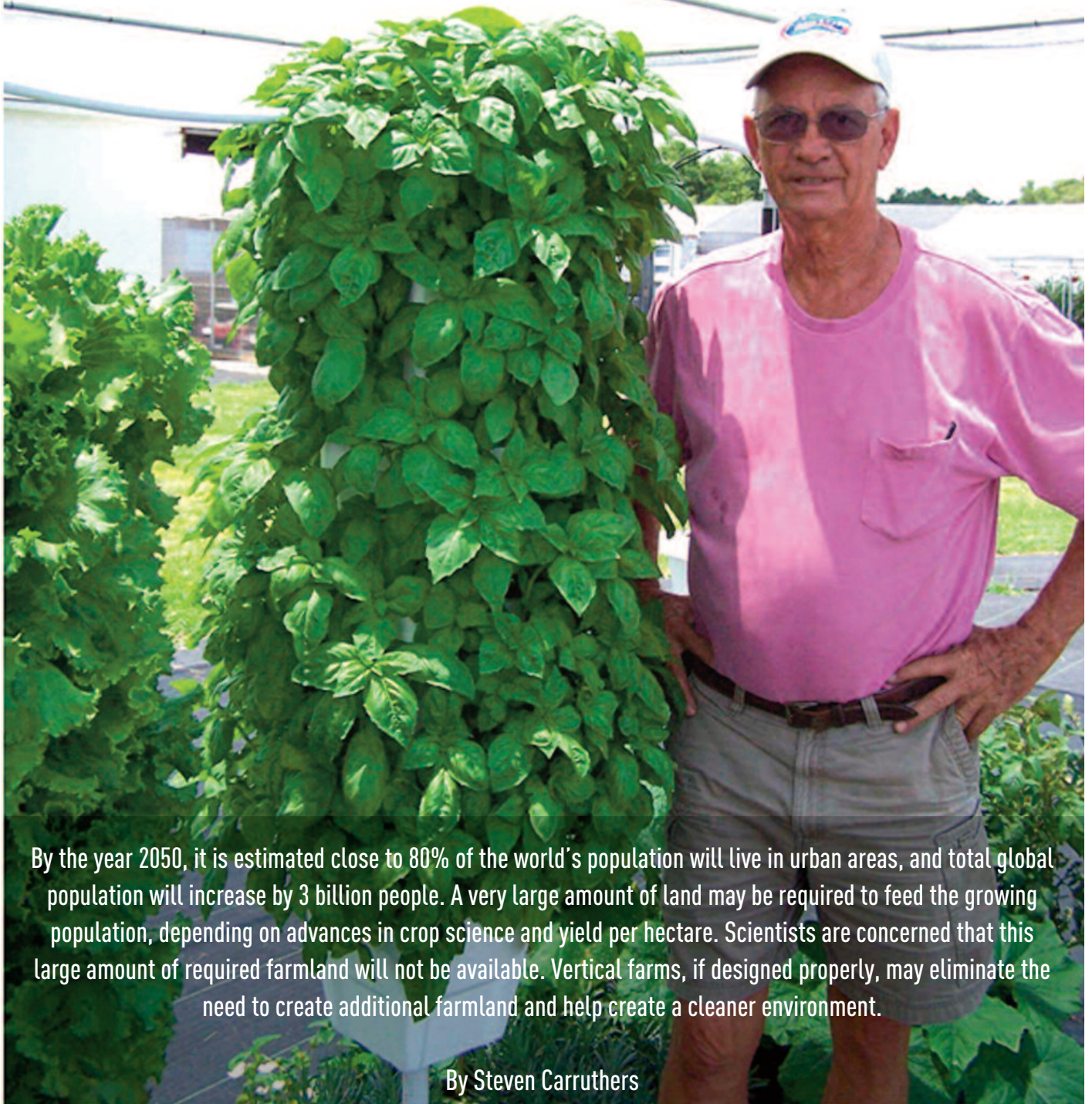


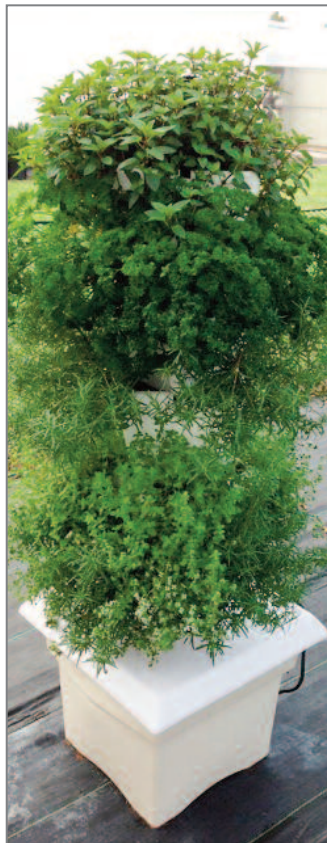
Vertical Growing Systems

For the Home Gardener and Commercial Grower



By the year 2050, it is estimated close to 80% of the world's population will live in urban areas, and total global population will increase by 3 billion people. A very large amount of land may be required to feed the growing population, depending on advances in crop science and yield per hectare. Scientists are concerned that this large amount of required farmland will not be available. Vertical farms, if designed properly, may eliminate the need to create additional farmland and help create a cleaner environment.

