

Urban Agriculture

Food, Jobs and Sustainable Cities

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Chapter 11 Promoting Urban Agriculture

By:

Jac Smit

Joe Nasr

Annu Ratta

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Promoting Urban Agriculture

Why Promote Urban Agriculture?

This question can be interpreted in two ways. First, we may ask why urban agriculture should be considered as a valid activity? Most of this book (and particularly Chapter 7) has sought to examine this question, indeed, many examples of successful urban agriculture during the last generation are included. Second, why intervene in an activity if it is already successful? It is essential to explain why active promotion of urban agriculture through a range of policies and other interventions is necessary. This chapter offers such an explanation.

The sub-title of this book is *Food, Jobs, and Sustainable Cities*, a phrase that neatly encapsulates both the purpose and priority of this chapter. By producing food, urban agriculture can enhance the food security of the urban poor and food quality consumed by all urbanites. By creating jobs, urban agriculture can generate economic development and sustainable livelihoods. And by contributing to sustainable cities, urban agriculture can support the broad agenda of sustainable human settlements as a component of the global ecology.

Capturing the many potential benefits of urban farming, solving problems that often accompany it, and overcoming the obstacles to its further development will require policies and programs that promote and regulate appropriate urban agriculture. This chapter suggests how to accomplish this challenging task.

The policy requirements for urban agriculture are different for:

- low-income, food-deficit countries;
- industrializing countries; and
- developed countries.

There are also special considerations for small island nations, isolated mountain countries or regions, arid regions, countries with low soil fertility, and a range of urbanization in countries.

A low-income, food-deficit country can choose for its urban areas to move toward food self-reliance in relevant crops, choose to develop its agriculture industry for export into the global market, or it can choose both. When a country is successful over the years at one or both of these options, it may choose to change its agricultural policies.

Industrializing countries such as Brazil and Thailand face problems for which urban agriculture can:

- improve nutrition in expanding cities,
- protect natural resources and environmental quality,
- encourage the informal economy to integrate with the formal economy, and
- exploit the opportunities that are offered by an urban and newly affordable diverse cuisine.

Developed countries are experiencing two trends in agriculture — conversion to larger production units that use high levels of external inputs, and the reemergence of smaller-scale production that uses low levels of external inputs, within and adjacent to urban areas. Urban agriculture policy issues in these countries are commonly

- food insecurity for low-income households and neighborhoods,
- environmental degradation caused by large-scale agriculture,
- environmental pollution caused by urban wastes, and
- deterioration in the quality of some foods.

Field visits and observations, a review of the literature, and workshop discussions have revealed that most of the actions required to promote urban agriculture are already being practiced today in cities and countries around the globe. Much can be learned from the success stories as well as from cautionary tales.

Government policies and institutional programs affecting urban agriculture are significantly different in the developing world than in the developed world. There are also differences in Europe and its former colonies, as well as in nations that were never or little influenced by European urban values and governmental systems. One size does not fit all for policy approaches and programs. Towns and cities in better-off regions and countries face a plethora of problems with obsolete and irrelevant laws, codes, infrastructure, and administrative practices that hinder the maximum benefits of urban agriculture.

This chapter has four main sections. The first suggests a framework to promote urban agriculture. The second and third consider the types of interventions that can increase the range and effectiveness of urban agriculture — broad interventions and those that focus on specific benefits. The fourth section revisits these interventions, considering which are most appropriate at each of four levels — community, city, national, and global.

Framework to Promote Urban Agriculture

Too many places around the globe face ever-greater water shortages, environmental degradation, and urbanization rates ahead of rates of economic growth or food production. We have only recently rediscovered that urban agriculture can reduce water consumption and conserve environmental resources. The success stories are not always from places that can benefit the most, whether the slums of Washington D.C. or the favelas of Sao Paulo. There are certain locations and groups where the potential to expand urban farming is particularly great. It is to these places and people that the interventions in this chapter are particularly targeted.

Policy changes and other interventions may be most significant in two principal arenas — agriculture and urban management. These might include providing the same

opportunities to urban farmers that are now provided to their rural counterparts, assigning appropriate importance to agriculture as an urban activity and land use, and ensuring that farming is both environmentally sound and safe for human health.

Parallel policy changes may be required in the agencies responsible for education and health. Food safety regulations may benefit from revisions that reflect practices in both urban food production and the corollary components of the urban food system, from inputs to markets. In a polluting, urbanizing world, the role of nutrition and agricultural education in primary schools may be due for a change in some countries. Berlin, California, and Canada agree on the need for school gardens and primary agriculture education for everyone.

It may have been a good idea in 1900 to separate land uses into sectors such as residence, industry, and agriculture. The city planning policy of ‘Cartesian zoning’ is no longer as relevant in 2001, yet this is the spatial context within which urban agriculture typically operates.¹ Policies to overcome structural land use and zoning constraints can help liberate the potential of urban farming.

Updated environmental policies should promote urban systems that close polluting nutrient and energy loops. Green, healthy cities will not emerge based on 1950s environmental policies. Around the globe, urban waste management and related infrastructure design and maintenance are degrading the environment and reducing food security.

In some towns and cities, there is a hopeful genesis of community-based biological waste management. This beginning requires support to strengthen and expand the effort. Realizing this potential will establish a health revolution in less-wealthy urban places and provide a foundation for urban agriculture.

The technology of urban agriculture can provide environmental refugees (those suffering from ecological disasters) and conflict refugees with a foundation for self-generated nutritional and health security more reliable and of better quality than relief supplies. Yet in crisis settings, interventions based on food production are only now starting to be recognized and tested. Capturing this potential still has a long way to go.

Policy research will be needed in most settings before changes can be adopted. Surveys should include (a) food system mapping; (b) current roles of urban/peri-urban agriculture; (c) nutritional status by locus, income, and social status; (d) land use; (e) food safety; (f) informal food distribution; (g) water use; and other relevant factors. In most cases, household and land-use surveys should be first.

Last but not least, there is a global change taking place in trade relations. Policies dealing with food security, enterprise development, and urban agriculture may follow a different path than the rapid and rigid drive to global systems. Community-based systems, including food delivery, are developing in parallel (and sometimes as substitutes) to global systems. Various interventions can help enhance the capacity of those systems, particularly in reaching those bypassed by global trade. The OECD recently reported that 80 countries have lower family incomes in 2000 than in 1990.

A framework to promote urban agriculture must include the main elements mentioned here, and must be considered at all levels — from community to global. The following

sections analyze the range of interventions. Tables 11.1 and 11.2 present possible frameworks to categorize interventions across and within sectors, examined at different tiers of intervention.

Table 11.1 Interventions to promote urban agriculture at the community, city, national, and global levels

Activity	Community	City	Nation	Global
<i>Policies and programs</i>				
Adopt policies linking urban food and nutrition with urban farming		♦	♦	
Integrate urban agriculture into urban planning (land use, waste, wastewater)		♦	♦	
<i>Reorganization for urban agriculture</i>				
Develop institutional capacity	♦	♦	♦	♦
Assist farmers with organization	♦	♦	♦	
Foster cooperation among stakeholders	♦	♦	♦	♦
<i>Research and information</i>				
Survey and document (indicators)	♦	♦		
Disseminate information (network)		♦	♦	♦
Conduct research	♦	♦	♦	♦
Create model codes and standards			♦	♦
<i>Access to resources and services</i>				
Improve access to inputs		♦	♦	
Provide extension and technical assistance	♦		♦	
Improve and support access to credit		♦	♦	
Provide access to land, water, and waste		♦	♦	
Provide right to land tenure			♦	♦

Source: The Urban Agriculture Network

Table 11.2 Areas of policy change that might achieve specific benefits through urban agriculture

Area	Community	City	Province	Nation	Global
Food security	♦	♦	♦	♦	♦
Health and nutrition	♦	♦		♦	♦
Safe food		♦	♦	♦	♦
Jobs	♦	♦			
Enterprise	♦	♦			
Marketing	♦	♦	♦	♦	
Natural resources	♦	♦	♦	♦	♦
Greening	♦	♦	♦		
Pollution	♦	♦	♦	♦	♦
Water reuse	♦	♦	♦		
Disaster mitigation		♦	♦	♦	♦

Source: The Urban Agriculture Network

Interventions that Encompass Multiple Aspects of Urban Agriculture

For the past century, urban agriculture has often been either invisible (China) or an outcast (USA). Many policies and action programs are appropriate for the entire industry. For example, policies to encourage approval of urban agriculture by mayors and other leaders have been enormously effective. Simple data collection, inclusion in media programs, and integration into primary education establish a foundation for city farmers to build on. Everything mentioned here is happening somewhere in the world.

