



AN INTRODUCTION TO URBAN AGRICULTURE  
*PAST, PRESENT, AND FUTURE*

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## **An Introduction to Urban Agriculture – Past, Present, and Future**

### **Introduction**

As the economy continues to stagnate, unemployment rates remain high, and disagreements persist about the best ways to address our national debt, many Americans have begun taking steps towards increasing their self-sufficiency. In addition, environmental and energy concerns continue to grow, which have led to the development of sustainable practices becoming more commonplace in many professional fields. One area in which self-sufficiency and sustainable practices have merged is the agricultural field, specifically in urban settings, which has led to the growth of an urban agriculture movement.

This report focuses on a reemerging trend towards growing food within cities. Self-sufficiency, ingenuity within the food arena, and concerns regarding food security and health has led to the growing popularity of urban agriculture. Today, non-profits, private entrepreneurs, local city governments, and even the U.S. Department of Agriculture recognize urban agriculture as a means to enhance local economies, improve environmental and human health, and support food security.

### **Urban Agriculture – What is it and Why is it Beneficial?**

Urban agriculture is defined as “*the practice of growing, processing, and distributing fresh food by people living in urban areas.*”<sup>1</sup> It involves plant cultivation from sources that may include ground crops, vine crops, and fruit and nut-bearing trees; it may also include raising animals (such as poultry) and beekeeping. Urban agriculture’s unique feature is its direct integration with urban economic and ecological systems.<sup>2</sup> It builds upon existing urban infrastructure, incorporating food crops into densely developed and populated environments. Urban agriculture can take many shapes and forms, ranging in scale from row crops grown on city lots, to rooftop farms, to backyard gardens. Urban production helps people understand where their food comes from and how it’s processed, and it can also create many environmental, economic and social benefits.

Environmental benefits associated with urban agriculture include potentially lower use of petroleum-based products, such as fertilizer, pesticides, and transportation fuels, resulting in lower amounts of air, water, and soil pollution when compared to conventional agricultural practices.<sup>3</sup> Urban agriculture sites tend to be much smaller than those in industrial agriculture, thus rarely requiring the use of heavy machinery that relies on fossil fuels for harvesting and processing crops. Furthermore, because urban agriculture is produced in close proximity to where it is sold and consumed, less fossil fuel may be required for transportation.

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<sup>1</sup> “How U.S. Cities are Using Zoning to Support Urban Agriculture”. Dec. 2010. *Land Stewardship Project*. Web. <http://www.landstewardshipproject.org/resources-factsheets.html>

<sup>2</sup> “What is Urban Agriculture?” *RUAF Foundation*. Web. <http://www.ruaf.org/>

<sup>3</sup> Horrigan, et. al. “How Sustainable Agriculture Can Address the Environmental and Human Health Harms of Industrial Agriculture.” *Environmental Health Perspectives*, Vol. 110, No. 5. (May, 2002), pp. 445-456.

Because urban agriculture tends to occupy a much smaller footprint than that of industrial agriculture, large quantities of fertilizers, pesticides, and herbicides are not generally required to produce healthy yields. Organic farming (without the use of synthetic fertilizers, pesticides, and herbicides) is typical of urban agriculture. Research has also shown that organic systems can compare favorably to conventional systems in terms of yield.<sup>4</sup>



San Francisco City Hall: Slow Food Nation Victory Garden, 2008  
Source: *Justin Sullivan/Getty Images*

From an economic perspective, urban agriculture presents the potential for economic growth within cities. This growth can be realized through job creation related to urban agriculture start-ups and the sale of locally grown produce. The self-contained nature of urban systems allows food-derived income to be kept in the local economy. Additionally, urban agriculture sites can turn blighted areas of a city into amenities – potentially raising property values similar to the way that landscaping has been shown to raise home property values. This in turn may create potential development opportunities as well.

From a social perspective, benefits associated with urban agriculture may include efficient land use practices, community development, and improved health. As previously mentioned, urban agriculture generally makes use of much smaller physical spaces; it tends to occupy vacant urban lots and other dense urban areas, thus efficiently utilizing existing space. The proximity of urban agriculture to homes and businesses within cities raises its profile, giving citizens a direct visual link and possible hands-on opportunities to get involved. This proximity has the ability to create health benefits. People are more likely to consume produce when it is more readily accessible and when they have a direct connection to fruits and vegetables.

