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## Urban Agriculture

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### Synonyms

Farming in cities; Urban cultivation of food

### Introduction

Urban agriculture is defined as the production of food and nonfood items through cultivation of plants, tree crop, aquaculture, and animal husbandry within urban and peri-urban areas. It also involves the processing and distribution of a diversity of foods and nonfood products, using large amounts of human and material resources, products, and services found in and around those areas. City dwellers in developing countries commonly use urban agriculture as a livelihood strategy to generate food and income, while those in developed countries may engage in gardening more for recreation. However, these goals are not mutually exclusive, and people engage in urban agriculture for a wide variety of reasons. No current and reliable estimates of the number of people participating in urban agriculture exist;

however, Smit et al. (1996) roughly estimated the number to be about 800 million. Of these urban farmers, 200 million produce for markets and employ 150 million people.

The history of urban agriculture is the history of both cities and agriculture, which are intimately and intricately tied together. While there is disagreement about whether planned permanent settlements or agriculture came first, the two are mutually co-supportive and interdependent. So urban agriculture has existed throughout the history of cities, towns, and all permanent settlements. Indeed, agriculture is a fundamental component, along with permanent settlements, of civilization. The earliest documented form of urban agriculture is found in Shanghai, China, where productive lands continue to be used for urban gardening to this day (Girardet 2005). Urban residents have also cultivated home gardens for thousands of years. During the Middle Ages, kitchen gardens planted in large estates throughout Europe provided vegetables, fruits, cut flowers, and medicinal herbs to families and their servants (O'Brien 1992). In other areas of the world, entire cities have been constructed to support urban agriculture. For example, Machu Picchu in Peru was built in the sixteenth century with infrastructure such as terraces and irrigation canals, as well as systems for waste management and food storage (Lovell 2010).

Worldwide, urban agriculture continues to evolve to meet the needs of city residents. Increasingly, urban agriculture is seen as a response to rising food prices, urbanization,

and the need to improve the livelihoods of the urban poor. In 2008, the world's urban population outnumbered its rural population for the first time, and by 2030, it is estimated that more than half the world's urban population will live in cities. In most developing countries, more than half the urban population lives below the poverty level of USD 1 per day. To cope with urban poverty, many people turn to farming; as much as 20 % of food throughout the world is produced in urban and peri-urban areas. Studies in nine African cities reveal that on average, 35 % of households engage in some form of agriculture, and by 2020, 35–40 million urban residents of Africa will depend on urban agriculture to feed themselves (Prain et al. 2010; Denninger et al. 1998). In China, where the 14 largest cities produce 85 % or more of their vegetables with urban agriculture, the urban poor earn money by selling surplus produce from their gardens. Similar trends are found throughout South America, such as in Brazil, where more than 45 % of the population is involved in urban agriculture. In many cases, urban vegetable production is more profitable than other available urban jobs.

Urban agriculture in developed countries is increasingly recognized as a valuable urban activity, and many cities are now incorporating urban agriculture into city planning and policies. Montreal, for example, has worked to protect its 95 community gardens and 75 collective gardens from the pressures of urban real estate development, recognizing that these gardens are important for urban food security, the environment, and as a way of bringing diverse communities together. Numerous other cities throughout North America and Europe have adopted similar policies to promote urban gardening. Additionally, urban agriculture has become more prevalent in many developed countries as interest has grown in agricultural sustainability. Urban gardening is now seen as a means of reconnecting people with their food systems. In the Netherlands, programs such as *Gezonde Gronden* (Healthy Soil) have been introduced to educate city dwellers about specific methods of sustainable food production with the goal of enabling residents to grow food in their own town or

region. Similar programs are now found in many major cities in North America and Europe.