Increasing Public Knowledge and Support

Broad appreciation of the benefits of urban agriculture is needed to overcome both traditional and modern biases. Public information aimed at current and potential service organizations is perhaps the most effective tool to transform the industry from its cottage status into a major instrument moving toward food security, sustainable livelihood, and environmentally-sound development. Information intended for the poor should receive priority because urban agriculture can most benefit those suffering from food insecurity and poverty. Information via radio, primary schools, primary health care centers, and community development programs may occur simultaneously with programs targeted to the general public.

Delivery of public information is likely to differ according to the level of development in a country. In low-income, food-deficit countries, radio is still of highest importance.² In the industrializing countries, the Internet is spreading rapidly and

television is well established. In the developed countries, newsletters, listservs and distance learning may be most effective.

The means of communication will vary with the organization. Local support organizations (NGOs, community-based organizations, and farmer organizations) can be reached most effectively through articles in newspapers and newsletters, radio and TV, workshops, and national and regional networks of similar organizations. Development agencies, government agencies, and researchers can be reached through journals, newsletters, listservs, conferences, and workshops.

Information about the benefits of urban agriculture is beginning to appear regularly in the mainstream media. But, as with most news reporting, the media pays more attention to bad news than it does to success stories. A continuous stream of success stories may help generate more balanced and analytical reporting.

Educating the next generation is critical to making urban agriculture a broadly understood and accepted industry. Primary agriculture education in schools, including outdoor environmental/agricultural classrooms and greenhouses, is an essential component of any action plan for public awareness. Vocational training in urban agriculture practices is being incorporated into the secondary school curricula in an increasing number of countries.

Urban agriculture tends to be visually attractive relative to many other industries — green gardens, blooming trees, cute small animals, or healthy children cultivating the land. Television and Internet graphics will be an important (if not cheap) tool in public understanding.

Building Institutional Capacity

Initiating or significantly increasing the scope of urban agriculture will require changes in the functions and priorities of some agencies and institutions. The capacity for urban agriculture is in short supply in many agencies, including health, education, urban development, environment, sanitation, housing, and trade. In most places, urban agriculture does not come under the exclusive agenda of any ministry or government department. It has usually fallen through the cracks.

The appropriate department to oversee urban agriculture will vary from country to country. Possible candidates include the ministries of housing and urban development, agriculture, and environment. Where urban agriculture is part of a national government's agenda, it is most commonly part of the agriculture ministry. In cities, it is more commonly found under the responsibility of the parks and recreation department. None of the studies reviewed during our background research compared the administrative organizations and regulatory frameworks of cities that support urban agriculture and those that do not. The differences in health codes and enforcement, food regulations, environmental regulations, police accountability, waste management administration, and other factors should be examined.

Comparative studies will provide important input for designing alternative institutional structures needed to manage urban agriculture. This area of study is an important aspect of policy research. Exchanges among countries and cities with similar climate and history will accelerate needed changes

Training is needed to build the institutional capacity to provide effective oversight of sector activities. Training for government personnel who will monitor the riskier techniques used in urban agriculture is particularly critical, especially if solid and liquid wastes are involved.

Insect and disease control and fertilization require a different set of indicators for urban agriculture than for rural agriculture, and specialists will need to be trained. United Nations agencies can be important resources to support institution-building for urban farming, each within their respective mandates.³

Building Political Will

Even in countries such as Chile and the United States where there are more urban than rural farmers, the former remain invisible to both legislators and government administrators. Without political will, the legislative and policy changes needed for urban agriculture to achieve its potential will not emerge — even if the public understands the benefits.

Policy priorities will differ from low-income, food-deficit countries to industrializing countries to developed countries. The first are likely to put food security and import substitution first, while industrializing countries may be more concerned with poverty amelioration and environmental degradation. The developed countries are emphasizing ‘good food’ and a healthy environment for living.

Political will can be informed and created through ‘policy training’. For example, one- or two-day leadership forums could be held to educate politicians about the contributions of urban agriculture and the challenges it faces from community and city leaders. Such forums could be facilitated by experts in urban agriculture, environment, health, and related topics to ensure full consideration of all critical areas. Field trips to production sites, cities, or countries where urban agriculture is well managed will help convince political leaders and government administrators of the benefits of urban farming.

Some of the most effective capacity-building programs have started from the top. Even one or two people attached to the office of a mayor or governor can initiate a program that is later disseminated. Current and past mayors known as friends to city farming include Jaime Lerner in Curitiba, Brazil and Richard Daley in Chicago, USA.⁴

Endorsements by high-level public leaders, such as those by Zambian President Kaunda in 1977, Tanzanian Prime Minister Sokoine in 1980, Soviet Union President Gorbachev in 1982, Chinese Chairman Mao in 1968, and Cuban Chairman Castro in 1992 can have a powerful, positive effect on how public officials view urban farming.

With the support of international agencies, many cities have adopted policies and programs to become a ‘green city’, an ecologically ‘sustainable city’, a ‘healthy’ city, or a ‘people-feeding’ city.⁵ Such programs also contribute to building political will, at least by providing legitimacy to what is often a little-known or nearly invisible activity. Local variants to such programs could help build political will for urban agriculture.

Regional and global forums can also produce significant results. During 1994, civic leaders discussed urban agriculture at a global forum in Manchester, England.⁶ At an

international colloquium of mayors in New York City in 1997, the 100 assembled mayors agreed that urban agriculture (along with job generation and microenterprise development) would be their first action to fight poverty.⁷

Certain groups are likely candidates to spearhead political awareness of urban agriculture — women, farmers' associations, anti-hunger and environmental advocacy NGOs, waste management organizations, or similar groups.

In many countries, relevant data can contribute to building political will. In places where politicians respond to appeals to support the farmer (rather than simply the agricultural product), data on the number of urban farmers and their contribution to urban and national well-being will be invaluable. Urban farmers in Italy, Japan, and Germany already have a political voice. In many countries, environmentally active political parties can lead the drive to strengthen the political will to support urban farming or place it higher on the agenda.

Efforts to build political will are needed in all sectors in which urban agriculture is effective — food, energy, urbanization, environment, agriculture, and health. However, as long as urban agriculture continues to be as unorganized as it is in most countries, the political will to support it is unlikely to emerge. Organizing farmers will continue to be a front-line intervention.

Organizing More Effectively for Urban Agriculture

As communication contributes to an ever-shrinking world, it is increasingly common to borrow forms of organization across national and continental boundaries. Models of ideal organizations and work plans for this 'new' urban industry are urgently needed.

There are diverse organizational models for urban agriculture. China has had a well-established national model since the late 1960s. Countries in Central Europe have been evolving new systems during the past decade. South Africa and Cuba⁸ have set dramatic new directions and had major achievements since 1992. Each of Canada's larger provinces are following a different path. Although the Singapore model is efficient, it may not be applicable in the Philippines or Mongolia.⁹

City farmers are generally not organized, especially low-income farmers. For this reason, efforts to educate the public about urban agriculture and its benefits should include the farmers.

