For Hunger-proof Cities
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For Hunger-proof Cities
Sustainable Urban Food Systems

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Introduction

Globalization over the last 30 years has been pressing national economies to become more interdependent.\(^1\) However, a view emerging from major sectors of the development community and from this book, in particular, is that the reinstatement of a proper measure of food self-reliance is urgently needed. Today, most developing countries are net food importers, and their dependence on imports is growing. Combined with persistent constraints, from fiscal to physical, this dependence results in food insecurity for large sectors of the population, particularly the urban poor (Singer 1997).

A growing number of countries have seen a resurgence of urban food production, and this has made urban food suppliers more self-reliant and urban households less food insecure. This reality is now recognized by more governments and development agencies. As a consequence, urban food production is likely to be promoted and managed in a better way over the next decades. However, recent international studies point to information gaps that must be addressed so that urban food production for consumption and for trade can be more timely and suitably phased into comprehensive urban and agricultural policies for the 21st century. This paper reviews these studies and identifies issues for development research and training support.

Globalization and urbanization

"Capitalism ... thrives on the construction of difference" (AlSayyad 1997, p. 211). Perhaps as never before, the struggle between advocates of interdependent specialization and advocates of self-reliant diversity has grown intense, even volatile. After decades of rapid advances in national welfare, more states and people now see their assets and prospects for social equity, economic resilience, and environmental integrity either threatened or eroded. Global interventions in national finances and international trade can help to trigger corrections needed in specific cases, but forms of targeting and processes that are insensitive to local settings have done little to improve the conditions for human development, if they have not made them worse (see, for example, the review of structural-adjustment programs [SAPS] in sub-Saharan Africa by Brandt

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\(^1\) Simai (1994, p. 283) defines globalization as "the entirety of such universal processes as technological transformation; interdependence caused by mass communications; trade and capital flows; homogenization and standardization of production and consumption; the predominance of the world market in trade, investment and other corporate transactions; special and institutional integration of markets; and growing identity or similarity of economic regulations, institutions, and policies."
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[1997] and the more general review by Picciotto and Weaving [1997]). Healthy national accounts and poor people could give way to "global wealth and national poverty" (Emmerij 1997, p. 100).

It is becoming more difficult for countries to retain meaningful sovereignty that includes the ability to define and rank their own challenges, let alone to choose and control the resources needed to address them (Simai 1997). Fiscal and trade reforms are driving countries into a global game with little if any margin for safe retreat in case of failure. This is a game in which the stakes grow higher and competition grows fiercer with each additional player. It is one in which the weak nations have to impose often medieval-style social contracts on their people to be allowed to keep playing. This is particularly evident in major Southern cities. The proliferation of city-authority forums, colloquiums, and associations and their number and prominent role at Habitat II speak to the need for greater national and international attention to the daunting challenges.

Advocates of globalization stress the need for the simultaneous specialization and interdependence of systems to curb planetary degradation and reduce inequities among peoples. Opponents of globalization reply that such degradation and inequities have been largely and consciously instigated by the same planetary expansion of predatory markets for production and consumption. They stress that diversity and self-reliance are essential to locally dependable and globally robust strategies. What may ultimately be at stake is neither interdependence nor self-reliance — one to the exclusion of the other — but a balance that promotes the welfare of deprived people.

Basic differences between Northern and Southern countries or cities suggest the need to emphasize self-reliance in the South. First, both the scale and the growth rate of sectoral insufficiencies or deficiencies make problems in the South qualitatively distinct from those in the North. Second, practicable solutions to these distinct problems are themselves qualitatively distinct. The capacities and constraints of prevailing sociopolitical systems in Southern societies differ among themselves and differ sharply from those in the North. The forces of globalization may disregard distinct sociocultural contexts and solutions. Foreign experts walk in and out, often oblivious to people's relentless and creative quest for a livable relationship with available resources (Ranis and Stewart 1997). The apparent chaos is actually surprisingly orderly, and Northern governments and Southern elites alike often belittle the seeds of upscaling and upgrading: incremental and multipurpose housing, utility sharing, short-distance employment, local recycling of local waste, diverse food procurement, multiple skills for multiple incomes, dense informal-assistance networking, local reinvestment of local savings, and resident-run neighbourhood surveillance. At a street level, these are facets of how Southern cities work, day in and day out. A globalization process that ignores the cultural "placefulness," or specificity, of problems and solutions may do little for human development in places where it is most needed. Many think that globalization is currently fueling an urban paradox: not only has economic growth slowed down globally in recent decades but disparities have continued to worsen between the haves and the have-nots at all scales (Emmerij 1997).