Throughout history, communities around the world have created urban agricultural systems that are adapted to the local climate, cultural preferences for crops, and that utilize locally available technologies (Lovell 2010). Urban agricultural systems take many forms, including backyard gardens and farms on vacant public and semipublic land, such as those gardens found under power lines and along road reserves in many developing countries. Other gardens may be found on the grounds of schools, prisons, and other institutions or in densely populated settlements where residents maximize their space by farming in containers such as sacks or old tires or gardening on rooftops. Community gardens have been established in cities worldwide, and the intentional transformation of vacant public lands into community farms is also occurring. Whether as a response to urbanization and economic insecurity or as a means of reconnecting city dwellers with their food systems, urban agriculture has continued to grow and is now valued by many cities as a tool to deal with food insecurity and to manage the urban environment.

There are several important ethical issues arising from or affected by urban agriculture, including livelihood strategies and issues of food security, environmental management practices, climate change, the use and regulation of natural resources, and social and gender issues. This entry examines these issues.

### **Urban Agriculture for Livelihoods and Food Security**

Confronted with poverty, unemployment, and food insecurity, millions of families in developing world cities and towns improve their access to food and raise income through agricultural activities in urban and peri-urban areas. This is now widely accepted as an urban livelihood strategy. Urban agriculture provides benefits to the economy in terms of employment and income, particularly for women and other disadvantaged groups

among the poor. Growing food in cities has some advantages over rural farming, including proximity to markets, low transportation costs, and reduction in postharvest losses because of reduced time between harvest and selling. While food insecurity historically was viewed as a result of inadequate agricultural production and food supply at the regional or national level, Sen (1981) showed that a household's food security status depends on its ability to access food by producing or purchasing it with its own assets. Urban agriculture can be an important part of an urban food security strategy either by providing additional income sources, increasing dietary diversity, or helping protect against seasonal unavailability in the food supply. Surveys conducted in the late 1990s in 24 cities, mainly in Africa and Asia, showed that people in poor households practicing urban agriculture ate more meals and had more balanced diets than other people. Data from Kampala, Uganda, in the 1990s suggest that children in urban farming households were better nourished than those in nonfarming households (Maxwell et al. 1998).

In times of conflict or other unrest, urban agriculture often keeps people fed when food supplies from the countryside are affected. Following the collapse of the socialist bloc in 1989, an economic crisis in Cuba created severe food insecurity throughout the country. As a result, thousands of urban residents began to cultivate urban gardens to provide food for their families. The government provided technical support and training to residents and relaxed laws on the sale of produce in urban areas. Although prior to the economic crisis urban agriculture was considered to be a sign of poverty and underdevelopment, it was quickly acknowledged as a key component of Cuba's national food security strategy (Altieri et al. 1998).

In North America and Europe, urban agriculture has also been used as a means of combating food insecurity. During the World Wars, upwards of 20 million households in England and the United States planted victory gardens to supplement their food supply during times of food scarcity. In the United States, beginning in the 1970s, the federal government and local city councils

began promoting urban community gardens as a way of revitalizing cities and providing food security to city residents who lived in areas with limited access to fresh produce. Much of the interest in urban gardening today centers around making fresh produce available to city dwellers at affordable prices. In the city of Detroit, numerous organizations are working with local citizens to convert vacant plots of land into community gardens and urban farms. Large areas of Detroit are considered to be food deserts, areas with limited access to food, particularly fresh produce. Many of the residents live at or near the official poverty level, so urban agriculture is a way of improving household food security and household nutrition. Other organizations, such as Growing Power in Milwaukee, have worked widely with households and youth groups to promote innovative urban farming methods as a way of providing both food and jobs to urban populations in Milwaukee and Chicago that live within food deserts in these cities.

### **Role of Urban Agriculture in Environmental Management**

In addition to contributing to livelihoods and food security, urban agriculture can also play an important role in the sustainable development of urban environments. Waste management is a major challenge faced by urban areas worldwide. Rapid population growth accompanied by widespread poverty, sociocultural change, and weak, resource-poor local governments has led to inadequate waste disposal systems in developing cities. While governments grapple unsuccessfully with solid and liquid waste management, the urban poor are known to be involved in waste recycling and compost production on a limited scale in many towns. A study of urban food production in Kenya identified the widespread use of organic inputs by urban crop farmers (Lee-Smith and Lamba 1991). About 70 % of the city's solid waste is biodegradable material which, if recovered, could be used either as livestock feed or for compost making. Waste composition affects the amount and quality of compost

that can be produced, and the higher the organic fraction, the better. In Mexico City, a barter market has recently been established where residents of the city can exchange recyclable waste, such as glass and plastic bottles, for tokens that are redeemable for fresh produce grown. This innovative program keeps waste out of local landfills and provides important income to urban farmers.