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<sup>4</sup> “LSP Myth Buster #21.” July 2008. *Land Stewardship Project*. <http://www.landstewardshipproject.org/resources-factsheets.html>

## Past Endeavors—Supporting U.S. War Efforts

Urban agriculture is not a new concept within the U.S. Produce gardens appeared during World War I, and reemerged during World War II, marketed by the federal government as Liberty Gardens or Victory Gardens. These “patriotic” gardens served as a way for the federal government to urge U.S. citizens to take an active role in producing their own food and were considered a “civic duty and morale booster”<sup>5</sup>, as well as a way to support the war efforts. The U.S. government recruited citizens to support the gardening effort using propaganda posters, magazine ads, and pamphlets. The campaign urged people to grow their own food with taglines including: ‘Join the Land Army’, ‘Sow the Seeds of Victory!’ and ‘Dig for Victory!’



Victory Garden Poster

Source: Jen Stewart. “It’s Planning Season for Recession Gardens”. Feb. 2010. *The Saturday Evening Post*.

Food security measures were required because the wars produced food shortages on the home front. Food was being shipped to U.S. soldiers in other countries, and wartime rations were in place.<sup>6</sup> Rations limited the amount of food a person or family could receive in a given week, and once gone, people could not receive additional food until the following week. Victory gardens allowed people to support themselves and supply needed sustenance when shortages occurred. During World War II, First Lady Eleanor Roosevelt felt so strongly about the return to Victory Gardens that she created her own White House Victory Garden to help promote the campaign. Roughly 20 million Americans followed her lead, and at the end of World War II, 40% of the country’s produce was grown in Victory Gardens.<sup>7</sup> Once the wars ended, however, the government no longer heavily promoted Victory Gardens, and the number of people growing their own produce began to decline.

## Present Initiatives— Leading the Way for Future Growth

### *Federal Government*

In 2009, First Lady Michelle Obama pulled from pages of eras past and created another produce garden on the White House’s south lawn. Aptly named the White House Kitchen Garden, it was the first garden to appear since Eleanor Roosevelt’s Victory Garden. While Mrs. Roosevelt’s garden had a strong tie to war efforts, Mrs. Obama’s garden focuses on health. The new garden is part of a promotional tool in Mrs. Obama’s national health campaign, entitled *Let’s Move!*, which urges American children and adults to eat healthy, locally grown produce and to implement exercise into their daily lives. This is especially important given national concerns

<sup>5</sup> “A History of Victory Gardens.” 2010. *ETPMC News*. U.S.D.A.

<sup>6</sup> “Victory Gardens, Our History.” *The Dinner Garden*. Web. <http://www.dinnergarden.org/victoryGardens.html>

<sup>7</sup> “Digging Their Way Out of Recession.” Feb. 2009. *The Economist*. Web. <http://www.economist.com/node/13185476>



regarding the rising rates of obesity and diabetes among Americans.<sup>8</sup> The national resurgence of urban food gardens can thus be seen as a revival of past practices. Margaret Lloyd, a Victory Gardens researcher from the University of California at Davis, believes there are multiple reasons for the resurgence, including concerns related to the recession, food safety, national health, and climate change.<sup>9</sup>

Also in 2009, the United States Department of Agriculture implemented a program called *The People's Garden*, spearheaded by Agriculture Secretary Tom Vilsack. This program is a federal initiative geared towards implementing gardens that promote community development and fight the challenges of hunger and environmental issues. According to the USDA, the program seeks to be collaborative, incorporate sustainable practices, help the environment, create teaching opportunities, enable social and cultural connections, and foster civic pride.

The initiative was named in honor of President Lincoln's description of the USDA (which he founded in 1862) as the "People's Department," and began as an effort to encourage employees to plant gardens at USDA facilities. Since 2009, the initiative has grown and now incorporates over 400 local and national organizations working together to establish community and school gardens across the country.<sup>10</sup> People's Gardens now exist in all 50 states, three U.S. territories, and five foreign countries.



People's Garden at USDA in Washington, D.C.

Source: *USDA Flickr Stream: "The People's Garden – Executive Master Gardener Program"*  
<http://www.flickr.com/photos/usdagov/sets/72157626313329987/>

People's Gardens exist in both rural and urban locations, and may or may not utilize food-producing plants. All food grown through the program is produced on land owned by the USDA and is donated to food shelves and shelters across the country to help improve access to healthy food for those in need. An interactive map of existing gardens can be found on The People's Garden website.<sup>11</sup>

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<sup>8</sup> Jen Stewart. "It's Planning Season for Recession Gardens." Feb. 2010. *The Saturday Evening Post*.