Small-scale farmers (most often women) will often require help to organize into cooperatives and associations and facilitate development of existing organizations. Assistance is also called for to enable existing CBOs and NGOs to adopt urban agriculture, or for new ones that focus on it to be established. Improved organization of farmers would benefit production as well as improved access to pre-production and post-production facilities. All these actions would ultimately create economies of scale, strengthening the competitiveness and profitability of urban farming.

Improving Communications

A network can facilitate communication among farmers as well as disseminate information. The Urban Agriculture Network is one such network, facilitating regular exchanges of information among urban agriculture groups around the globe and connecting them with corresponding experts. The SGUA (Support Group for Urban Agriculture) has recently created RUAF (Resource Centre for Urban Agriculture and Forestry).¹⁰ RUAF produces a magazine three times each year, manages electronic conferences, and is organizing a database. In 2000, the Consultative Group on International Agricultural Research (CGIAR) founded Urban Harvest, an urban agriculture initiative that will coordinate the urban research of its 16 member institutions. Urban Harvest is based at the International Potato Center in Peru.¹¹

The Cities Feeding People program at IDRC in Canada plays a leading role in establishing regional networks for urban agriculture research. Through AGUILA (Urban Agriculture Research Network in Latin America and the Caribbean), information exchanges take place rapidly.¹² In Europe, several countries have national affiliations of allotment gardeners or city farmers, and there is a coordinating office in Brussels. In North America, the ACGA (American Community Gardeners Association) and CFSC (Community Food Security Coalition) are both increasingly supportive of urban agriculture efforts.¹³

There are now urban agriculture networks, present or in their formative stages, girdling the globe. New networks are forming in South Asia, West Africa, and the Middle East.¹⁴ Such networks can reach urban farmers and their associations, and they can help coordinate actions with the respective agencies.

RUAF instituted urban agriculture communications centers in three cities in 2000 — Quito, Dakar, and Harare.¹⁵ Each of these centers will provide information to several surrounding countries.

Networks in related areas such as sustainable agriculture, nutrition, food security, and microenterprise development are being linked to the urban agriculture networks, as are specialized networks, including poultry farming and ecological sanitation. With the widespread emergence of the Internet in the 1990s, the two most significant linking devices are currently the sites of CityFarmer and Cities Feeding People.¹⁶

Developing Appropriate Technology

Appropriate technology for urban agriculture must fit the priorities we set at the beginning of this chapter —be useful to the small-scale, low-income farmer; promote jobs and economic development within human settlements; and contribute to ecologically and socially sustainable towns and cities. The next agricultural revolution will be very different from the successful technologies of the Green Revolution. More food was generated by the Green Revolution, but also greater ecological degradation. In some countries, people who were already better off received relatively more benefits.

Urban agriculture offers an opportunity to have more farmers producing a wider range of crops, livestock, fish, and medicines. Biotechnology research at the urban level

can focus on the local climate, ecology, and culture. It can also focus on region- or country-specific problems such as saline soils, insect pests, vitamin deficiencies, or frost.

The technologies that have recently increased the effectiveness of urban agriculture include small-scale hydroponics, plastic greenhouses, drip irrigation, small-scale poultry, vermi-composting, and aquaculture (including wastewater fisheries).

Technologies that respond to the problems that underlie urban food poverty will require continual policy development. It has been suggested that the process of setting policies include:

- consulting with the poor,
- improving dissemination mechanisms for biotechnology, and
- determining what investments need to be made in human and financial resources to ensure that solutions to the problem of food security reach the poor.¹⁷

Expanding Research

The most pressing research need is to develop tools to eliminate the constraints that hinder development of urban agriculture and solve problems associated with current practices. Studies and data are needed to help urban farmers gain credit ratings from banks, improve small-scale producers' access to wastewater, help agribusinesses to serve urban farmers, provide the same urban agriculture opportunities to low-income mothers as are now available to well-financed businessmen, and ensure that food produced within cities is consistently safe. Research to increase productivity and improve the environmental, health, and urban management record of urban agriculture is also needed.

Urban agriculture is an emerging research field, and its parameters and methods must be defined. Urban agriculture was 'discovered' separately by social scientists, urban planners, and agronomists. Each discipline brought its own past practices to the 'new' field. Research methods used in urban agriculture today are an eclectic mix. A focused effort is needed to agree on definitions, concepts, and research methods among the small number of urban agriculture researchers so that greater comparability across data sets becomes possible.

Surveys are needed to generate data on the current state of urban agriculture as well as projections for its potential. These baseline data are needed to convince investors, supporters, and promoters of its benefits and to provide inputs to the process of formulating policies and interventions. By including urban agriculture in census and other data collection, governments can send an important signal about the key role the industry plays in the national economy. Many of these surveys can be carried out by professionally supervised secondary and college students.

The impact of future interventions can be measured against such baseline data. Specifically, data are needed on:

- the geographical extent and structure of urban agriculture,
- food system demand and supply,
- input and output markets and links,

- socioeconomic effects of increased income and more employment opportunities,
- technologies and farming system mix and efficiency,
- nutritional and health impacts of farming,
- environmental impacts and their enhancement and/or remediation,
- waste management integration, and
- contributions to conservation of water and other resources.

Farming system surveys study a particular farming system or subsystem in depth (for example, horticulture and fisheries or, more specifically, hydroponics or wastewater-based aquaculture lagoons). Farming system surveys identify the production process, producers, technologies, inputs, markets, linked sectors (input and output industries, credit agencies, extension and research agencies), beneficiaries, and ecological, economic, and social impacts. Such surveys are needed to define existing and potential benefits, as well as the needs of each farming system. They should also provide information on the links among farming systems. Information on any synergy among specific crops, and more broadly, among systems is crucial to the design of successful urban agricultural systems.¹⁸

Both baseline surveys and farming system surveys will reveal the current status and extent of farming in a particular city. A baseline survey could include a land survey to establish which parts of the city are currently farmed and which could be farmed. It could also include market and household surveys to establish the percentage and type of residents who are farming as well as details about the farming activity. A number of broad-based surveys have been undertaken in the past few years. It may be feasible to review the best of these surveys in order to devise an efficient instrument that could be adapted to different situations.¹⁹

Comprehensive studies also need to start with the dinner plate and move backward through the entire food system of various cities. The potential for urban agriculture requires knowledge from both the consumer and producer about:

- consumption, need, demand, and satisfaction; and
- supply, technology, capacity, and therefore, opportunity.

The so-called ‘microbe hunters’ of the late 19th century were searching for microbes that caused diseases, and urged us to keep our distance from them. Today we are enlisting microbes as sanitation workers to consume and transform unsanitary waste into beneficial inputs for urban food production and other greening activities. Research is needed to transform these emerging systems into safe tools for use by small-scale urban farmers.

We advocate comparative studies to define best practices in the world today and studies of previous urban civilizations to rediscover ‘what worked’ and what did not. For example, the low-density settlements of the Yucatan Mayas and Gangetic delta Bengalis may be compared to the high-density settlements of the Andean Incas and the Harrapan civilization of the Indus delta.

Climate and cultural regions need to be examined and compared across continents. As presented in Chapter 6, urban agriculture interacts closely with other urban systems. In order to plan, studies are needed that compare situations that have similar circumstances.

There are many special sets of circumstances such as small islands, mountain towns, or oases. Some are more nutritionally self-reliant through urban agriculture than others, and until today the cause is mostly a mystery. Comparative research studies could potentially present all similar settlements with an optimum choice. All of this research can benefit from ‘food mapping’ which, as we have noted, can begin with work by secondary school students.

