-nourishment or malnutrition in the population. In such situations, food intake usually consists of many carbohydrates, with few vegetables and fruits available to supply minerals and vitamins essential for good health.

Such populations require a survival strategy that involves growing vegetables, however, sites with soils suitable for growing food crops are scarce. Most urbanised settlements are located on landfill soils where there is little natural soil and very little physical space, or in areas subject to flooding. Additionally, there are residues of animal faeces as a result of animals raised there. Nitrates, heavy metals, and solid municipal biological wastes pollute soils and water and everything that is grown there. Several diseases are transmitted by micro-organisms such as *E. coli* and cholera, and parasites are frequently found there. These pathogens are a serious threat to populations, especially for babies, young children, the sick and elderly, and people with poor immune systems.

La Paloma-Chuy pilot project

In one area of Uruguay under pressure from urbanisation, the Departmental [local] Government has established a pilot project to promote Simplified Hydroponics. The La Paloma-Chuy region is located in the province of Rocha, in the south-east of the country.

2 . *Ingenious home-made system to collect rainwater for a hydroponic vegetable garden.*

3. *A married couple with their hydroponic vegetable garden using different hydroponic techniques - solid, floating and with vertical pipes.*

4. *Outdoor view of a vegetable garden with a small greenhouse (15m^2) built in the backyard of a house with simple materials.*

5. *Inside view of a greenhouse (20m^2), with different types of produce for family consumption.*

6. *A girl enjoying her own bean production in a solid growing substrate.*

7. *Hydroponic crops in containers (bathtub, wood crate). A view of a simple greenhouse and shade provided by waste materials (an old curtain).*

The region is bordered by Brazil on one side, and the shores of the Atlantic Ocean on the other. Its rural population is mainly engaged in agriculture and cattle-raising. Tourism is also a major source of jobs along the coast. However, over the last few years this area has experienced an increase in poverty, especially in urban areas. To overcome this problem, the Departmental Government of Rocha has sought new development strategies in the area of La Paloma-Chuy, especially for women who are the traditional heads of the family household. The government decided to promote family-grown vegetable gardens in the home using simplified hydroponic techniques.

Aims of the project

The aims of the project are to improve the health and quality of life of families in crowded urban communities, and to promote similar community developments to other urban populations in Uruguay and Latin America. The project involves training the families themselves, focusing on women and fostering self-employment of idle household labour using the scarce resources available to them.

Advantages of Simplified Hydroponics

The inclusion of innovative technologies such as Simplified Hydroponics for growing fruits and vegetables, was proposed for the following reasons:

- SH is a low-cost and easy-to-learn technique, which does not require any previous knowledge. Local participants can see for themselves concrete results within just a few weeks.
- SH allows "soil-free" production of vegetables in containers with water, or in low-cost natural substrates such as sand, rice skulls, pumice stone, etc. SH makes it possible to grow a broad range of vegetables ideal for a balanced family diet, such as lettuce, tomatoes, carrots, garlic, watercress, aubergines, beans, parsley, radish, leek, strawberries, and melons. Flowers, and aromatic and medicinal plants can also be grown.
- SH uses recycled materials to build growing containers, utilising low-cost materials such as wood and disposable containers.
- SH is ideal for food production in urban and suburban areas. It offers the advantage of using places that have not previously been thought appropriate for food production (courtyards, small gardens, walls, balconies, and rooftops).
- High efficiency in the use of water, although SH requires the availability of uncontaminated water.
- SH generates direct income for families.
- SH leads to the production of high quality, safe food, rich in nutrients and minerals. Since it is grown by the family, it is harvested immediately before its use, thus, the produce is fresh

and keeps its nutritional qualities intact. Another advantage is that these crops can be cultivated above and away from contaminated ground areas. In order to ensure food safety features of the end product, it is essential to use drinking water and/or clean rainwater.

