



Growing Profitable and Non-Profit Urban Ag Businesses

By Dan Martin, Managing Principal, Market & Feasibility Advisors, LLC

Growing food in cities has become a big enterprise. There are now more than eight-hundred sites tracked by the in Chicago by Urban Agriculture Mapping Project. These include community and school gardens to rooftop farms, orchards, and multi-acre urban farms.

On a commercial level, there are fewer, but many efforts in the Chicago area. There are efforts to grow produce commercially in greenhouses and enclosed spaces in greenhouses and without artificial light. Most use hydroponics and aquaponics. The result has been several high-profile failures but also many successes.

Our analysis of the commercial business, suggests that small commercial indoor living-farm stands, up to 10,000 square feet but as small as 3,500, selling directly to the public, work well. Based on our review of local and national operations, we believe new facilities can be developed profitably or as non-profits in food deserts and far more widely.

It's also clear that indoor farms align closely with many Green goals in connection with climate change (reduction of agricultural carbon footprints) and addressing critical environmental issues.

Entrepreneurs, community develop organizations, grocers, agriculture interests and even farmers should consider this opportunity.

The Big Picture

The US agricultural economy is enormous. Here's a quick two-paragraph briefing on how we got to today's national farm economy.

For better or worse, since 1935, the farm economy has been driven by efficiency. From 1935 to the 1970s the number of farms fell from 6.8 to about 2 million as total acreage declined slightly. Today's farms, which averaged 155 acres in 1935, have grown to an estimated average 444 acres today. Technology, including crop genetics, chemicals and the-driven equipment, have led to a tripling of yields per acre between 1948 and 2017, even as farm labor has declined. Rural communities have declined with these trends. The 46 million US non-metro population was about 14% of the US in 2019 and its population growth, has hovered around 0% in recent years as metro areas continued to grow. Worldwide there are entire small rural towns for sale here in the U.S. and even Spain and Italy.

Gross income from farming has been growing. From \$333 billion in 2000 (in 2020 dollars) to \$431 billion projected for 2020, although it has been mostly stable for the last four years. Note that this includes substantial farm program payments from the US Department of Agriculture (USDA) and other agencies. Net income in 2020 (including dollars and gov't credits) is projected to be about \$97 billion, or about 22% of gross. The USDA is a not so invisible hand as it supports corn, soybeans, wheat and other grains with substantial grants and loan programs – offering far less support to more healthy crops. Support for this flipped food pyramid (now called My Plate) results in fruits and nuts, melons and vegetables earning less than 25% of all crop cash receipts with minimal support.



Why Urban Farming?

The effort to move away from outdoor soil-based farming towards urban farming is also driven by technology and efficiency, but the aims are different.

Unlike rural soil-based farming, urban farming, has a number of advantages: reduction of farming's carbon footprint, direct access to customers with shorter feedback loops on products, fresher food to customers, local workers employment and production (with resultant urban/metro economic and fiscal impact), control of environmental impacts and better quality less-engineered crops. Just as important, the applicable business models can be profit and job creation driven.

When asked about the job creation potential, the executive director of Chicago's Growing Home, a USDA certified organic nonprofit farm, was recently quoted saying that for-profit Gotham Greens, a national commercial grower, with 175,000 square feet of indoor growing space in the Pullman neighborhood of Chicago is less of a competitor than a potential 'next employer' for her employees. At least seven have made that jump to Gotham Greens jobs, at above minimum wage, with some in management.

Unlike urban farming, soil-based farming is increasingly vulnerable to unpredictable weather and climate change. Some stories that illustrate this include: the vast area impacted by midwestern floods last year, regional droughts, like in California and Texas, the new formerly agricultural 'climate change' hotspot identified last week on the western slopes of the Rockies in Colorado and Utah. One of the more remarkable cases includes hundreds of millions in agricultural investment in the middle east that is now dusty desert. There, aquifers ran dry in just twenty years. When these vast fields were active, Saudi Arabia was briefly the 6th largest exporter of wheat. Today Saudi Arabia must import to meet needs. The same dire circumstance is possible for their similar investments in vast outdoor farms east of Phoenix that tap into the limited amount of water in aquifers there.