By Steven Carruthers



If you have visited Disney World's famous EPCOT Center in Florida, USA, then you can't help but be impressed by the vertical growing systems overflowing with lush, healthy plants, including many fruiting plants. The theme park includes a series of futuristic greenhouses linked by a meandering water canal used to convey EPCOT guests on a voyage of imagination and discovery. Genetic diversity, intercropping, rotating crops, using legumes as cover crops, and carefully managing water, nutrients and plant pests, are familiar phrases used by EPCOT 'cast members' and the dedicated scientists and researchers who work behind the scenes. In addition to its infotainment role, other activities include comparison trials between different types of growing media and soilless systems, and the development of innovative technology in partnership with private entities and government agencies.

EPCOT is an acronym of Experimental Prototype Community of Tomorrow, a Utopian city of the future planned by Walt Disney before his death in 1966. It took another 16 years for his vision to be realised. Spanning 300 acres (120ha), the theme park is dedicated to the celebration of human achievement, namely technological innovation.

The iconic 'The Land' pavilion is the world's most famous hydroponic display, showcasing dynamic examples of agricultural techniques and innovations. It is a vibrant, living blueprint to the future, promoting sustainable agriculture practices by growing plants using methods that are both economically viable and environmentally sound. Highlights include important agricultural crops, and concepts and technologies that include hydroponics, aeroponics, aquaculture, integrated pest management (IPM), computer applications, biotechnology and agriculture in space.

Today, vertical growing is no longer a futuristic idea; such systems are widely used in commercial cropping operations, public buildings, research facilities and home gardens worldwide. The main benefit is economy of space; vertical systems can produce the same volume of fresh food and flowers in a fraction of the area needed for traditional horizontal farming, using less water and fertilisers.

Space and energy are major factors in the economics of growing plants, and properly engineered vertical systems are proving an attractive solution to growing fresh food in small spaces close to urban markets, thus minimising transport and utility costs.

Tim Carpenter, the principal of Verti-Gro, is a pioneer in the development of vertical gardens. Verti-Gro became a partner at EPCOT in the mid-1990s and is still a partner more than 17 years later. EPCOT has consistently displayed Verti-Gro systems since 1996 and has since expanded the current Verti-Gro display.

Verti-Gro systems are modular growing towers with insulated growing pots stacked along the vertical tower axis. Additional pots can be added, depending on space. Systems come with optional automatic watering units, with irrigation regimes dependent on the type of soilless growing media and plant variety. Verti-Gro also supply proprietary hydroponic fertilisers containing all the essential elements. Plants can also be grown organically with the right organic planting media or compost and an organic fertiliser. Verti-Gro has a list of over a dozen organic fertilisers and pesticides.

"With our vertical growing systems, high density growing is achieved with plant densities five to 10 times that of field, and three to five times the density for certain crops grown in greenhouses," said Tim.

"The unique add-on capabilities of the Verti-Gro stacking system makes it easy to expand. Mobility is a key advantage; it can be set up outdoors or indoors, in a greenhouse, under semi-protected covers, or in high tunnels," he added.

The vertical plant stacking system can be easily installed in a short time, with little or no experience.

Tim began his hydroponic career at the age of 18 in Palm Harbor, Florida, with American Hydroponics. After a short stint in the Army, he attended Colorado State University and obtained a BS degree in Applied Chemistry with minors in horticulture and business. In 1972, he

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Verti-Gro founder Tim Carpenter is a pioneer in the development of vertical systems for home gardeners, small farmers and commercial greenhouse growers.

installed the first large hydroponic farm in Colorado Springs under the name Hydro-Gardens, Inc., which he sold in 1996 to form the new vertical growing company, Verti-Gro, Inc. Today, Verti-Gro has commercial systems in over 25 countries.

Tim's other achievements include being President of the Western Greenhouse Vegetable Growers Association and the American Greenhouse Vegetable Growers Association for 10 years during the 1980s, and on the Board of Directors for the National Greenhouse Vegetable Growers Association and the American Society of Plasticulture for five years. He is currently on the Advisory Committee at the University of Florida's Institute of Food and Agricultural Services, and the Advisory Board at the College of Central Florida for the Agri-business program.

Verti-Gro also designs and manufacture greenhouses of all sizes and types suited for the vertical growing system, from inexpensive shade houses, plastic houses and tunnels, to state-of-the-art complete controlled-environment greenhouses.

Other benefits of vertical growing systems are: land cost savings, less water usage, less fertiliser usage, insulated root system, stand-up harvesting, auto-injected irrigation, and no weeds. In a protected cropping environment, the growing seasons can be extended with environmental control.

Verti-Gro patented the vertical stacking growing technology in 1996 and the company continues to develop and ship indoor and outdoor vertical growing systems for the home gardener, small grower and large farmer worldwide. Verti-Gro has patents pending in 284 countries and manufactures high density EPS food grade insulated pots in Colorado and Mississippi, USA, France and Puerto Rico. ☺