The Battle Over Indoor Farming in Rhode Island

With resources scarce and land scarcer, the local agricultural community is locked in a battle over indoor farming.

February 11, 2022

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Illustration: Doreen Chisnell and Getty Images.

Tim Schartner eases his Dodge Ram over puddled ruts and parks it dead center of a grand plan: Tomatoes. Fresh tomatoes, with all the flavor and nutrition produced by well-amended soil, just the right amount of water and August heat — except grown hydroponically, harvested in February and eaten in a BLT a few days later. Sunk into the Exeter loam, powder-coated steel supports fan out in every direction like an illusion of infinity, but the glass-encased greenhouse that will eventually be finished here only covers twenty-five acres — a third of his fields.

“I think we are a generation away from losing our farms because of the encroaching commercial value of residential development; it’s going to force their sale,” says Schartner, the third generation to work these fields. “I wanted to keep the family in agriculture, and to do that I had to bring us to what was relevant in agriculture.”

Schartner began planning this $60 million project two years ago, but the idea of large-scale greenhouse farming has been rattling around in his head since he took a boat ride through Epcot Center’s Living with the Land exhibit as a teen. He was awestruck by the coconut trees and corn plots thriving in a computer-controlled environment under a glass geodesic dome.

“I was blown away. I said ‘Dad, this is what we’re going to do.’ ”

Growing under glass to extend the season is hardly a new concept. Archaeologists can trace it back to 30 AD, when ancient Roman gardeners devised a structure to grow the daily supply of the fresh melon Emperor Tiberius required. Greenhouses are now a common facet of many commercial bedding plant and farm operations. Controlled Environment Agriculture (CEA) — an umbrella term for different forms of indoor farming — takes the idea to its high-tech extreme, where light, temperature, water, humidity, plant nutrients and pests are monitored by sensors and are computer-controlled under algorithms that are ideal for the plants, often grown without soil.

A mature industry in Europe, today’s commercial CEA is more than fifty years old. The Netherlands, the acknowledged global leader, has been advancing this technology since the 1990s. Today, this tiny country is the world’s second-largest agricultural exporter behind the United States, where CEA — particularly the fully enclosed, urban and sustainable variety — is a burgeoning sector. In 2019, celebrity, institutional and other private investors raised $2.8 billion in venture capital for agtech startups worldwide, according to a 2020 report in The Progressive Farmer. CEA is so new here that there are no established federal growing standards, as there are for traditional agriculture. In October, the USDA Agricultural Research Service launched a CEA study to develop them.

“CEA [fully enclosed farming] is going through a moment right now in the United States,” says Viraj Puri, CEO of Gotham Greens, a pioneer in “new guard” CEA. This new interest, he says, is the result of a confluence of factors: interest in sustainability and locally grown food, and pressures on conventional agriculture in California, where water scarcity, migrant labor costs and conditions, shipping time and distance, and climate change drive up costs.

State agriculture officials see CEA as an important addition to the state's farming portfolio. Rhode Island grows less than 5 percent of its land-based food; regionally, New England produces less than 10 percent. In 2014, Food Solutions New England, a network of food sustainability advocates, released its regional food vision, 50 by 60: New England would produce 50 percent of its food by 2060. Rhode Island supports this goal via its own food sustainability program, Relish Rhody, a five-year food strategy plan to develop the agriculture and fishing industries and market their products.

"To reach that goal, we have to take advantage of the technologies to achieve that. It doesn't mean leaving traditional agriculture or small farms by the wayside. In fact, it adds to diversity of the community of farmers producing food," says Ken Ayars, chief of the state Department of Environmental Management's Division of Agriculture and Forest Environment. "It allows us to take advantage of the fact that Rhode Island is surrounded by 50 to 60 million people between Boston and New York."

Certainly, the state's proximity to a population-dense corridor has attracted a handful of CEA companies currently considering an expansion here, says Julianne Stelmaszyk, Director of Food Strategy for the state, who oversees Relish Rhody.

"They run the gamut from traditional hydroponic, vertical farming to a circular economy approach with an anaerobic digester and solar to offset the energy costs of growing year-round." These companies are also interested in the state's position on CEA — looking for "a shared mission around building a more sustainable and regional food economy with a social-impact focus," she says.