Urban food systems of the South

Globalization and urbanization are affecting the food supply of cities in the North and in the South. The North has developed a highly integrated and energy-intensive food-supply system. This system and the formal market essentially coincide. The formal
market has specialized seed-to-recycling operations, competitive import–export outreach, relentless value-adding activities, and aggressive marketing. The market externalizes several social and environmental costs (Kneen 1997); it reduces, or relocates abroad, a growing share of jobs and investment formerly based in Northern economies, not only through control of processing and marketing but increasingly through production abroad. Northern countries have been exporting surpluses of less nutritious food, often through dumping, and importing more nutritious items that are often unaffordable to the people who live where these items are produced. In this way, the market has effectively stabilized or lowered the cost of Northern labour. At the same time, food purchases also represent smaller and declining shares of Northern consumers’ incomes. Although poverty and food insecurity are on the rise in the North, as a result of unemployment and much reduced public assistance, they remain more limited there than in the South. Poor people in the North benefit from greater public assistance and, increasingly, the programs of nongovernmental organizations (NGOs). However, market “improvements” of the formal food sector (policy lobbies for cost internalization, corporate transfers of retail outlets from inner cities to suburbia, discounted large-format retailing, middle-class-driven market niches for organically grown food) further worsen the urban poor’s food security in Northern societies.2

In the South, the market — particularly the formal component — still has a more limited role in the urban food-supply system. According to Drakakis-Smith (1990), the urban food system has the following components: food-producing areas (domestic rural and urban and foreign), marketing networks, and urban consumption centres. Urbanization quantitatively and qualitatively affects all system components. The marketing network’s response to urbanization (growth, spatial concentration, and changes in food demand) also affects the relative mix of acquisition methods (exchange, production, transfer) among different income groups, as well as the system’s use of supply areas (domestic rural and urban and foreign).

Over the last 30 years (and for decades to come), several factors have worked together to undermine the ability of formal Southern food markets to cater to the needs of swelling numbers of city dwellers. On the supply side, export-oriented and hard-currency-earning agricultural policies have increasingly dictated crop choices, credit programs and incentives, technical extension and research, and distribution networks. The frequency and adverse effects of civil and natural disasters are growing in developing countries and are bound to more and more disrupt rural food production and supply lines to cities. The migration of rural youth to cities has been intense and will continue to be for decades in sub-Saharan Africa and in many Asian countries. This affects rural food production, which is still largely small scale and labour intensive. Subsidies to decrease food prices in cities are less frequent today, and this exacerbates price variability. High transaction costs may discourage rural producers from supplying critical markets, and markets may lack the institutional framework they need to operate effectively (Jones 1996). Where high-quality food is produced, larger quantities of a wider range of products are diverted to export markets for longer periods of the year. As a result, surpluses sold domestically may become smaller, less diverse, or only temporarily available and may be sold at export prices to a local elite. Some developing countries actually import staple surpluses from the North that are lower-quality sources

2 Food security is defined as access by all people at all times to the food required for a healthy life; at the household level, at issue is the household’s ability to secure enough food to ensure adequate dietary intake for all of its members (Von Braun et al. 1993).
of calories and proteins and are foreign to local diets and know-how. Because of the latest round of the General Agreement on Tariffs and Trade, more of those imports will have to be bought at higher prices. Given that 104 out of 132 developing countries are already net food importers and their dependence is set to worsen, and given the experience with social emergency funds in the 1990s (Raffer 1997), the overall effectiveness of proposed compensatory and targeting mechanisms, such as a food-import facility, must be questioned.

On the demand side, the capacity of the urban poor and middle class to purchase the good-quality food they need is undermined by a number of factors: currency devaluations; reduced purchasing power; salary reductions; formal-job retrenchment and the informalization of employment; elimination of subsidies for needs such as food, housing, transportation, and health care; and the very uneven access of different income groups to retail food within cities. In 1990, households in nearly half of the largest metropolitan centres in lower-income countries were already spending 50-80% of their income on food (PCC 1990). This figure was higher for low-income households. The cost of food has notably increased in dollarized Latin American economies and in currency-devalued West African countries. It is likely to grow in recession-struck East Asian economies. Already, the cash spent by the urban poor in many places is insufficient to meet daily requirements.

