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Visionaries Work to Get Rooftop and Vertical Farming Off the Ground

By Azadeh Ensha

In 1999, Dickson Despommier, an environmental health sciences professor at Columbia University, coined the term “vertical farm.”

Mr. Despommier’s vision entails whole, multistory structures designed to grow and harvest food in urban spaces. But on a more modest scale, the idea of growing vegetation on existing rooftops has continued to spark the interest of public policy experts, horticulturalists and structural engineers in recent years.

Apart from select operations, however, commercial rooftop farms haven’t moved much beyond the planning phase in the United States.

Keith Agoada, founder of the urban agriculture company Sky Vegetables and a rooftop farm advocate, is hoping to change this. Mr. Agoada has organized a two-day long Building Integrated Sustainable Agriculture Summit (PDF), with the goal of drafting a commercially viable open source rooftop farm prototype. The summit is being held in Berkeley, Calif., on Friday and Saturday.



Keith Agoada wants to plant farms on rooftops. (Photo: Sky Vegetables)

“In doing research on rooftop farming, it became clear to me that the problem is that the different fields are not communicating and working together to integrate the systems,” said Mr. Agoada, whose company’s vision is to grow vegetables hydroponically on the rooftops of grocery stores.

“They don’t talk to one another,” Mr. Agoada said. “While rooftop farms are a pretty straightforward idea, there are a lot of different aspects to it that need to be looked at.”

Mr. Agoada, 22, became interested in the idea of rooftop farming after winning the top prize — \$10,000 — for his Sky Vegetables concept in the University of Wisconsin School of Business 2008 G. Steven Burrill business plan competition. He says that turning a profit is key.

“We want the farm to have a financial feasibility,” he said. “The idea is to minimize the carbon footprint while maximizing the profit. Without economic viability, it’s hard to have adaptors.”

Though Mr. Agoada declined to provide cost figures citing ongoing research, he said that the current industrial food system, which is based on using fertilizers and chemical sprays, is not sustainable.

“It is incredibly inefficient and costly and bad for the environment,” he said. “We’re eating oil. But on a rooftop, it’s a controlled environment. We’re going to use biological, water-based solutions so our goal is to not use chemicals or oil-based insecticides or fertilizers.”

Mr. Agoada also said the other major difference between rooftop farms and traditional farms involves water usage. He cites the oft-repeated statistic that around 70 percent of the world’s fresh water is used by agriculture as cause for concern.

“Right now agriculture companies are getting huge discounts and subsidies so they’re not paying for the water they use,” he argues. Mr. Agoada estimates that this system will use about 1/20th the water of traditional agriculture methods. He also plans to use as much renewable energy — from geothermal to solar to wind — as possible.

“In the summertime, the sun hits down on rooftops and heats up the building, which creates pollution. By having plants, it’ll absorb the sun, which means less heating and more stable temperatures year round.”

However ambitious Mr. Agoada’s plans might seem, they pale in comparison to those of Mr. Despommier, who told The New York Times in July that he places the cost of a prototype of one of his much more elaborate vertical farms at \$20 million to \$30 million. He estimates the cost of building a 30-story tower that he says could feed 50,000 people at hundreds of millions.

In a phone interview from Bangalore, India where he was invited to give a talk on vertical farming, Mr. Despommier added that “if you gave me \$50 million, I’m sure I could construct a very high-tech prototypical five-story vertical farm.” Concerning the 30-story tower, he said that “it’s not unrealistic to say that a large building like that could be constructed.”

He said that year-round crop production, no weather-related crop failures and no agricultural run-off as well as the possibility of freeing up land for ecosystem restoration are worthy reasons to build vertical farms, although he concedes that it will be an expensive and research-intensive effort to get off the ground, a sentiment that's shared by green roof critics.

"There is a lot more greenhouse cheerleading than there is solid analysis of the costs and rewards," Gerald White of Cornell University told Wired Magazine in 2005. "It's a very difficult business that hasn't quite figured out a model that works right yet."

Armando Carbonell, chairman of the department of planning and urban form at the Lincoln Institute of Land Policy in Cambridge, Mass., made a similar argument.

Speaking to The New York Times over the summer, Mr. Carbonell said, "Would a tomato in lower Manhattan be able to outbid an investment banker for space in a high-rise? My bet is that the investment banker will pay more."

Mr. Despommier, however, isn't bothered by the skeptics.

"The best answer to the critics is to go out and do it. I don't want to argue with them. I want to show them that it works," he said.