Looking back to renaissance cities and the industrial cities of our fathers, today cities are more than ever being conceived, planned, built, and managed by the urban poor. This is commonly called squatting — informal or uncontrolled urbanization. This new kind of city often includes urban agriculture, and we need to study its systems.

Policy research is needed from the global to the local scale. Globally we need to analyze why policy shifts by Gorbachev in Russia, Sokoine in Tanzania, and others had such a massive impact. At the local level policy research begins from the viewpoint of the dinner plate. Who benefits in what way? Which opportunity is being overlooked? Who support urban agriculture and who opposes it.

Strengthening Training and Technical Assistance

Four types of training are urgently needed for this burgeoning industry:

- policy training for executives and politicians,
- management training for NGO directors and heads of government agencies,
- extension training for government and NGO extension agents, and
- production and business training for farmers.

Training in urban agriculture, as distinguished from public education, may first be driven by the needs found at the ‘dinner plate’. Where does food insecurity lie? How can this systemic shortfall be resolved? Second, training may be oriented to degradation in the environment. Is this a good environment in which to raise your children? How can you contribute to making this a healthy city? Third, training may be driven by market analysis. Few farmers can respond positively to these questions if their return to labor is too low.

In designing training activities, pilot projects can show what the benefits of urban agriculture may be and provide investment models for policymakers, bankers, support agencies, farmers’ organizations, and government departments. Case 5.1 reports on the success of this approach in Viet Nam.

In this rapidly evolving field, technology transfer within and across national, cultural, linguistic, and continental borders is critical. A few ‘hot’ technologies have been spreading rapidly, but they have tended to be high-profit rather than high public-good technologies (lagoon shrimp and hothouse flowers produce dollars faster than mushrooms and drip irrigation vegetables).

Projects to support technology transfer have many successful examples in some urban agriculture farming systems. Support for these programs is needed to increase not only yields, but also the number of crops, as well as to advance ‘safe food’ methods.

Technology transfers are generally easier to accomplish within a country or region rather than across regions.

Technical assistance most often takes on the shape of an extension worker. Outside of a few countries (particularly in Asia), urban agriculture extension has usually been provided by rural extension workers employed by a government. The few trainers with special competence in urban farming are often based at a few NGOs.

Too often the extension worker in the city has been the promoter of (a) commodity agriculture, (b) the social benefits of gardening, (c) the nutritional benefits of a particular diet, or (d) a certain set of inputs (seeds, tools, fertilizers, etc). Urban agriculture now needs extension workers who are experienced in the local market, calculating returns to labor, and promoting a healthy environment. Training these trainers has been addressed in a previous section, Building Institutional Capacity.

The most appropriate urban agriculture technologies in any location can often be found by seeking the local best practices, that is, the farmers who produce the greatest output per unit of land or labor. The goal of training would then be to advance the production level of all farmers to that of the best local practices. It may be useful for trainers to document best practices, arrange farmer-to-farmer visits, and encourage the best-practices farmer to become a teacher and coach.

Training in urban agriculture may best be accomplished by farmer-to-farmer contacts. In this way, a farmer who is proficient in a best practice conveys his or her skill and knowledge directly to another farmer. Similarly, the leaders of the most effective NGOs should train other NGO leaders within a country.

Improving Access to Resources, Inputs, and Services

One of the greatest obstacles for urban farmers is lack of access to credit. Possible approaches to increase the amount of credit available to urban farmers include:

- providing a special line of credit for urban farming entrepreneurs,
- reserving part of an existing agricultural credit quota for urban farmers,
- including urban farming among the industries eligible for special small-enterprise support, and
- earmarking loans for woman and single-parent farmers.

Urban farmers often do not achieve maximum yield on a new site for 2-4 years. Support programs or soft loans with a possible repayment delay may be desirable in the first years of a farmer's involvement.

To improve the access of small- and medium-scale urban farmers to markets and market information, government departments could:

- create market places for small-scale farmers (see Case 9.8 on Ibadan),
- provide incentives for operators in the market to cater to small- and medium-scale urban farmers, and
- help farmers to form marketing cooperatives.

Urban agriculture requires strong links with other industries to achieve its potential. Interventions by NGOs, community-based organizations, or municipalities may be needed to ensure timely establishment of these links, especially for small-scale producers and processors.

Urban farming can benefit from some of the latest science and use some of the most modern agribusiness inputs. However, great caution is needed in defining the how and when of these adoptions. Agribusiness can provide markets for some urban agriculture products, however, with the advent of the Internet, urban farmers can increasingly sell on the global market without agribusiness assistance (or charges). Urban farming and agribusiness can benefit each other, but a neutral meeting place may need to be arranged by government or other institutions.

Interventions that Focus on Specific Benefits of Urban Agriculture

Urban agriculture is a major industry in some cities, yet a minor one in others. Variations include not only its level of development, but also the emphasis given to different aspects, as well as its *raison d'être*. In city 'A', food security will be most important; in 'B' it will be concern for the environment; and in 'C' the prime reason for urban farming is community economic development. Each of the diverse subsectors required special policies and programs in the majority of places we visited or heard about.

Promoting Food Security, Health, and Nutrition

Safe food is a prime concern of many public authorities, as well as families. Dependable year-round access to a well-balanced diet is the prime concern of at least 50 percent of urban residents in Asia, Africa, and Latin America who live at or below the poverty line, as well as up to 15 percent in the United States and some other wealthy countries. Urban agriculture can help improve food security, food safety, and the nutrition.

Food Security

Common strategies to achieve more equitable distribution and access to good food — as well as improve food security for the poor — include food aid (such as 'food for work'), food subsidies, rationing, food stamps, and differential pricing. However, subsidies and price controls are costly measures that are difficult to target to needy populations and, like rationing and food stamps, they create dependence on food assistance. Urban agriculture, by contrast, empowers the target population and makes it somewhat nutritionally self-reliant.

Community food security, and more specifically household food security, require a different set of capacities and skills than food distribution programs. This implies thinking like a mother rather than a delivery driver, and begins with studying how vulnerable people in a particular geographic area ensure that they are food secure. When this population is food insecure, how can the group be helped to change its behavior to enhance food security and/or how can the group be empowered politically to change the situation. Food from outside the community, city, or metropolitan area may thus be

considered as a complementary source rather than as the sole standard source.²⁰ Food security interventions need to be chosen based on such a mental framework.

Urban agriculture is a self-sustaining strategy for food security and nutritional self-reliance that reduces the burden on public resources. The transfer from government handouts to household and community production is not simple, quick, or cost-free. It requires policies, planning, and action programs to implement the transition.

Nutrition and Health

In her analysis of urban nutrition policies, Atkinson identifies the advantages of farming for self-consumption relative to other measures: it . . . “generates independence, makes use of idle resources, improves the quality of the environment, increases the amount of available resources and establishes new bonds between the urban and natural environments which seem increasingly important for the city as a whole.”²¹

For low-income residents, urban agriculture-related nutritional support might include extension services and access to land on a permit basis. Programs directed toward the poorest of the poor can additionally include provision of subsidized inputs and water, or low-interest credit without collateral requirements. Such interventions to promote community food production not only cost less than direct food aid, they have the additional advantage of being temporary. In the case of middle-income residents, interventions could be designed to provide nutrition education, extension support, and improved access to needed inputs, resources, and markets.

Where malnutrition is endemic, the healthcare system could promote farming as a strategy to ensure family and community food security, as well as greater family control over the nutritional content of meals. In Lusaka, for example, agencies encourage the poor to produce vegetables that increase their vitamin and micronutrient intake.²² School, health clinic, and community garden programs can also promote community and home farming as a nutritional solution, as illustrated by the case of the ‘comedores populares’ in Peru (see Case 7.2).