No matter how efficient urban food-supply markets may be, rapid urbanization and growing urban poverty will complicate the demand side of the equation for decades to come. Poverty is increasingly an urban phenomenon: more of the rural poor are migrating to the cities, more of those born in cities are of poor families, and more urban middle-class residents fall under the poverty line. If in 1988 at least 25% of the developing world's absolute poor were living in urban areas, by 2000 they are expected to constitute 56% of the world's poor households (UNICEF 1993; WRI et al. 1996). This trend has been evident in Latin America and the Caribbean for some time: by 1986, more poor were already living in cities than in rural areas, and by 2000 they could make up as much as 47% of the region's urban population (Izquierdo 1997). Urban poverty will affect women more than men and children more than adults and more households overall as more households come to be headed by a woman.

As urban populations become poorer, more of the food insecure will be found in cities. Food security is the most vital of all basic needs. Food insecurity undermines people's ability to learn, work, and make progress on other fronts. Malnutrition is a result of pronounced food insecurity. People in large cities may suffer from as much malnutrition as those in rural areas. In fact, the rate of malnutrition is often higher in urban slums than in typical rural areas. United Nations Children's Fund (UNICEF) studies showed that increased food insecurity was associated with increases in urban poverty during the 1980s (Immink 1994).

Supply and demand constraints to the conversion of Southern urban food systems to formal urban food markets have led to informal sources of supply. In higher income countries, distinct networks have evolved in various types of production, ranging from petty and small-scale to capitalized and large-scale production. Yet, in a forthcoming article, Ratta and Nasr (1999) contend that in the developing world the traditional supply structure often overlaps with the new structure. Such a development accommodates, for instance, the resurgence of urban food production, big and small, in the African urban food-supply system. According to Ratta and Nasr, several macrotrends will sustain urban food production's growing role during the next 30 years.
or so, particularly in sub-Saharan Africa. The fastest urban growth will occur in the countries that are least equipped to feed the people in their cities. Within less than a generation, African cities will contain as many people as the whole continent holds today. This will take place despite lagging economic growth and slow development of marketing networks. A gap is widening between population growth and growth in staple-cereal production. This is exacerbated by limited foreign exchange for imports to make up for deficits. Urban poverty and food insecurity will expand considerably for several reasons, including demographic and fiscal ones.

Urban food production in more self-reliant urban food systems

An integral part of urban food-supply systems since ancient times (Mougeot 1994), urban food production has expanded enormously since the 1970s in major cities of Africa and Latin America. This has been a response to insufficient, inadequate, unreliable, and unaffordable food supplies from rural and foreign sources. Growth in urban food production depends on poverty level, household size, city layout, access to land and water, official attitudes, and climate. In a country such as Zimbabwe, which has been affected by an SAP and droughts for years, the capital, Harare, has abundant open space for area-dependent grain crops. In Harare, open-space cultivation — excluding fallows, homestead cultivation, and crop fields extending beyond official city limits — doubled its acreage between 1990 and 1994 to some 16% of the city’s area (ENDA-ZW 1994). Similarly, in Cairo, the largest city of Africa and the Middle East, with population densities averaging 32 000 people per km², 16% of households (30% in slums) keep small animals, mainly poultry (Gertel 1997).

Until recently, such phenomena were dismissed as a temporary adjustment inspired by recent arrivals to cities. Now many recognize that these phenomena are buttressed by an enduring web of factors. In any given urban food system, the mix of acquisition methods and supply areas is mediated by several constraints and opportunities. Central to urban food production’s role in the urban food system are the ways in which marketing networks adapt to urbanization under different conditions. Because demand is ruled more by affordability than by availability, different income groups resort predictably to different mixes of acquisition modalities, jointly determining the relative contributions of production areas (urban, rural, foreign) and marketing channels (formal, informal).