<sup>9</sup> "Digging Their Way Out of Recession." Feb. 2009. *The Economist*. Web.

<http://www.economist.com/node/13185476>

<sup>10</sup> "The People's Garden." 2009. *USDA*. Web.

[http://www.usda.gov/wps/portal/usda/usdahome?navid=GARDEN\\_RT1&parentnav=PEOPLES\\_GARDEN&navtype=RS](http://www.usda.gov/wps/portal/usda/usdahome?navid=GARDEN_RT1&parentnav=PEOPLES_GARDEN&navtype=RS)

<sup>11</sup> [http://www.pubinfo.usda.gov/garden/Map\\_View.cfm](http://www.pubinfo.usda.gov/garden/Map_View.cfm)

### *Local Governments*

Increasing public interest in urban agriculture has garnered the attention of many local governments. City governments throughout the country have begun recognizing the benefits of urban agriculture and have started enacting related policies, specifically focused on zoning code changes that incorporate issues related to urban agriculture practices. Many current city zoning codes either prohibit agriculture-related practices in proximity to other land uses or do not address the practices at all. This has made it difficult for entrepreneurs to start urban agriculture businesses. As a result, some city governments, with public support, have stepped up to the challenge of adapting zoning code changes for the benefit of urban agriculture.

Cities such as Chicago, Minneapolis, Madison (Wisconsin), Detroit, Seattle, Portland, Kansas City, Cleveland, Pittsburgh, and San Francisco are in the process of implementing zoning code changes and policies focused on promoting urban agriculture. These new zoning codes, in conjunction with new policies and ordinances, address specifics related to:

- Work vehicles and machinery,
- Disturbances – noise, smells, and pollution,
- Scale – plot size in relation to existing land uses,
- Animals – what types are allowed, and
- Sales – whether or not produce grown on site can be sold on site

In order for agricultural practices to occur in concert with other urban land uses – including residential, industrial, and commercial – many diverse aspects of the new land use must be taken into consideration, both for legal and livability reasons.

Some local city governments, including those in Minneapolis and Detroit, are taking urban agriculture one-step further by implementing it into citywide master plans. In Minneapolis, the city's Department of Health and Family Support has created an initiative named *Homegrown Minneapolis* that seeks to expand the city's ability to "grow, process, distribute, eat and compost more healthy, sustainable, locally grown foods."<sup>12</sup> A major part of this initiative involves the creation of a Minneapolis Urban Agriculture Policy Plan. Meanwhile, in Detroit, Mayor Dave Bing has led an effort to create a program called *The Detroit Works Project*. The program seeks to re-imagine Detroit, with urban agriculture serving as its catalyst for change and growth. In both cases, urban agriculture is being embedded into the way each city thinks about food security, economic growth, and self-reliance for the future.

### *Entrepreneurs*

In the non-profit sector, one visionary – Will Allen – has emerged over the past decade as an urban agriculture guru. In 1993, Allen started an organization in Milwaukee named Growing Power that sought to provide teens on the city's north side with the necessary resources for learning how to grow food. Since then, the organization has grown from a few greenhouses to a large scale working urban farm. Its headquarters in Milwaukee consist of greenhouses, hoop

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<sup>12</sup> "Homegrown Minneapolis." *City of Minneapolis*. Web. <http://www.ci.minneapolis.mn.us/dhfs/homegrown-home.asp>

houses (half-round hoop shaped structures that extend normal plant growing seasons), an apiary to house bees, pens for livestock, and a retail store for selling produce.

Today, the organization seeks to transform communities and their local food systems by providing citizens with training, demonstrations, workshops, outreach, and technical assistance. It also develops Community Food Centers in other urban neighborhoods, including the greater Madison and Chicago-land areas, which provide communities with sites for raising livestock and growing food in a sustainable manner. Allen believes in the transformative power of locally grown food, and states, “I believe we cannot have healthy communities without a healthy food system.”<sup>13</sup>