The Key Ingredient

Water is the key ingredient in all of these cases. While we've done it for millennia, growing outdoors can waste a lot of water and aquifers, and even rivers, usually have a finite amount. Growing indoors cuts water consumption by as much as 90%. Arid areas like Phoenix, Las Vegas and other cities take note. As much as 99% of the water used growing outdoors evaporates and doesn't contribute to plant development.

Overall, crops are a surprisingly major user of water, 92% of all human water consumption, more than we might expect. All of our personal use of water is covered in the other 8%. Most current growing approaches use a lot of water. Tomatoes, one of the lower water consumers uses 26 gallons a pound, avocados 60 gallons each. Staples like green coffee beans and some nuts use 34x and 150x tomatoes. Almonds are far larger consumers of water 1.1 gallon per almond or 1,900 gallons per pound.



Today's rural industrial-scale farms use soil as a grow medium. They fortify it with fertilizers and often pesticides. Soils original nutrient value was lost long ago when topsoil was depleted of nutrients and annual floods. In some places, annual floods brought fresh topsoil, places around the world from the Yellow and Nile Rivers in China and Egypt to the Missouri and Mississippi river deltas in the US. But now, except for extreme-weather floods, these rivers have managed or controlled flow.

Packaging, food quality and shipping soil-grown crops great distances to consumers are all subject to climate change and sustainability issues. Rural agricultural runoff issues for soil-grown crops have also led to fresh-water supply contamination. Communities along Lake Erie's shore lost their water supplies when agricultural runoff of fertilizers and pesticides fueled algae blooms making the Lake Erie's fresh water undrinkable. Similar runoff problems have rendered many local water supplies, especially well across the US useless or have depleted the water resource itself.

Fresher food can taste better too. Interest has surged in better-tasting specialty crops like heirloom tomatoes and other fruits and vegetables not designed for the today's industrial food production and transportation. Urban agriculture fruits and vegetables can be effectively grown organic, without pesticides for example, but often the organic rules assume soil, so there are some efforts to change certification regulations.

Challenges with Urban Agriculture

There are a lot of challenges with urban ag, some of which can be addressed by city administrations. Land and development costs are typically high in urban areas. Utilities can be too. But cities have permitting and other regulations that rural areas do not. Agricultural development navigators could help guide City staff and bureaucracy move more efficiently through this unfamiliar use. Some cities distinguish between community gardens and urban farms. Once an operation begins to sell its produce, becoming a for-profit commercial organization, it moves into the urban farm category and needs to satisfy a host of zoning, permitting, and licensing requirements.

Another challenge for urban farming is that the cost of growing some types of crops, like many grains, will simply be too high for the foreseeable future.

Today's small scale of the industry, and its unique practices can present a business issue. Urban farming risk management can baffle insurers and other standard business line items. Similarly, while urban farming is constantly evolving and getting technologically stronger than ever, it still can take months to get the balance of nutrients and fertilizer right, especially in aquaponics, before production could begin in volume.

Nevertheless, there are for-profit and higher volume non-profit urban farms in Chicago that operate successfully. Unlike their rural cousins, the indoor facilities, in greenhouses or with artificial lights, can produce year-round and provide a sustained local food supply. This contrasts with the necessity of shipments from distant places where complicated growing and shipping logistics are increasingly subject to climate changes that can threaten food security.



Approaches to Urban Farming

Urban farms are generally much more productive per square foot than rural ones, especially if operated as vertical farms (multiple growing trays). Using local soil as a growing medium is not typically desirable nor necessary in urban areas. Existing soil in urban areas can be too contaminated for food production. Urban farming uses hydroponics and aquaponics to make soil unnecessary.