Lourenço-Lindell (1995, 1999) studied urban-poor households, with special reference to food consumption and involvement in food production and distribution. She used a broadened concept of entitlement (beyond possession-based entitlement) that encompasses behaviours rooted in social and cultural codes, such as charity and safety networks, institutional conditions, and illegal practices. This approach enabled her to document the direct contribution of urban agriculture to provision strategies.³

³ Urban agriculture has been defined as “an industry that produces, processes and markets food and fuel, largely in response to the daily demand of consumers within a town, city or metropolis, on land and water dispersed throughout the urban and peri-urban area, applying intensive production methods, using and reusing natural resources and urban wastes, to yield a diversity of crops and livestock” (Smit et al. 1996, p. 3). This article focuses on food production, including that which is nonmarket-demand driven, but nonfood production also improves household food security by generating income that can be spent on food and other food-related needs.
Her study indicated how central urban agricultural production can be to such strategies through the many ways producers may be influenced (mutual help among producers, community welfare, and burial groups) and may in turn participate in formal and informal channels of acquisition in the urban food-supply system. Urban farmers generate employment and earn additional, often seasonal, income or savings for other basic needs (processed food), link up with the food trade, produce foodstuff otherwise unavailable or unaffordable, reduce dependence on purchased food, enhance their own exchange entitlement, and provide gifts of food and meal sharing. Also, they unintentionally help to reduce food insecurity inasmuch as other people rob them of their crops, animals, and assets. This last effect is far from insignificant, according to several surveys (for example, Lee-Smith et al. 1987). The literature on urban food supply in the South seems to have disregarded other possibly significant strategies for people to provide for their own needs: gleaning, gathering, and gifts from rural kin.

**Urban food production on the development agenda**

Urban food production has shifted from being a scientific curiosity to being an urban policy issue and development tool in the same way as did squatter housing and informal employment in the 1960s and 1970s. Urban agriculture, specifically urban food production, is not unlike those appropriate solutions to qualitatively distinct urban challenges of the South. It is simply a new coping strategy, changing the way people in cities feed themselves. This transition in urban food production is outlined as follows.

**Step 1: Object of scientific study**

Pioneering surveys on urban food production date back to at least the late 1950s, to the work of French geographers in West Africa. Since then researchers supported by Coopération française (French cooperation), the International Development Research Centre (IDRC), the University of the United Nations, and others have documented the diversity of urban farming systems worldwide, the diversity of practitioners, and the scale of their operations. They have surveyed and estimated the importance of food production as a land use and as a source of employment and food. Covering at least 90 cities in 31 countries of East and South Asia, the Middle East, Europe, sub-Saharan Africa, South and Central America, the Caribbean, and North America, these studies formed the basis for a book by The Urban Agriculture Network, commissioned by the United Nations Development Programme (UNDP) (Smit, Ratta, and Bernstein 1996). The studies revealed the following:

- Urban agriculture, including food production, is typically practiced over smaller and more dispersed areas than rural agriculture, uses land and water more sparingly and efficiently, integrates systems more effectively, and produces much higher yields and more specialty crops and livestock.

- More than 40 production systems and subsystems have been observed in city cores, wedges, and peripheries. These diverse urban sites, including home spaces, rights of way, road and stream sides, land reserves, flood plains and hillsides, water bodies, and wetlands, are used in both the short and the longer terms.
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- As with other land uses, urban agriculture adapts to city development, with the less space-dependent forms surviving in central areas and the more land-demanding forms migrating to less coveted locations.

- Most urban farmers are low-income men and women who grow food largely for their own consumption on small plots that they do not own, with little if any support or protection.

- Producers tend not to be recent arrivals and in many cases were born in the city where they live.

- Agricultural production for the producers' own use provides much if not most of poor households' supply of nutritious food, which would otherwise be out of their reach.

- Urban agriculture benefits the long-term nutritional health of children in poor farming households and has made food aid redundant in places where it is practiced extensively.

- Savings from the producers' consumption of their own produce represent up to several months of annual income, and income from sales may be spent on other basic needs or invested in other businesses.

- Urban producers cope with greater competition over resources, environmental stress, tenure and crop insecurity, and inadequate or nonexistent legal, financial, and technical support. These problems result in hazardous practices; loss of resources or products; foregone gains in employment, productivity, yields, and profits; idle and wasted resources; and loss of dependable and affordable supplies of fresh and nutritious food.

- In francophone Africa, urban agriculture does not compete with, but complements, rural agriculture because it reduces seasonal price fluctuations and diversifies the food supplied to cities.