## **The Future – Agricultural & Architectural Integration**

### *Rooftop Farms*

Current practices focus on the integration of agricultural practices within the existing urban landscape. However, when integrated with architecture, additional opportunities exist for urban agriculture to flourish. Rooftop farms are becoming more popular, most notably at restaurants that focus on serving local foods, including The Bachelor Farmer in Minneapolis,<sup>14</sup> Uncommon Ground in Chicago,<sup>15</sup> and Bell Book & Candle in New York.<sup>16</sup> This form of urban agriculture makes use of existing unused space within the built environment, seamlessly tying together agriculture and architecture. However, rooftop farms are still in their infancy and have many hurdles to overcome, such as building code restrictions and building-related structural deficiencies. For example, many existing structures do not have ADA accessible rooftops (they are inaccessible to those with physical disabilities) and were not built to carry the additional weight of plants and soil. Despite these difficulties, rooftop farms have begun to appear. They have the ability to aid many different applications – ranging from restaurants and grocery stores, to schools and hospitals. Each of these institutions already serves and/or sells food on-site and could benefit from growing their own produce instead of importing it from other sources.

A handful of architecture firms have begun designing concepts for new developments that integrate agriculture and architecture from the beginning of the design process. These concepts are not simply new buildings with accessible reinforced roofs; they re-imagine the ways in which agriculture and architecture can exist cohesively within cities.

### *Vertical Farms*

One example of integrated agriculture and architecture is a project designed in 2007 by the west coast-based architecture and design firm Mithun, Inc. Named the Center for Urban Agriculture, the project was touted as “a vertical farm in downtown Seattle.” The project was conceived in response to the Cascadia Region Green Building Council’s Living Building Challenge and was awarded for being the most visionary among the entries received. According to Mithun, the

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<sup>13</sup> “About Us.” *Growing Power*. Web. [http://www.growingpower.org/about\\_us.htm](http://www.growingpower.org/about_us.htm)

<sup>14</sup> <http://thebachelorfarmer.com/>

<sup>15</sup> <http://www.uncommonground.com/>

<sup>16</sup> <http://bbandnyc.com/>

building concept focused on self-sufficiency, specifically in the areas of food, water, and energy.<sup>17</sup> The vertical farm model combined greenhouses, rooftop gardens, growing “fields” (terraces), apartments, and street-level retail all under one roof. It sought to completely separate itself from the city water supply through the use of a rooftop rainwater collection system, which would filter and purify water through the use of plants and recycle it throughout the building. This multi-use concept also sought to further implement urban agriculture practices by producing food that could be sold to local grocers.



Center for Urban Agriculture

Source: [http://mithun.com/projects/project\\_detail/center\\_for\\_urban\\_agriculture/](http://mithun.com/projects/project_detail/center_for_urban_agriculture/)

The vertical farm model is beginning to gain popularity in the architectural field. Several new concepts have reached the design stage, though none have been executed yet. Because no physical example currently exists, it's unknown whether such a project would be viable. Critics of the vertical farm model argue that towers of agriculture will not succeed without the use of artificial light, which would make such structures prohibitively expensive to operate. Because floors of crops are covered by additional floors in the model, only those plants nearest the windows would receive the full amount of necessary sunlight needed for growth, while those on the interior would need to be stimulated with artificial light. According to Peter Head, a planning and sustainable development leader at British engineering firm Arup, “light has to be very tightly controlled to get uniform production of very high-quality food.”<sup>18</sup>

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<sup>17</sup> “Center for Urban Agriculture.” *Mithun, Inc.* Web.  
[http://mithun.com/projects/project\\_detail/center\\_for\\_urban\\_agriculture/](http://mithun.com/projects/project_detail/center_for_urban_agriculture/)

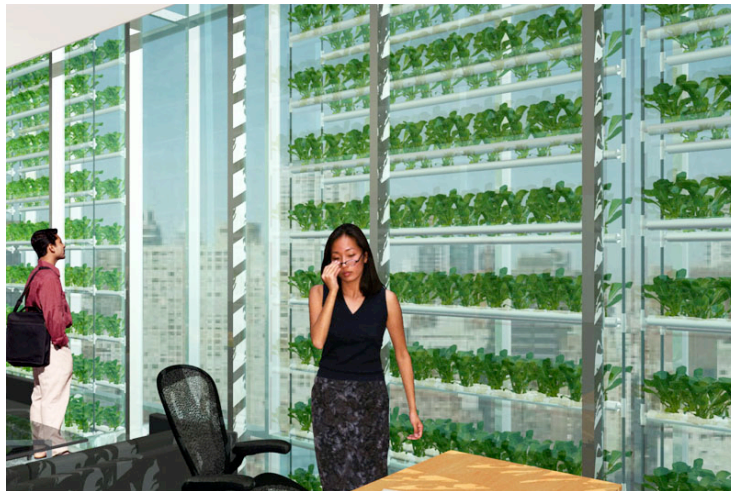
<sup>18, 19</sup> “Vertical Farming: Does it Really Stack Up?” Dec. 2010. *The Economist*.  
<http://www.economist.com/node/17647627>