The state has two ongoing CEA operations: Gotham Greens and Agcore Technologies, occupying industrial land in Providence and Cranston, respectively.

Opened in 2019, Gotham Greens' urban farm is the sixth of nine in six states spanning both coasts. In winter's early evening darkness, its 100,000-square-foot greenhouse is lit with vistas of piercing green. In the nursery, seeds of nine different leafy greens nestle in rows of peat pots, like little golden eggs in nests. The air is temperate and scented with basil, spreading its rounded leaves languidly in optimized growing conditions. Year-round, workers hand-harvest and pack millions of heads of butter, romaine and other varieties of greens to be distributed from Connecticut to Maine.

Agcore Technologies farms a very different type of green: spirulina, a protein-rich blue-green alga used for human and animal nutrition under different brands. Year-round, the company produces spirulina in 420 six- to eight-foot clear, bubbling fiberglass cylinders in a temporary greenhouse, and then dries and processes it at its Warwick facility into fish food, dog food toppers, protein powders and vegan snack foods. Agcore then packages and sells the products to regional aquariums and local supermarkets, such as Wakefield's Belmont Market.

Founder Larry Dressler got into high-tech farming after nearly three decades selling refined vegetable oils to food producers, and a brief foray in 2010 transforming algae into renewable fuel. Then, energy prices dropped.

"I wanted to come up with a new vegetable," Dressler says. "Instead of closing shop, we pivoted from algae to energy to algae to protein. We are environmentally friendly. We don't need farmland and we re-use our water."

In 2018, the University of Rhode Island and former Governor Gina Raimondo announced its stake in promoting and developing this technology, leveraging $4 million of a $20 million bond to create an "agricultural innovation campus" with private partners. This spring, URI expects shovels in the ground to construct a twenty-five-acre greenhouse and a 15,000-square foot Agriculture Innovation Center just behind Peckham Farm on the West Kingston campus. The Rhode Island Mushroom Company, American Ag Energy Inc., Verinomics, a genomics and computational biology company, and VoloAgri, a vegetable seed company, will join the effort as investors and occupants in what is estimated to be a $115 million project.

URI Dean of College Environment and Life Sciences John Kirby says the center will be a training ground for agriculture, engineering and computer science students.

"If we are going to play in this game, we will have to develop a model that works so we can compete on an international level," he says. "It takes a bachelor's or master's degree to get into those facilities and to get that training; internships will be key. Our goal is to produce people who can fit in all phases of the industry."

The lack of a trained workforce is only one of CEA's current challenges, says Gotham Greens' Puri.

"It's a lot harder than it looks. Plants are not widgets," he says. "You can raise $100 million in venture capital, build a greenhouse for the plants to grow in,

but they are not going to grow themselves. Gotham Greens' Providence facility was built on land occupied by the former GE Electric light bulb factory, a "brownfields" site requiring reviews from multiple state and city entities. The process involved a lot of educating, says Puri, but didn't generate controversy.

In contrast, URI's and Schartner's plans have touched off a debate about taking arable land out of traditional production; the scale of such projects in rural settings; and the limits on a farmer's right to use greenhouses. In October, the work at Schartner's one million-square-foot greenhouse came to an abrupt halt in a permitting dispute with the town of Exeter.

Farmers themselves have mixed feelings about these projects and CEA in general, says Heidi Quinn, executive director of the Rhode Island Farm Bureau. The bureau which "supports all forms of agriculture, from the small farm to the CEA, and from organic to conventional" is opposed to the Agricultural Innovation Center, Quinn says, because the university has steadily strayed from its roots as a land-grant institution, turning prime farmland into buildings and parking lots. The main beneficiaries of the new ag center will be private businesses.

Schartner, having held this vision somewhere in his mind for more than forty years, takes the long view. He expects to resolve his issues with the town by the summer. And eventually, he says, the community will come to appreciate what CEA has to offer: better, fresher produce with fewer demands on resources, year-round employment for agricultural workers, and a chance to farm in the future.

"We need the field crops, too. This isn't the end-all," he says. "I ask myself, what can we determine? Do we fight and stay in agriculture? Take on all this debt for the good of my family and the community? As people peel this onion, it gets better and better. This actually gives agriculture a chance to fight back."