The UNDP-commissioned study estimated that 800 million people are now engaged in urban agriculture worldwide; of these, 200 million would be producing for the market and 150 million would be employed full time. These estimates were derived from extrapolations, academic surveys, and official statistics. Still, even if such estimates were halved, nearly 0.5 billion urban producers would indicate that an important change is under way in our cities, particularly in the South. In several cities, urban food production is already a major employer, land user, and supplier of food; and specific crops and livestock are estimated to reach multimillion-dollar market values (Mougeot 1994). Multiplier effects of activities in this sector have been observed up- and down-stream, but they are still unquantified.

Step 2: Management issues for domestic policy

Local public interventions for effective promotion and management of low-income urban food production have been growing in the South since the late 1970s. So far, there is scant evidence in the literature of any opposition to this kind of urban agriculture, but the debate is likely to heat up as production grows in scale and begins to affect interests in more tangible ways. However, in places where people have overtly opposed
this type of agricultural production, the opposition tends to be strong initially and to weaken with time, with reactions shifting from repression to tolerance to selective support, at which point the focus is on issue management. Urban agricultural practices occurring on public open space are frequently an issue, and more so when they occur on private residential space. Animal husbandry on both public and private land raises more concern than plant cultivation does. Opposition in developing countries has tended to come from technocrats rather than politicians; people in urban-planning, public-health, and environmental circles tend to object more than those in the employment, community-service, and agricultural spheres. Generally, official intolerance or repression has been giving way to cautiously receptive attitudes and official practices. The general picture has improved considerably over the last 30 years.

Long before international agencies recognized urban food production, Southern governments, particularly city authorities, were its main promoters. Policy and planning reviews have followed from official recognition. These in turn have led to selective endorsement of ongoing activities, incorporation of new ones into planning, and their regulation. Examples include the following:

- Presidential and local official declarations have pressed citizens into becoming more self-reliant in both rural and urban areas (Cuba, Philippines, Tanzania). In newly independent countries, elections have made politicians more accountable than before and thus more responsive to the ways their constituencies cope with food insecurity. More countries are supporting communal gardening and production cooperatives.

- New capital cities have been designed to accommodate urban food production, and more authorities are supporting it, even providing subsidies (Côte d'Ivoire, Tanzania). This support occurs initially in secondary cities and then in principal urban centres (Kenya, Tanzania). Master plans of existing cities have been revised to set the framework for practical initiatives (Tanzania, Zaire).

- More city planners acknowledge that some colonial regulations and standards are unrealistically demanding or remain largely unenforceable. On humanitarian and political grounds, repression of technically illegal food production is becoming less defensible (Zimbabwe).

- More cities are reviewing and adapting technical planning norms to facilitate urban food production. Cities are creating permanent institutional programs and agencies to exploit flexible zoning modalities; allocate open spaces to communal agriculture through purpose-specific leaseholds; and legalize organized activities, entitling farmers to credit and technical assistance (Argentina, Costa Rica, Cuba, Guinea Bissau, Peru).

- More cities are using multistakeholder consultation to resolve conflicts and set courses of action regarding urban agricultural issues (Ghana, Tanzania, Zimbabwe).

- More recently, national governments have been developing more policy instruments (Ghana, Kazakhstan) and institutional facilities for urban food production. Public utilities have leased land, entered into partnerships with producers, or become producers themselves (Mexico, Senegal, South Africa, Tunisia).
Step 3: Sustainable-development tool for international cooperation

In the official international-development community, bilateral agencies seem to have initially taken the lead in interventions in urban agriculture. By the late 1990s, multilateral agencies were making it possible to include urban agriculture on the formal agendas of international summits and forums. Both bilateral and multilateral agencies are creating intersectoral working groups to incorporate urban agricultural concerns into their structures and programs (Food and Agriculture Organization of the United Nations [FAO], Gesellschaft für Technische Zusammenarbeit [GTZ, agency for technical cooperation]), and they are now formalizing new delivery mechanisms (IDRC, Natural Resources International [NRI], World Bank). They are also collaborating more on specific projects.