Wastewater farming is another important way in which urban farmers help recycle urban waste. In recent years, wastewater has gained importance in water-scarce regions like the Middle East and North Africa. Recycling of wastewater for irrigation in urban areas is a long tradition in many countries. In China, Egypt, India, Lebanon, Mexico, Morocco, Peru, and Vietnam, wastewater has been a source of crop nutrients for many decades. Jordan is one of the 10 most water-scarce countries in the world. A 2001 census of Amman found that 40 % of the population used gray water to some extent to irrigate their gardens.

Urban agriculture may also benefit local environments by ameliorating the environment and improving the biodiversity in cities. Urban agriculture, in the form of agroforestry, often provides shade for people and livestock and supplies fruits and nuts. Trees also act as windbreaks and improve air and water quality, provide places for outdoor leisure, and conserve biodiversity. In some regions of the world, year-round production strategies in urban areas create a steady supply of seeds, which may be shared with rural relatives during the dry season. In many developed countries, the urban environment may actually be more diverse than rural farmland. In Germany and the United Kingdom, urban beehives actually produce more honey than their rural counterparts because the cities contain more trees and flowers than the intensively farmed rural areas (Deelstra and Giradet 2000). City gardens may also improve biodiversity of plants, as well as attracting beneficial soil microorganisms, insects, birds, and other animals.

While farming in cities is beneficial in many ways for urban environments, it is not without hazards. Urban agriculture activities may contaminate local water sources if overly high inputs

of fertilizers and pesticides are used. Neighbors may complain of dust, odors, and noise created by the urban farms. If urban farmers do not manage their farm wastes well, these may clog the storm drains and pile up in the streets, leading to bad sanitary situations. Organic solid wastes that are used in compost production may transmit pathogens or attract disease vectors. Additionally, contamination of soil and irrigation water with heavy metals also poses health risks to many farmers or consumers of food grown in urban areas. Heavy metal consumption can result in long-term diseases, including cancer, neurological disorders, and chronic pain. Unlike most biological pathogens, which result in immediate illness, it can take years for health problems to manifest due to exposure to heavy metals. It is becoming more common in developed countries for urban garden projects to encourage testing of soil for heavy metals. However, this remains an expensive endeavor and is virtually nonexistent for urban agriculture in developing countries.

### **Urban Agriculture in the Context of Climate Change**

Predicted changes in climate, including more intense droughts, flooding, increased frequency of extreme weather events, and higher temperatures within urban heat islands, will require adaptations within urban areas. Thus, urban agriculture has the potential to make cities more resilient to future climatic change and to manage the risk imposed by more extreme weather events and natural disasters. Among city dwellers, the urban poor are particularly vulnerable to the impacts of climate change. Widespread drought or flooding negatively impacts rural agriculture, driving up urban food prices. This is particularly problematic in developing countries where urban residents may spend up to seventy-five percent of their household income on food. Urban agriculture enhances the coping strategies of the urban poor, providing them food and jobs in times of need and creating a social support network among urban farmers. Farming in the city

increases urban green spaces, which improves water infiltration in low-lying areas, which reduces the impact of higher rainfall during extreme weather events. Urban farms planted on hill slopes provide groundcover and may also prevent landslides during heavy rains. Additionally, urban agriculture may provide shade in some areas of the city, reducing the effect of the urban heat island.