Development agencies with programs that help the rural poor improve micronutrient intake through farming vegetables, fruits, and livestock in home and community farms include Africare, Save the Children Federation, Plan International, CARE, and UNICEF. These international agencies could expand such programs to include the urban poor.

Policies and programs may be desirable to educate both health and agriculture workers to the benefits of ‘biopharming’. In many locations, health professionals have come to rely too heavily on pharmacy solutions to health problems rather than the lower cost ‘garden first’ approach. School gardens could contribute to public health by including medicinal crops.

Food Safety

In urban and rural areas alike, chemical and organic pollutants are of concern. In urban areas, controls need to be more stringent because farming is in close proximity to dense human activities.²³ However, enforcement may be easier because activities are not dispersed in remote areas and are more accessible to hygiene specialists.

Food safety standards have been published by several international agencies. These are global and must be adapted to match each city's conditions and farming systems. Regulations are needed to control what crops are grown where and which farming methods are used (for example, peas can sometimes be grown where lettuce is inappropriate). Solutions to health concerns were discussed extensively in Chapter 8.

Is it reasonable to expect weak local governments to regulate agriculture within and at the edge of their cities? In general, completely prohibiting urban agriculture has not been feasible, in part because of its widespread presence and farmers' economic needs. Most countries today have food safety regulations, but there are enforcement gaps. Helping municipal and national governments to devise ways to effectively control urban farming practices may be one of the most important technical interventions.

A case in point is the situation in Asmara, Eritrea. More than one-third of the vegetables consumed in the city in 1994 were produced with sewage irrigation. There was no short-term alternative source of vegetables within the country, and importing vegetables was not financially or physically feasible. A program of progressively enforcing regulations that ensure adequate wastewater treatment may be appropriate to prevent outbreaks of contagious diseases.

Regulations can be introduced on a step-by-step basis. First, the most dangerous problems and urgent needs are targeted, for example, prohibiting use of industrial and hospital waste as agriculture inputs, disallowing certain crops on highway verges, and seasonally checking the quality of irrigation water at a few points. The use of secondary indicators, such as levels of diarrhea, may provide a guide to trouble spots or dangerous processes. After dealing with such significant problems, less urgent issues can be gradually addressed.

Where there is a good information system, the market will assist the regulatory function to some degree. In La Paz, Bolivia, vegetables grown above the city sell at a higher price than those grown below it because the market recognizes that polluted irrigation water flows downhill.²⁴

Policies and regulations favoring urban agriculture should recognize the important environmental health benefits of maintaining otherwise derelict land and water, improving physical access to food (in portions of the city poorly served by food outlets), and enhancing the quality and safety of the food that urban agriculture produces.

Generating Economic Activity

Fruit orchards and fish tanks at the suburban edge, lettuce on the rooftops of food stores or markets, flowers at the roadside — diverse agriculture all over the city contributes to quality of life *and* economic activity. There are at least four bases for policy and programs focused on generation of urban wealth through urban farming:

- a core production industry supporting and supported by others (processing, packaging, sales, building materials, medicines, and fuel);
- an ancillary industry enhancing others (e.g., reuse of brewery waste);

- an activity that cuts the economic costs of urban management (waste as an input, savings in infrastructure and transport); and
- an economic activity that is internal to the city is far more valuable to the city than an equivalent activity that is external to it.

Poverty reduction and economic development programs can go a long way toward achieving their objectives by including urban agriculture among their strategies. In some urban communities, (for example, Ho Chi Minh City, Vietnam), families spend more than three-quarters of their income on food and fuel. Food security frees money for expenditures on other items, thereby promoting economic growth. It also drives entrepreneurship. Any intervention to promote urban agriculture therefore stimulates economic development.

In many cities, more than half of microenterprises are already engaged in food production and food processing. The Trickle-Up Program found in 1994 that 60 percent of its 8,000 very small enterprise projects in over 60 countries were food related.²⁵ Towns and cities with economic development goals can do well with urban agriculture projects in both poor and middle-class communities.

The support policies and programs to promote and protect urban agriculture as an economic activity are well known in many countries, and are already in place for other industries. The requirements for urban agriculture to develop an entrepreneurial capacity are similar to those of rural agriculture:

- access to credit and insurance;
- access to training and technical assistance;
- access to appropriate data, including daily market information;
- access to land and infrastructure; and
- equitable taxation.

Because the nature and relative significance of the industry varies so much from low-income food-deficit countries to wealthy and highly-developed countries, there is no standard package of policies and action programs. Instead, we must rely on best practices and success stories cited elsewhere in this book.

Employing urban agriculture for economic development requires an analysis of the food needs of a city or region. This analysis is far more complex than most business plans. It might well begin with an economic appraisal of the ecological region, frequently a watershed, and the potential symbiosis between rural and urban agriculture.

Achieving Sound Land-Use Management

In many locations, specific crops will clearly be advantageous to raise in the city. Other crops will be advantageous to raise in specific locations, such as below a sewage treatment plant, on a flood plain, or in a wetland.

In most countries, farming is not included in urban land-use policy. Cities would do well to include urban agriculture as a land use that works toward a more balanced and ecologically sustainable urban development pattern that also conserves natural resources. Zoning and building regulations could be used to shift urban development planning

toward creating an ‘edible landscape’, thus opening up opportunities for urban agriculture. Transforming polluted land to productive land is a key concept.

Most cities have significant amounts of vacant public land where farming is practical and desirable. To adopt a policy of urban agriculture as a productive land use, urban planning departments may choose to identify public spaces that should be farmed. Another task will be to map public and private areas that are not suitable for built-up uses (steep slopes, flood plains) (see Fig 4.2), as well as places that have a particular natural resource value (for example, aquifers, construction materials, rare plants). When city planners start to include agriculture among urban land uses, city-wide land rent increases and natural resources are conserved.²⁶

The specific policies needed to make land available for farming depend on land ownership patterns. It may be easier for the government (whether municipal, provincial or national) to institute policies that result in the provision of substantial spaces for farming in cities where it owns a substantial share of the land than in ones dominated by fragmented private property.²⁷

Sanyal has suggested five policy measures to provide urban land for farming:

- give farmers access to public vacant land;
- induce owners of private land to allow temporary access for farming;
- allow land around public facilities such as schools, ports, and hospitals to be farmed;
- improve land for agriculture and aquaculture by dredging, filling, leveling, terracing, etc.; and
- design sites and service areas for squatters and other low-income residents so that they have room to farm.²⁸

In reclaiming derelict land, the government can follow a policy of allotting land to volunteer low-income farmers in return for reclamation work. Including space for farming in government housing schemes for low-income residents would benefit the government by increasing residents’ income and thus their ability to make monthly payments. To maintain control over land that may be needed for another use in the future, lease agreements specifying the duration of farming may be appropriate, whether the landowner is public or private. The Calcutta Port Authority leases land to fishermen’s cooperatives, and the U.S. Navy in Los Angeles leases land to market gardeners. Other appropriate interventions in land-use management and planning include:

- cost-benefit analyses of the uses of various lands and water bodies for farming (as an input into the planning process);
- legal structures for tenancy agreements and land use for farming; and
- controls that regulate the type of farming on fragile lands, lands in need of conservation, floodplains, steep slopes, and land over aquifers.

Most of the arguments made here about access to land apply equally to surface water in ponds, lakes, rivers, and estuaries. Access to water bodies by government permit, however, is usually obtained more easily than access to land that forms part of the public domain.

Urban agriculture can be a beneficial component in many urban projects. In a housing project, for example, the developer may wish to allow urban agriculture so that unbuildable portions of the site are put to productive use, thereby improving the rate of return. In larger projects phased in over many years (whether residential, industrial, or commercial), the developer may find that leasing land for farming provides income during the build-out period of the project.