Among bilaterals, IDRC has since the early 1990s been supporting research that informs policy and technology interventions in three areas: non-space-dependent production technology affordable to low-income urban producers (for example, Peru), community-based waste-reuse and environmentally appropriate practices (northeast Brazil, Cambodia, and Senegal), and urban policies receptive to urban agriculture (Uganda, Zimbabwe). This research is often supported jointly with other agencies to create enhanced impact (see examples below).

More bilaterals are active in the field: the Canadian International Development Agency (CIDA) and GTZ have been supporting urban food production in metropolitan green belts (La Habana, Maputo). CIDA, with IDRC, is supporting the development by the Cooperative for American Relief Everywhere (CARE) of space-confined production systems for income generation in low-income districts (for example, Port-au-Prince). Swedeplan has helped local governments to incorporate intraurban food production into social-housing projects (Maseru, in Lesotho [Greenhow 1994]). The Department for International Development (United Kingdom) has supported NRI studies on urban waste-peri-urban food production interactions in Nigeria. Dutch Cooperation promotes the incorporation of urban agriculture into city zoning for poverty alleviation (peri-urban zoning for high-density residential areas with productive open spaces in Addis Ababa, Ouagadougou, and with IDRC, in Cochabamba and Harare). GTZ is assisting the development of peri-urban vegetable-production systems and recently reviewed the state of the art in urban animal husbandry. The Danish International Development Agency has financed urban fuelwood plantations (Ethiopia) and has channeled funds through banks to assist cooperatives of female urban farmers (Tanzania). The Fonds national suisse de la recherche scientifique (Swiss national fund for scientific research) has funded studies on the sanitary impact of wastewater use in small urban agriculture projects in West Africa. Institut français de recherche scientifique pour le développement en coopération (French institute for scientific research to promote development and cooperation) has supported agronomic and socioeconomic research on market horticulture in Togo (Schilter 1991). More recently, French Cooperation and the European Union have charged the Centre de coopération internationale en recherche agronomique pour le développement (CIRAD, Centre for international cooperation on agronomic research for development) with feasibility surveys for the development of peri-urban horticulture in capital cities of several West and Central African countries (David and Moustier 1993; Moustier 1996). The Ford Foundation has assisted market-oriented horticulture in Nairobi (Undugu Society). The Rockefeller Foundation, the World Health Organization, the International Food Policy Research Institute, and IDRC have recently funded the Noguchi Memorial Institute for Medical Research to conduct an assessment of urban agriculture for Ghana's national action plan on food and nutrition.
Among multilaterals, UNDP is advising local governments on how urban agriculture can make the development of their cities more sustainable. UNDP and FAO have been providing technical training and feasibility studies for several production systems within (hydroponics) and at the edge (vegetable gardening) of cities (Chile, Colombia, Dominican Republic, and Nicaragua). The United Nations Centre for Human Settlements has been supporting, with IDRC, a multistakeholder approach to urban-management action plans that formally addresses urban food production. UNICEF and related international NGOs, such as CARE and Oxford Committee for Famine Relief, have implemented urban food-production projects. The World Bank, UNDP, IDRC, and the European Union have been supporting work on the treatment and reuse of solid waste from cities in peri-urban agriculture in metropolitan districts of Brazil, Cambodia, Chile, and Peru.

The World Bank–UNDP Water Sanitation Program has issued project-design guidelines for municipal waste-water reuse in agriculture (Khouri et al. 1994). The World Bank recently funded projects recommending the inclusion of agriculture as a land use in new-city master plans (First Uganda Urban project). It commissioned an assessment that came out in favour of comprehensive World Bank support to urban agriculture in sub-Saharan Africa (Smit, Ratta, and Nasr 1996). Regional banks (Development Bank of Southern Africa, Inter-American Development Bank) and the multidonor-supported Urban Management Program have also supported urban agriculture projects. Many of these multi- and bilateral organizations, plus other institutions, were initially convened by UNDP in 1992, in New York, and organized into the Support Group on Urban Agriculture (SGUA) at their Ottawa meeting in 1996. The SGUA agreed to create a global support facility, defined workplan priorities, and took charge of specific tasks to improve information and coordination among agencies for communication, research, policy, technical assistance, and credit and investment in urban agriculture (SGUA 1996).

The emerging development arena for urban agriculture

The emergence of a development arena for urban agriculture is informed by trends influencing the growth of the industry, the range of actors and the information they need to properly promote and manage such growth, and specific key areas in need of research and training to provide more enlightened and strategic interventions.