In addition to helping urban residents adapt to climate change, urban agriculture can play a positive role in reducing urban energy use and greenhouse gas emissions. Food grown in cities reduces the reliance of urban residents on food imported from rural areas. Urban agriculture produces food in close proximity to consumers, requiring less energy for transportation, storage, and packaging of the food. Urban agriculture often relies on recycled organic waste for fertilizer. By composting and using organic waste for agriculture, this reduces the need for fertilizer and reduces methane gas emissions from the decomposition of organic materials placed in landfills.

In many cases, the benefits of urban agriculture as a means of mitigating climate change are secondary to the main purpose of improving household food security. However, some cities are adopting policies that specifically target urban agriculture to reduce the impacts of climate change. For example, the city of Chicago has adopted policies to promote rooftop gardens. These green roofs insulate a building, reducing energy spent on heating and cooling. They also absorb water during rain events, preventing runoff and erosion into storm sewers. Additionally, green roofs help absorb heat reflected off of concrete, diminishing the urban heat island effect and reducing energy used on artificial cooling systems.

### **Conflict in Resource Use and Policy Issues Around Urban Agriculture**

Acknowledging the many benefits of urban agriculture, it is now actively being incorporated into urban planning in many areas of the world. Globally, cities have begun to adopt official zoning

policies to facilitate the growth of urban agriculture. Specific policies vary widely, but generally, they aim to promote sustainable urban food systems by designating land for community gardens, providing technical support, and fostering economic opportunities for growers. However, despite its long history, the recent interest and explosion of urban agricultural activities have meant that official policy has not kept pace with the growth of urban agricultural activities, sometimes leading to conflicts between farmers, other residents, and city officials. There are various forms of conflict in resource use experienced by urban farmers. One form of conflict is due to different interests in the use of land, such as between urban farms and other types of urban development, including houses, industry, commercial properties, and roads. In many countries, urban farmers lack tenure for the land they farm, instead occupying vacant or unused lands such as open reserves near the side of roads. This places farmers in constant battles with local city authorities, who may harass farmers, vandalize their farms, or demand fines or bribes on a regular basis (Foeken 2006). Other conflicts between urban farmers and residents occur over the keeping of livestock. In North America, increased interest in raising chickens and other small livestock within city limits has forced many cities to rethink zoning laws. While some cities, including New York and Chicago, have opted to allow residents to raise a limited number of animals, opposition from other residents concerned about the noise and smell has kept other cities, like Montreal, from legalizing poultry keeping within city limits.

For many years, urban farming was not included in policy frameworks in cities and towns, but today it is being recognized for its contribution to poverty alleviation, food security, and sustainable urban development. In 2007, the American Planning Association adopted a policy that encourages its members to help build stronger, sustainable, and more reliant local food systems. In Argentina, policy support for urban agriculture appeared as a response to its 2001 economic crisis, while in July 2009, the mayor of San Francisco asked all municipal departments to

conduct an audit of land under their jurisdiction to create an inventory of land suitable for gardening as part of first-ever citywide food policy. A minister's conference on urban agriculture in East and Southern Africa, held in 2003, resulted into the Harare Declaration on urban and peri-urban agriculture, signed by all the participating nations. Kenya is currently developing a national policy on urban agriculture, while its national land policy has a section on urban agriculture and urban forestry. Kampala, the capital city of Uganda, has guidelines and a department of urban agriculture that institutionalizes the practice. Researchers, policy makers, and urban planners have accepted urban forestry management as one important strategy to improving urban living and working environment. In China, for example, research projects and education programs have been initiated to better plan for urban forests.

### **Social Capital and Gender in Urban Agriculture**

Urban agriculture brings city dwellers together and helps generate social interaction. Self-help groups of young people, women, and vulnerable people including the elderly meet as a result of their involvement in urban agriculture, giving them an opportunity to organize and share information and skills and together address their problems. This helps improve well-being while providing a voice that otherwise would not be heard. Together, these groups are able to advocate for technical, financial, or policy issues with both government and nongovernmental organizations. For instance, the Musikavanhu Urban Farmers movement in Harare, Zimbabwe, originally formed in Budiro and Glen View and has now spread to the other low-income suburbs. It started with seven families meeting and agreeing to form a group that would work together and engage in urban farming. Currently, the movement counts more than 5,000 members of which over 90 % are women.