Managers of infrastructure projects and other projects that contain large open spaces (such as airports) can also benefit from cost-free maintenance by putting buffers or rights-of-way to productive use with formal or informal agreements with urban farmers. Urban managers can also find agriculture to be a good interim use of land in very varied contexts, from urban renewal sites at city centers to parkland acquired for future use.

Enhancing the Environment

Green spaces improve the living environment, aesthetics, and climate. Policies to promote such greening efforts should be based on productive landscape principles — gardens can be a mix of farming and recreational space, and trees can bear fruit or nuts, as well as offer shade and nesting space. Farming reduces and privatizes the maintenance cost of such green spaces because farmers maintain the land while they farm it. Cities as different as Chicago and Addis Ababa have agroforestry programs to improve the environment and climate, and (in Addis Ababa) improve the supply of fuelwood.

Frameworks for environmental policies that incorporate urban agriculture are being shaped in several corners of the world. We have previously mentioned a number of highly varied approaches:

- Green architecture integrates urban food production and waste reuse, with numerous examples in Germany and elsewhere.
- Ecologically conceived settlements such as the Ecovilles are now found in several countries.
- Some cities have integrated development models, such as The Natural Step in Sweden.
- Some urban regions such as Paris have advanced models for green planning.
- Green nutritionally self-reliant cities, such as in China in the 1960s, were based on countrywide policies and programs.

A basic approach to environmental enhancement through agriculture is to use an ecological zone as the planning area. By setting aside 19th century concepts of town versus country, we can plan for our children's children within a sustainable region. In most cases, this region will include large and small human settlements and a diverse array of agriculture that responds first to the civic needs of that region, and second to economic and trade potential.²⁹

Managing Waste

As described in Chapter 1, the goal of replacing open-loop systems with closed-loop systems should lie at the core of environmental policies. Urban agriculture can be an

integral part of policies that advocate closed-loop development. A basic change that should be a priority in local government policies, and which is being recognized on every continent, is the need to use waste as an farming input, thus helping to conserve natural resources. Urban agriculture can thus play an especially vital role in waste management — both waste that is usable in farming and waste created by farming. Transformation of waste into food and fuel is essential if a city is to attain the full benefit of urban agriculture.

For centuries, provision of water has been recognized as an appropriate function of local government. Once agriculture is again recognized as an appropriate urban industry, policies to provide it with controlled access to wastewater (as well as to surface and groundwater) will also become appropriate.

Water is quite a different issue in low-income, food-deficit countries, where less than one-half of urban residents are provided with piped water. In wealthy and highly-developed countries, per capita potable water consumption is more than 150 liters per day. In the latter, reuse of water may be the key issue, whereas in the former separate systems for potable water and irrigation water may be desirable.

City waste management systems are usually centrally managed, making it virtually impossible for farmers to have legal access to wastewater and solid waste. A new approach is needed in which collection, sorting, treatment, and recycling take place at the community level in cooperation with local organizations.³⁰

Local waste management systems can be introduced on an incremental basis, beginning in areas with the greatest potential to use waste in farming. Government requests for proposals could produce a range of alternative approaches to biological waste management using both traditional and new technologies.

Policy changes are needed to move toward a wastewater management system based on purification through aquatic plants and animals as well as reuse of the purified water to irrigate urban and peri-urban fields. Well-tested and well-established examples of both processes exist and can be gradually implemented. Biological processing of wastewater and solid waste makes urban agriculture both more affordable and more sustainable.

To prevent food contamination, new standards and procedures need to be instituted to process and treat wastewater and solid waste, as well as to apply them to farming. Standards developed by the Food and Agriculture Organization, the World Health Organization, and some industrial countries can provide a start.

Mitigating the Impact of Disasters

Urban agriculture can be included as a strategy in city disaster management policies. Traditionally, flood management strategies have included damming rivers and leaving floodplains and steep slopes vacant. Urban agriculture is a more sustainable and preventive strategy. By planting crops and trees upstream and on steep slopes, soil erosion and excess runoff can be prevented. Planting crops and trees across a flood path reduces the force of the water.

A partial answer to a drought crisis is to promote urban farming methods that use little water. Economic and political disasters are often mitigated by urban agriculture. Sarajevo is the best known recent example; Baghdad is another.

All indicators point to a continued increase in the world population of refugees, displaced persons, and disaster victims. Organizing urban agriculture for this special population has little resemblance to the organization discussed in other portions of this chapter. This special sector has little written history, expertise, and corporate capacity. The normal pattern is to provide some seeds and tools and expect those victims who know how to farm to do it again, sometimes with technical advice.

A more complex approach is in the process of being formalized through a new working group on the subject, Agriculture in Relief and Transition (ART). Table 11.3 offers a framework to design a disaster management program.

There is a good deal of information on successful interventions using some elements in Table 11.3. Sadly, these are not published and will need to be extracted from the databases of relief agencies. Africare and UNICEF have data on several projects in Africa, including the Liberian and Ugandan civil wars. Half a world away, USAID may have data on the Honduran camps for Nicaraguan refugees during their civil war. Recent projects in Central America helped people recover from Hurricane Mitch.³¹

Urban agriculture for disaster populations will require partnerships with international organizations (UNDP, FAO, UNICEF, WFP, UNHCR), national host governments and donor country aid agencies, NGOs, and the victims.

Local to Global Urban Agriculture Policies and Actions

There are four levels at which action is needed — community, city, national, and international — with varying interventions for each one. Many of the interventions can occur at more than one level. Because most of these interventions have been discussed in the previous section, they are not detailed here.

Tables 11.1 and 11.2 earlier in this chapter provide an informal matrix to find which urban agriculture concerns can be best addressed at what organizational level. This analytical tool suggests that the most intensive interventions are likely to be at the community and city levels. Conversely, the least number of interventions will be furthest from the dinner plate — global organizations. This does not, however, reduce the importance of interventions at all levels of organization. Moreover, most of the national and international interventions serve to facilitate interventions at local levels.

Latin America has led the way among developing regions in inventing and applying new policies and programs. These policies are being documented by a program funded jointly by UNDP and IDRC, and implemented by the Urban Management Programme. From small Haiti to large Brazil, from megacities to small towns, urban farming is growing, sometimes with support from a state or national government, and with technical assistance and funds from diverse bilateral and global development organizations. Table 11.4 illustrates the range and types of policies that may be instituted, and the multiple levels at which these may operate.

Table 11.3 Framework for a disaster mitigation program*Characteristics*

- Additional activity within a relief project
- Requires additional staff and expertise
- Achieved mostly by the disaster victims
- Reduces the need for food aid and other support

Elements

- Standard plan of operation
- Appraisal mission
- Case-specific plan
- Packaging and shipping inputs
- Site plan, operation plan
- Evaluation program

Human Resources

- Staff skills
- Participant training

Socioeconomics

- Economic development plan (relief & transition)
- Culture, cuisine
- Jobs, businesses
- Production, processing, storage
- Marketing, distribution

Environment

- Waste management
- Greening

Source: Based on framework developed by ART (Agriculture in Relief and Transition), 2000.

Community-Level Actions

Community-level interventions can be carried out by CBOs, local NGOs, farmers' associations, and ad hoc committees:

Integrate urban agriculture into ongoing projects and activities in education, environment, food, health, housing, community development, or waste management.

Urban agriculture flourishes in partnership, but in isolation, it has potential to be negative.

Conduct surveys to document the status of urban agriculture, and inform local government, institutions, and the public of the survey results. Typically, the extent and character of urban agriculture in a city are poorly understood. Community leaders may choose to conduct a survey (possibly assisted by secondary school students) and make a visual record to share with interested groups and individuals.