Project strategy

The strategy of this project was based on two main ideas:

- Capacity-building among the participants for them to engage in self-help projects. This strategy draws from the analogy of teaching the population how to fish, instead of giving fish.
- To promote family-grown vegetable gardens at home (as an alternative to community modules featured in *PH&G Issue #71*), using the following strategies:
- *Motivation*. Since hydroponics is not well known in this part of the world, the starting point was disseminating information about the advantages of Simplified Hydroponics for the population in general.
- *Intensive training of family members* on the application of SH technology for the production of fresh vegetables, as well as technical follow-up.
- *Delivery of inputs*. The Departmental Government of Rocha provided the minimum essential inputs (nutrient solution, plastics, vegetable seeds, sand, etc.) for people to grow their own vegetable garden at home.
- Beneficiaries of training and inputs must make *a moral commitment*; i.e., they undertake to develop their own vegetable garden within 20 days.

Results

To date, the following results have been observed:

Expected results

- *Good Compliance* – A high degree of compliance with the moral commitment undertaken by this population was achieved, exceeding 90% of participants. This issue is extremely important, because it proved that Simplified Hydroponics is easily adapted to the environment of low-income populations, and that these people respond positively if the proper conditions are made available to them.
- *Improved family diet* – These vegetable gardens have enabled the intake of a broad range of excellent quality fruits and vegetables. Likewise, by building simple greenhouses, it is possible to grow produce all year round.
- *Improved family income* – Several participants have improved their family income. In most cases, the participants have not earned money, but they have provided nutritious vegetables for their family and generated sufficient resources to pay for the expenses of having a vegetable garden. Others have traded their vegetables to shops in the area for other complementary foodstuffs, improving the family diet further. Monetary rewards occurred for those families who had vegetable gardens that exceeded 30m^2, and during the tourist season when demand was greater.

Unexpected Results

There were also unexpected results from the La Paloma-Chuy pilot project:

- *Improved family self-esteem* – When participants start to see concrete results (i.e., they consume top quality hydroponic produce they have grown), they develop greater self-esteem. They feel capable of doing something productive and positive to feed themselves and their family.
- *Motivating effect of hydroponics* – Besides being a clean type of plant production system, hydroponics has something special: it is a technology that helps to arouse curiosity, it encourages innovative thinking and presents a challenge for people, and it provides leadership opportunities.
- *Family ties* – Some families had little in common to talk about among their members, but there was a shared interest in the hydroponic vegetable gardens. This factor has helped reduce family stress levels.
- *It fostered creativity and personal Ingenuity* – Once people acquired a good command of SH techniques, they were able to develop their own personal inventiveness in the use of different containers and growing spaces, which in turn nurtured further motivation.
- *Multiplier effect* – With proper technical assistance, as time passes, the first set of participants in each community acquires more skills and become leading advocates of hydroponics vis-à-vis their neighbours. This happens in two ways:

First of all, because of the "attraction factor" they have at home: their own vegetable garden. It conveys something tangible and they can boast they have achieved something. This is an actual event that arouses the interest of their neighbours, and is a source of encouragement for others to imitate the positive values experienced by others.

Secondly, they can convey their knowledge of the technology to their neighbours in a simple manner, because they already know how to do it. This promotes leadership based on positive values. This is a major social component.

Family contribution

A significant issue of this project was the quantification of the average contribution made by each family to the establishment and management of a hydroponic vegetable garden at home. This involvement ranged from 200 to 330 hours over 12 average months of actual work, depending on the area covered by the vegetable garden, which can be broken down as follows:

Family work in the vegetable garden	15m^2 Garden	30m^2 Garden
Hours to create the garden (one-off)	18	56
Hours a day for maintenance purposes	$^1/_2$	$^3/_4$
Total hours over 365 days	200	330

Conclusion

The adaptability of Simplified Hydroponics for low-income population environments has been validated, and so has the fact that these people respond positively if the proper strategies, training and materials are made available to them. Similar projects such as this can be implemented in many other areas of Uruguay, and elsewhere in Latin America.

About the author

Martin Caldeyro Stajano Ing.Agr. (M.Sc.) is an International Consultant, and President of the Uruguayan Hydroponics Society. (Also see'Profile')
Email : aquafood@chasque.net
Website: www.chasque.net/aquafood