Some believe renewable energy is the solution to such problems – including on-site solar panels. In fact, Mithun's Center for Urban Agriculture contains a south-facing wall of solar panels that aid in energy production for the building. However, according to environmental engineer and researcher Dr. Ted Caplow, generating enough energy from solar panels to light vertical farm crops would require an area about 20 times larger than that of the crop size.<sup>19</sup> This has been seen as the main roadblock to vertical farming's success. Since the model seems impractical from multiple standpoints, Dr. Caplow's non-profit, New York Sun Works, focuses on creating rooftop greenhouses. He believes that taking advantage of existing urban rooftop space is the way to go and that many retail operations, specifically groceries, will start growing produce for sale on-site in the near future.

### *Façade Farms – the Vertically Integrated Greenhouse*

Another New York-based firm, Kiss+Cathcart Architects, in collaboration with Arup Engineers and New York Sun Works, has developed a different model that integrates agriculture and architecture. This model, dubbed the Façade Farm, utilizes principles of greenhouse food production and ties them into building façades through the use of a system called a vertically integrated greenhouse (VIG). According to Kiss+Cathcart, the VIG is a “highly productive, lightweight, modular, climatically responsive vegetable culture system designed to be installed in the curtain wall of a high rise building.”<sup>20</sup>



Vertically Integrated Greenhouse

Source: [http://www.kisscathcart.com/integrated\\_agriculture.html](http://www.kisscathcart.com/integrated_agriculture.html)

Whereas typical glass and steel buildings consist of one façade (a glass curtain wall), the VIG implements a double skin façade. Rows of planters exist between two glass walls, connected to a pulley system, which would allow all planting and harvesting to occur on the building's ground level. A re-circulating hydroponics system would be used to grow the food, because the system

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<sup>20</sup> "Integrated Architecture." Kiss+Cathcart Architects. Web.  
[http://www.kisscathcart.com/integrated\\_agriculture.html](http://www.kisscathcart.com/integrated_agriculture.html)

has the ability to produce fruits and vegetables using ten times less water than conventional agriculture systems, and it eliminates the need for pesticides and fertilizers.<sup>21</sup> Furthermore, because the food is in a controlled indoor environment, it would have the ability to produce food continually, as opposed to conventional agricultural practices that rely on the weather.

Not only does this model have the ability to grow food year-round, it also has the ability to reduce carbon emissions associated with the use of farm machinery and long-distance food transportation. Kiss+Cathcart state that additional benefits of the system include a reduced environmental footprint, reduced transportation costs, greater food security, enhanced energy management of the building envelope, and improved physical and psychological comfort for building occupants.<sup>22</sup> The proposed VIG system could be designed into new buildings or retrofitted into existing ones. This flexible system could thus provide a range of social and environmental benefits.

### Bottom Line

As human populations continue to grow, commodity prices rise, and resources dwindle, food security measures must be addressed. Urban agriculture may be one such solution for future food security. This form of agriculture can benefit human health, aid economic growth, and offer environmental advantages. Urban agriculture's inherent integration with the urban fabric, and possible architectural integration, can also aid society and the environment by bridging gaps between built and natural forms. It has the potential to expand in cities with help from individuals, non-profits, private business entrepreneurs, and elected officials, many of who have already begun taking steps toward implementing urban agricultural developments. Food availability and agriculture's interactions with the environment affect everyone, so it would be wise for us to pay close attention to these issues and continue searching for sustainable solutions for the future.



Source: *The Victory Garden of Tomorrow*,  
<http://victorygardenoftomorrow.com/index.html#posters>

<sup>21</sup> "Vertically Integrated Greenhouse." *The Buckminster Fuller Challenge*. Web.  
[http://challenge.bfi.org/application\\_summary/127#](http://challenge.bfi.org/application_summary/127#)

<sup>22</sup> "Integrated Architecture." *Kiss+Cathcart Architects*. Web.  
[http://www.kisscathcart.com/integrated\\_agriculture.html](http://www.kisscathcart.com/integrated_agriculture.html)

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