Table 11.4 Latin American public policies that support urban agriculture

National	
<i>Argentina</i>	<i>Federal District of Brasilia</i>
Several government and national agencies and organizations manage a national small-scale farming program, Pro-Huerta, with international assistance.	Credit system Technical assistance Support for processing and marketing Established the brand name 'prove'
<i>Peru</i>	Local government
Support to community gardens Promotion of micro-livestock Technical training of NGOs	<i>Rosario, Argentina</i>
<i>Chile</i>	Organic waste recycling Established community farms
Demonstration of biointensive city gardens Research, training and extension, for NGOs	<i>Bogota, Colombia</i>
<i>Costa Rica</i>	Supports cooperatives Provides technical assistance Community planning
Learning/training farms	<i>Cuenca, Ecuador</i>
<i>Cuba</i>	Financial and technical assistance to: fruit & vegetable production and school farms on idle public and private land
Grants of land in usufruct Tools and seeds Training and extension Public markets Radio & television programs	<i>Fortaleza, Brazil</i>
State and district	"Live Pharmacies" project Research & training Support to urban forestry [greening] Land use in city plan
<i>Federal District of Mexico City</i>	<i>Teresina, Brazil</i>
Research & training Financial assistance (dairy, floriculture, poultry, cactus, vegetables, micro-livestock) Wastewater irrigation support Restoring the 'Chinampas' (aqua-terra system) Municipal markets	Financial & technical aid to community gardens Access to public land in usufruct Support for infrastructure, tools, seeds to family farmers
<i>State of Para, Brazil</i>	<i>Rio Branco, Brazil</i>
Supports peri-urban poultry	Research, extension Support for farming cooperatives Tools, seeds and equipment Truck transportation to municipal markets

Source: Isabel Maria Madaleno. 2001. *Urban Agriculture Supportive Policies in Latin America*. Lisbon, Portugal: Tropical Institute (posted at www.cityfarmer.org)

Improve access to land, water, credit, extension services, inputs, and security. Action in this area may require interaction with municipal, state, banking, business, and other organizations. Survey data and other evidence will help make the case for action.

Train in good practices. Skills will exist in the community, but these skills may need to be upgraded in light of nutrition, health, environment, and enterprise concerns and opportunities. Best practices will be found within the community or in nearby communities. Farmers skilled in each best practice should serve as teachers and coaches.

Help organize urban farmers. In some cases, farmers will require assistance from community groups to establish an effective affinity or solidarity organization.

Establish partnerships with farmer groups. Such associations may be with NGOs, municipalities, universities, the media, food and health authorities, or rural farmers. Community organizations have a role to play in facilitating access to technology, market information, technical advice, and crop security.

Establish better and more direct links among urban farmers and the communities they serve. This may include direct purchasing by local school systems from local farmers; organizing links between farmers, restaurants, and supermarkets; and fostering the growth of community-supported agriculture.³²

City-Level Actions

City governments and other city-wide organizations can undertake the following set of actions:

*Initiate a city-wide study and discussion program as background to formulating and adopting a policy to regulate and/or promote urban agriculture.*³³ This action can be taken in concert with community groups, affinity groups, other cities, and national organizations. It can also have input from international organizations.

Adopt enabling legislation. Modifying health and land-use regulations is the most common way to encourage urban agriculture. National government support may be required.

Recognize agriculture as an urban industry. The distinction may vary to include food and fuel production, waste management, environmental and land management, and community development. Recognition of urban agriculture should be reflected by inclusion in the appropriate municipal data collection system.

Plan an institutional structure to promote and regulate urban agriculture. One possibility is for a municipality to establish a department that provides extension and information.³⁴ Urban agriculture requires up-to-date information on markets, diseases, inputs, and security. The municipality can provide such a service independently or in cooperation with other groups. In concert with banks and technical institutions, the city can offer credit and assign citizens the right to farm idle land.

*Create a city-level food system plan, including both rural and urban supply sources.*³⁵ A food and energy partnership between a city and its hinterland can be beneficial to both by sharing information as well as resources. A land-use plan and regulation system can be prepared to provide access to land, water, and markets for urban farmers.

Integrate the waste management system with the food system. An integrated system includes collection of waste, treatment, supply to urban agriculture, and monitoring of the entire process.

Encourage urban farming in areas that are vulnerable to disasters or that increase the vulnerability of nearby places.

Establish a program and plan to achieve environmental sustainability through urban agriculture. For most larger cities, urban environmental sustainability should include municipal or metropolitan programs for food and fuel production. These would include forestry and disaster mitigation.

Establish and implement a public and worker safety program. If poorly practiced, urban agriculture is dangerous to its workers and the public. Regulations that are developed in conjunction with farmers and communities are needed.

Support groups of disadvantaged citizen. Urban agriculture is particularly effective as a poverty-fighting tool and especially appropriate for women's initiatives. Municipal programs to eliminate poverty and empower women can include urban agriculture.

Create market places for urban farmers. Farmer's markets, street food, and school lunches can be structured to allow equal access to small-scale, locally-produced agricultural products.

Train in urban farming methods. Secondary schools and groups such as women and the unemployed can be suitably targeted.

National-Level Actions

National governments and civic organizations can draft model ordinances and provide training to local governments and civic organizations. National governments can also enforce quality control. The choice of policy tools available to national governments includes legislation, public education, structured incentives, and retrofitting agencies to regulate and support urban agriculture. Institutions that act at the national level include the national government and its various ministries, NGOs, universities, and research centers. Numerous options are available at the national level:

Establish an urban agriculture policy. National policy may be more flexible than city-level policy and can have a great effect. Concern for the impact on rural food and fuel producers may be greater at the national level. Environmental policies can include guidelines to conserve environmentally vulnerable and resource-critical land and water, which may include agriculture.

Create a national food policy that establishes synergy between rural and urban production systems and guides a urban-rural integration program for agriculture. This synergy would complement food system planning undertaken by individual urban regions, particularly in small cities where planning capabilities tend to be limited. National intervention will be needed where past national agriculture programs have been exclusively rural and there is a need to extend research and extension to include urban farming.

Provide research and extension services. Municipal governments generally have little capacity for research. Most national governments have agricultural research and extension facilities that can be expanded to include urban agriculture. National organizations can facilitate information sharing among cities both within and outside the country.

Alleviate taxes or subsidize inputs for particular groups of urban farmers. It may be appropriate to devise a system of national incentives, at least for an interim period, to realize the full range of benefits.

Prepare model health and land-use codes. Development of model codes in areas such as public health, land use, waste management, and water conservation could significantly aid small- and medium-size towns and cities in developing their own policies and programs.

Conduct surveys and collect and disseminate data. Beginning with census and employment data, there are many national or sample surveys that can include urban agriculture. National-level efforts to develop data on nutrition, land use, pollution, disaster proneness, food systems, and energy could make a significant difference.

Facilitate access to public land and waterways. Airports, highways, hospitals, military bases, universities, forest parks, and many other publicly-owned lands can be made available for urban agriculture as an interim or permanent land use. While local and regional authorities are also important owners of some of these properties, national governments tend to be particularly significant landholders in most countries. Rivers, estuaries, and bays suitable for aquaculture are also typically controlled by the national government.

Facilitate cooperation among farmer groups and both public authorities and large private corporations. Electricity, telecommunications, ports, railroads, and parks authorities are often established as extensions of national governments. Their partnership with urban farmers associations may be critical in some cities.

Establish a credit system. Existing national schemes for credit to agriculture and small businesses can be extended to include urban farming.

Establish a system to facilitate cooperation between local farmers' organizations and regional and global agencies that support urban agriculture. Global organizations and their regional branches are beginning to offer assistance in urban agriculture. This assistance can be facilitated by a national ministry that communicates with individual cities or national NGOs.

