

NEWS

Vertical Landscapes Pioneers Urban Farming on Walls in South Africa

Consider the journey of a tomato from the ground to your table. Traditionally, the tomato is picked while still green in order to maintain its firmness.

The tomatoes are then sprayed with ethylene, their natural ripening agent, in order to turn the tomatoes red. In season, they are transported, most likely from a farm in Limpopo Province, to one of 17 national fresh produce markets (wholesalers). From there, they are transported to supermarket distribution centres and satellite produce markets. Finally, they are transported to the retailer. All transport is done using diesel trucks with refrigerated containers, which requires more fuel and leads to greater greenhouse gas emissions. Significant losses and damage occur during handling, transportation and marketing [1, 2, 3].
The only way to get fresher, more locally grown produce would be to grow it yourself. Urban farming is the practice of cultivating, processing and distributing food in an urban area. Food grown in your home eliminates all aspects of land-use and transportation and the current model's inefficient use of time, distance, and costs. As a result, shelf-life is three times longer. In addition, food safety concerns are practically eradicated [4, 5].

However, modern complex living styles and high property prices mean that space for farming in urban areas is limited. Vertical Landscapes, a Johannesburg-based company manufactures, installs and maintains innovative systems that allow them to cover interior and exterior walls with a lush layer of living plants, creating garden space where there was none. A Vertical Landscape is a living garden growing on a wall. Vertical Landscapes allow the planting of gardens in apartments, foyers, terraces and other places where floor space is limited. In addition, Vertical Landscapes absorb carbon dioxide, improve air quality, provide city-dwellers with a connection to nature, insulate and protect buildings and provide havens for birds, bees and butterflies. All components of Vertical Landscapes systems are 100% recyclable or reusable.

Rockwool, the growing medium of a Vertical Landscape being prepared in modules.

An interesting feature of Vertical Landscapes is that they contain no soil. Plants are grown in the system using the hydroponic method. Instead, rockwool, an inorganic material made from crushed stone, is used. Each plant is washed of soil and then planted into a layer of rockwool, after which it will rapidly root into the fabric. This eliminates the hassles of soil-borne pests and weeds. The rockwool fulfils the soil's function of anchoring the roots of the plants. In addition, it holds the water and nutrients long enough for the plants to soak up what they need. The elegance of the hydroponics method is that just the right amount of crucial minerals and water required for plant growth are applied directly. Consequently, the plant roots don't have to spread out as much as they would in soil. Consequently, the plants can use the energy they would have put into growing bigger roots, into growing bigger fruit, vegetables or foliage.

Vertical Landscaping is more typically done as a décor element

The South African government is doing research and making significant investments in hydroponics [8, 9]. One hectare of a hydroponics farm can produce 200-300 tonnes of vegetables per year. This is five to 10 times more than the yield of any commercially grown crop in open field [6]. It has been proven in countries like Australia, Holland, Spain and Mexico that hydroponics systems are water-efficient. In Almeria, a semi-arid area along the Spanish portion of the Mediterranean, hydroponic greenhouses currently cover over 74,000 acres of land from the sea to the mountains. Over 2,700,000 metric tons of produce are being grown in the region including lettuce, cucumbers, watermelons, peppers, and tomatoes [7]. Comparative analyses of water consumption in Australia for example show that it takes 160,000 litres of water to produce AU $100 of cotton, compared to 600 litres (best practice) of water to produce AU $100 worth of hydroponically grown produce.

In Qatar, an arid country with poor soils and limited water resources, hydroponics is envisaged to play a major role in improving the country's Food Security [6].

"Scientists at NASA are developing hydroponic methods to allow astronauts to grow their own food during increasingly long missions and, in the future, in human colonies on other planets," states Justin Sam, co-director of Vertical Landscapes, and himself an ex-aerospace engineer.

Plant physiologist Ray Wheeler checks onions being grown using hydroponic techniques. The other plants are Bibb lettuce (left) and radishes (right). Credit: NASA/ KSC [10].

Arabidopsis plants appear purple under red and green light produced by light-emitting diodes. Scientists are studying plant growth under various light conditions. Credit: NASA/KSC [10].

HYDROPONICS VS. ORGANIC GARDENING

Vertical Landscapes use specially formulated mineral-based nutrients made of the most highly-refined, pure ingredients, including food and pharmaceutical grade minerals. They are derived from natural sources, but cannot be termed 'organic' because of the refinement process they have undergone, and more importantly, because they were never alive. Of course, they are still of the earth.

Vertical Landscapes come equipped with an automated irrigation system ensures that water and nutrients are regularly cycled through the roots.

Water is collected in a reservoir below the wall and the system recirculates water to minimise water use. Consequently more food can be cultivated with less water. The closed system recirculates water, so that the only water that is lost by the system is absorbed by the plants or lost through evaporation. Thus, for the same yield, a Vertical Landscape will require less than 30% of the water used in a similar conventional garden. In a conventional garden, much of the water is wasted, entering the water table.

The specially formulated nutrient solutions for hydroponics are very pure and leave no residue in the cultivated fruits and vegetables. Since hydroponic methods are more efficient than soil methods, more people can be fed with less area and ecological impact.

The hydroponic method of growing is sustainable. In the long-term, the hydroponic method of growing is cost-effective, though startup capital costs are higher. With the right funding partner, Vertical Landscapes hopes to put community-based urban farms in place to produce food and upliftment via skills transfer to people living in RDP housing and informal settlements, as has been done successfully in other countries [11].

Justin Sam stated, "The average South African household consumes between five and ten tomatoes per week [1]. Our studies have shown that a 2 m2 Vertical Landscape planted with tomatoes will be sufficient for such a household. If planted in the right season, or with the addition of a lighting system, the time taken for the plants to grow from seedling stage to harvest time is about 10 weeks. The water used by such a system would be less than the free basic quantity of water that each South African citizen is entitled to per month, as afforded by our country's constitution."

More information is available on the company's website: www.verticallandscapes.co.za. Alternatively, call Justin on 073 486 6288 or Brett on 074 101 0209.

REFERENCES:

1. Tomato Market Value Chain Profile. Directorate Marketing of the Department of Agriculture, Forestry and Fisheries.
2. Tomato Production in South Africa. Dr. M. Furter. Hygrotech Forum. Jaargang 9, Vol. 7, Spring 2010.
3. Postharvest Physiology of Tomatoes as Related to Transit and Marketing Problems. L. Morris, A. Kader. California Fresh Market Tomato Advisory Board. Informational Bulletin No. 19, April 1978.
4. www.urbanfarming.org
5. http://en.wikipedia.org/wiki/Urban_agriculture
6. http://www.qnfsp.gov.qa/programme/agriculture/crop-production/hydroponics. Qatar National Food Security Progamme Website.
7. www.schundler.com/spain.htm. Hydroponic Miracle Story in Almeria, Spain
8. http://www.southafrica.info/what_happening/news/hydroponicsfarm-wcape.htm. R2.2m for Karoo hydroponics farm. Nombini Matomela. 7 April 2004.
9. http://www.csir.co.za/technology_transfer/successstories_beaufortwesthydroponics.html. Technology Transfer Success Stories of the Council for Scientific and Industrial Research.
10. http://www.nasa.gov/missions/science/biofarming.html
11. www.cityfarmer.org/manila.html . Introducing Simplified Hydroponics in Manila Philippines.