Aquaponics can double as a food production system for both fish and plants - both raised in a continuously looped system. The fish waste, typically from tilapia (they grow fast and are a salable fish product), is captured from the fish tanks, often right under the growing beds, where it can be broken down into nitrates by naturally occurring bacteria, before being used under the plant growing beds as fertilizer. The plants contribute to the water quality for the fish by filtering and oxygenating the water, which returns to the fish tanks.

Hydroponics uses water-based nutrient solutions fortified with essential minerals and no soil. The plants are grown in frames for support and soil itself is not essential, pretty much all plants can be grown this way, including root vegetables like potatoes or carrots.

A downside to hydroponics and aquaponics is on the front-end of the development. They are both very capital intensive. The cost of building the production facilities is much higher than preparing, tilling and seeding a field.

Flexible space requirements make both approaches of growing in a water solution well suited to urban settings. Fresh water is plentiful in some urban areas, especially those in the watershed of the Great Lakes and communities along rivers (thanks to the Clean Water Act of 1972).

From an urban development perspective urban farming can go anywhere, whether into new construction, old buildings, or disadvantaged areas where economic development programs can help with costs and create jobs. Every city has sites with these characteristics.

By operating close to customers, and having direct, even personal, relationships with them, the commercial producers can cut out many middlemen typical for a commercial food supply chain.

What Works in Urban Farming?

Large, urban, 75,000 to 100,000 square foot hydroponics “wholesale vegetable factories” have been developed, sometimes in high-cube spaces that use the height for many stacked trays of other vertical approaches. Typically, they have been built in urban industrial but they have not always done well. The problem has often been that investment is substantial and they can find themselves competing, at a wholesale level, against traditional agriculture producers with lower seasonal costs. Picking with scissor lifts and other costly labor practices can add costs.

Alternately, small (3,000 to 10,000 square feet) facilities can sell directly to the public at retail prices – thus capturing more of the food supply chain profit. The smaller facilities, which can pick-to-order for drive-up customers or commuters getting off of trains, are more labor intensive but can give customers exactly what they want.



A hybrid of this model is to actually grow food for consumption in a section of an actual grocery store. Efforts along these lines have been made in some of Kroger's chains. This is possible, in part, as grocery stores have gotten so enormous in the last two generations. Grow areas, for some produce can generate sales per square foot (like for fresh basil, special lettuces and tomatoes) earning them a spot in the store.

Community interest in (really) local food grew during Covid-19 as many local nurseries and many big box stores from regionals like Menards and national players like Home Depot & Lowes sold out of vegetable seedlings, seeds, supplies and garden beds and boxes.

Market interest, technology, demand and the potential for profits, jobs and environments gains are there. Urban farming is moving out of infancy and into the mainstream, with multiple business models and opportunities. Contact us know if we can help.

Market & Feasibility Advisors has developed case studies of: Upright Farms, Growing Home, Gotham Greens, Metropolitan Farms, Farmed Here, Urban Till and other operations.

Send ideas, thoughts and comments to me and my MFA colleagues at:

dan.martin@mfallc.com

or call 312.933.7898 to continue the conversation.

Thanks for reading.

About Market & Feasibility Advisors

Market & Feasibility Advisors (MFA) provides timely in-depth data, comprehensive analysis, and sustainable strategies for public, private, and non-profit clients.

Whether working directly for clients or as a part of multi-disciplinary team, MFA executes market, feasibility, master plan economics, and impact studies resulting in strategic planning based on realistic environments and the unique characteristics of each specific site, project, target market, and competition.

The MFA team of professionals brings more than 100 years of consulting and research experience to their projects. Many successfully worked together for years at the former Economics Research Associates, ERA and helped grow that firm prior to its sale.

We often work with firms that provide professional services in Architecture; City and Regional Planning; Exhibit Design; Fund Raising; Landscape Architecture; Legal Services; Survey Research; Civil Engineering; Theatre Design; Museum Planning; Transportation; Education and Branding.