Train trainers, leaders, and monitors. The training of trainers and leaders can be carried out on either a national or regional basis. These leaders/trainers can then organize and oversee farmer-to-farmer exchanges and local training.

International-Level Actions

The international policy role is crucial at the present time because farming in cities is sweeping the world. Policies should always be built on best practices, which can flow through international organizations from one country to another.³⁶

Urban agriculture may not require long-term support, but international support will be needed on an interim basis. During the next decade, start-up efforts will require assistance. During that time, technical support will be needed for technical cooperation among developing countries, special farming systems, and troubleshooting issues such as diseases and pollution.

Global data sharing, information exchange, and networking will continue indefinitely and should be self-supporting. Regional urban agriculture networks are beginning to form.

The actors involved at the international level include the United Nations and its specialized and associated agencies, research centers, development banks, bilateral and multilateral assistance agencies, and international NGOs. The tasks they can perform to promote urban agriculture include:

Develop agreements on research priorities and common research methods. A conference of leading researchers is needed to develop research guidelines.

Develop model codes that can serve as a basis for national and city regulatory programs. Codes are particularly needed for the use of public and private land, wastewater, and ecologically sensitive land and water areas.

Conduct surveys across national boundaries to compare industry performance by climate zones and similar economies. Comparative studies of farming systems, subsector economics, environmental impacts, the role of women, and nutritional impacts in different cultures, for example, can contribute valuable information.

Retrofit existing and new projects to include urban agriculture. Potential areas include food systems, the environment, energy, agriculture (research, marketing, extension), forestry, utility infrastructure, urban management, and waste recycling, as well as such initiatives such as national environmental action plans.

Identify organizational models for urban agriculture. There are several effective local and national governmental agencies across the globe that could be described and profiled as models for other cities and countries. Public-private partnerships that have been successful at promoting the industry could be prototypes or models.

Develop regional and global networks. This has been discussed extensively in the preface and earlier in this chapter.

As the global trend toward greater urbanization continues, urban food insecurity is increasing in both rich and poor nations. As cities are growing, urban environments are deteriorating. Urban agriculture has the potential to address hunger, poverty, and urban environmental degradation in a sustainable way. Efforts at all levels and by both public and private interests are needed to establish regulatory and support systems that can help the urban agriculture industry to flourish. These systems must be designed to solve the problems associated with the poor practices of urban agriculture, reduce the constraints hindering its development, and capture its many potential benefits.

Notes

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1. Daniel Lazare. 2001. *America's Undeclared War: What's Killing Our Cities and How We Can Stop It*. New York: Harcourt. Lazare's core point is that exclusionary zoning

is not a good idea gone bad, but it was a bad idea from the beginning, after World War I.

2. Urban agriculture radio tapes are available from DCFRN (Developing Countries Farm Radio Network) in Canada.
3. These include FAO for agriculture, UNCHS for urban management, UNEP for environmental dimension, WHO for health and sanitation, and UNDP for overall guidance in institution-building.
4. See www.ruaf.org/ump/quito/2000.
5. Some multilateral agencies have specific programs: the Inter-American Development Bank (urban greening activities); UNCHS (Sustainable Cities program); WHO (Healthy City program, particularly active in Europe); and IDRC (Cities Feeding People program).
6. Global Forum 94 was held on 24-28 June 1994 as a follow-up to the 1992 Earth Summit in Rio de Janeiro (the United Nations Conference on Environment and Development).
7. International Colloquium of Mayors on Social Development, Mayors' Declaration on Social Development and Sustainable Human Settlements, United Nations Development Program, New York City, 19 Aug 1994. The Colloquium was a preparatory conference to the Social Summit held in Cairo in 1995. Another meeting of mayors on urban agriculture also took place in New York, under the auspices of the United Nations. See B.L. Wilson. 1997. Urban Agriculture for Food Security, Jobs and Waste Recovery, roundtable of top local government officials (unpublished IDRC meeting notes, 29 July).
8. See Chris Rogerson for South Africa and Catherine Murphy for Cuba in Appendix 'G'.
9. See Case 9.5 for Singapore technology
10. See www.idrc.ca/cfp/sguaf_e.html and www.ruaf.org.
11. Contact person is Gordon Prain at g.prain@cgiar.org. Urban Harvest is also known by the acronym SIUPA.
12. See www.idrc.ca/cfp/aguila.html
13. See www.communitygarden.org and www.foodsecurity.org
14. Information on the emerging networks can be found by contacting ruaf@etcnl.nl.
15. See www.ruaf.org
16. Their addresses are www.cityfarmer.org and www.idrc.ca/cfp.
17. Gabrielle Persley. 2000. *Focus 2: Biotechnology for Developing-Country Agriculture*, IFPRI Briefs. Washington, D.C.: IFPRI (International Food Policy Research Institute).

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18. J. Sumberg, U. Kleih, and R. Grand-Pierre. 1994. Production and Marketing of Vegetables in the Port-au-Prince Peri-Urban Area: A Sub-Sector Study, Report for CARE International-Haiti.
 19. Excellent surveys have been carried out by the Urban Vegetable Promotion Project, a GTZ-funded project in Dar es Salaam, Tanzania, in cooperation with UNCHS and others. This project can be contacted at uvpp@uvpp.africaonline.co.tz
 20. R. Gottlieb and A. Fisher. 2000. Race, Poverty and the Environment. *Community Food Security News* 7(2):18 (winter).
 21. Sarah Atkinson. 1992. *Food for the Cities: Urban Nutrition Policy in Developing Countries*. Public Health and Policy Departmental Publication 5. London: London School of Hygiene and Tropical Medicine.
 22. Robert Ledogar. 1978. Food and Nutrition in Squatter Areas: A Case Study of John Howard in Lusaka. Report prepared for the American Friends Service Committee, Lusaka, Zambia.
 23. Jack Hale. 2000. Phytoremediation Gets the Lead Out . *ACGA Multilogue* 17(1):11.
 24. Juan Arbona, SEMTA, La Paz, Bolivia, personal communication, 1994.
 25. Trickle-Up Program. 1993. *Annual Report*. New York: Trickle-Up Program.
 26. Portland, Oregon found that after it established an urban expansion boundary in the 1980s, land values rose sharply inside the boundary and agricultural production per acre rose sharply in the surrounding countryside.
 27. Bishwapriya Sanyal. *Urban Cultivation in East Africa: People's Response to Urban Poverty*. Food-Energy Nexus Program. Paris: United Nations University, pp. 48 and 53.
 28. Sanyal, op. cit, pp. 56-63.
 29. Ian McHarg. 1969. *Design with Nature*. Natural History Press.
 30. Inge Lardinois and Christine Furedy. 1999. Source Separation of Household Waste Materials — Analysis of Case Studies from Pakistan, the Philippines, India, Brazil, Argentina and the Netherlands. *Urban Waste Series* 7. Gouda, The Netherlands: WASTE.
 31. Personal communication, James Nienhuis, AVRDC, Costa Rica, 1999.
 32. In the Washington, D.C. area, the largest supermarket chain (Giant Food) and one of the most prominent restaurant chains (Clyde's) both have in-house buyers who specialize in purchasing from local producers.
 33. P. Jacobi, J. Amend, and A. Drescher. 2000. *Justification, Assessment and Planning guidelines for Urban Agriculture in Sustainable City Development*. Dar es Salaam: Urban Vegetable Promotion Project.
 34. This is what the city of Jakarta, Indonesia has done, forming an agriculture department with specialized divisions staffed by professionals (see Case 2.3).

35. The city of Toronto and others have food policy councils that coordinate urban and rural food production, with the aim of metropolitan food self-reliance.
36. Nico Bakker et al. 1999. *Growing Cities, Growing Food*. Conference, Havana, Cuba.