Community garden projects around the world have been shown to foster relationships and create social capital among community members.

A study of the Dig In community gardens in Melbourne found that garden members created social support networks that people turned to in times of crisis and increased social cohesion among the garden members (Kingsley and Townsend 2006). The California Healthy Communities Project runs community gardens in 65 cities throughout California. They also found that these community gardens helped to build the capacity of their communities and were an excellent public demonstration of public health efforts designed to promote community engagement. In Philadelphia, a study of gardeners and non-gardeners found that people who gardened were more active in participating in other community projects. They were also likely to share the produce from their gardens with friends and family members (Blair et al. 1991).

In many cities, the majority of urban agricultural producers are women (on average around 65 %). Urban farming is a viable alternative to wage labor for women who lack access to formal employment due to limited education and training or sociocultural factors limit in their freedom of movement (Hovorka et al. 2009). As a largely informal sector activity, urban agriculture is in many cases especially effective and efficient for married women with children or women heads-of-households because it is often performed close to the home and combines well with their household responsibilities. Urban agriculture can be undertaken with relatively little capital, technology, and inputs. It is thus attainable and affordable for women with limited education and resources and often stimulates the use of indigenous practices. Urban agriculture contributes to empowerment, improved self-esteem, leadership, capacity building, increased independence, and freedom of women. It is important to note that for women, urban agriculture is not an overload of activities but rather a place to build their personal development and their capacity for social interaction and organization and overcome many conditions devaluation, subordination, and exclusion.

Challenges facing women interested or participating in urban agriculture activities are numerous. For example, women face severe constraints in accessing, using, and/or controlling land in

cities compared to their male counterparts. Men tend to have the first choice of any available vacant land, leaving women with low quality or less secure plots of land often located at a considerable distance from home. Even within households with adequate land resources, wives may be constrained in their ability to access these plots given this inequitable access to urban land between themselves and their husbands. A related challenge to land tenure is the distance to agricultural plots whereby women are often left to travel extensive distances to marginal lands, requiring considerable time, physical effort, and financial costs for transportation, if available. Women also face constraints in terms of urban agriculture production itself. Women often lack inputs and working capital, as well as access to knowledge and information on the use of modern inputs and technologies. The latter is partly due to women's limited exposure to commercial urban agriculture or to limited access to training courses offered by institutions or nongovernmental organizations. As such, Alderman et al. (1996) estimated that reducing inequalities in human capital, physical capital, and current inputs between male and female farmers in sub-Saharan Africa could potentially increase agricultural productivity by 10–20 %. For future agricultural research to produce meaningful changes, the needs, preferences, and constraints and differential roles of female farmers and women engaged in agricultural production must be recognized.

## Summary

Urban agriculture refers to the production, processing, and distribution of food and nonfood items within urban and peri-urban areas. It is often practiced as a livelihood strategy to generate food and income for poor urban residents, but it is also a form of recreation that connects people to the source of their food. In addition to contributing to livelihoods and food security, urban agriculture has been shown to increase social capital and foster beneficial relationships among community members. It can also play an important role in the sustainable development of urban

environment by aiding in the recycling of solid waste and wastewater, and it may serve to reduce the carbon footprint of urban areas by reducing urban energy use and greenhouse gas emissions. As rural food systems are impacted by climate change, urban agriculture is becoming a coping strategy for the urban poor. Challenges to urban agriculture include inadequate access to land and insecure land tenure, exposure to environmental toxins when farms are located in previously degraded environments, conflicts between different land users, and a lack of policies in cities to help regulate urban agriculture.

## Cross-References

- ▶ [Cuban Agriculture](#)
- ▶ [Climate Change, Ethics, and Food Production](#)
- ▶ [Food Deserts](#)
- ▶ [Food Security](#)
- ▶ [Home Gardening](#)

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