Development trends influencing future food production

An assessment to the year 2005 (Smit 1996) suggests that worldwide urban food production will continue to expand. Between 1993 and 2005, urban agriculture may increase its share of world food production from 15% to 25–33%, its share of vegetable, meat, fish, and dairy products consumed in cities from 33% to 50%; and the number of urban farmers from 200 million to 400 million. Smit’s (1996) background paper, commissioned by IDRC for the Third Meeting of the SGUA, indicates that several current trends in urban agriculture are likely to expand and to transform the way it is done well into the next century:

• Lower-density urban expansion will increase land available for interim or permanent urban farming;
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• Urban food production will continue to compete and outrun rural production in certain crops as urban production techniques improve;

• Following promotional programs and projects in the 1970s and 1980s, more national and local governments and specific public sectors will support urban food production in the South, for its food-security, job, and environmental benefits, and in the North, for its provision of a healthier product;

• Urban food production will be accepted and implemented more systematically as an intervention in food and social-security programs (environmental agencies and programs will also increasingly include urban agriculture);

• Urban waste will be more commonly used as a production input because home and community-based treatment of waste will outperform massive and nonselective sewerage and landfill systems;

• Information and communication technologies will enable small producers and processors to access and share prompt and reliable technical and market information, have access to credit, and organize themselves in virtual corporations;

• Community and civic organizations will increasingly support urban food production, and women will continue to dominate the industry in production, processing, and marketing (urban agriculture will grow with women's inexorable achievement of greater legal and financial rights);

• Public–private partnerships are accelerating, and national and local urban agricultural organizations appear destined to come together in regional networks;

• Food markets in many of the world's low-, medium-, and high-income countries will carry an increasing share of products grown and raised in urban areas (informal food markets will behave more like today's formal ones, and formal and informal markets will be better interrelated); and

• Urban planning will more widely incorporate agriculture as another land use or urban-space economy.

To accelerate these trends will require expertise and information well beyond what is currently available. The SGUA's current perception is that new research needs to be more prescriptive and operational, catering to the needs of local, national, and international actors for concrete interventions in urban agriculture.

Recent international conferences have raised information issues for the promotion and improvement of specific food-production systems in urban and peri-urban areas. For instance, in late 1994, Germany's Foundation for International Development and its Council for Tropical and Subtropical Agricultural Research sponsored an international workshop, organized by the Food and Agriculture Development Centre, on "Vegetable Production in Peri-urban Areas in the Tropics and Subtropics" (Richter et al. 1995). Areas of development-research needs for urban and peri-urban horticulture were identified. France's CIRAD carried out an international networking seminar in early 1998, which stressed the need for more prescriptive research on complementarities between production and consumption systems particularly suited to urban and
peri-urban needs, as well as on synergies between compatible agricultural and nonagricultural urban land uses. Urban forestry has attracted considerable attention in recent meetings of the World Forestry Congress. The FAO’s forestry journal, Unasylva, has dedicated at least two issues to the subject, and its Forest Resources Division commissioned a concept paper on the potential for urban forestry in developing countries, followed by a series of case studies (Carter 1995; Murray 1997).

In 1995, the FAO, the World Association for Animal Production, and the Korean Society of Animal Science held an International Symposium on Supply of Livestock Products to Rapidly Expanding Urban Populations. This represented a major effort in using subsectoral analyses to address supply challenges. The joint FAO–International Institute for Land Reclamation and Improvement roundtable stressed the growth of the urban and peri-urban components of the livestock subsector and the need to pay greater attention to both the large and the small livestock components of urban agriculture (FAO et al. 1995; Wilson 1995). Since then the FAO’s focus has shifted away from supply issues to production-related animal- and human-health risks (Phelan, personal communication, 1998). In 1997, an international workshop on hydroponics, organized by Peru’s Universidad Nacional Agraria La Molina (national university of agriculture), highlighted the still neglected potential of space-confined technologies to resolve urban poverty, technological advances for input-cost reduction, and the need for socioeconomic evaluations to fine-tune training, financing, and marketing (Mougeot 1997).

Taken from these and other sources, the following is a list of areas in which research and training are particularly urgent if enlightened development interventions are to occur in food production in and around cities over the next few decades (IDRC 1997):

- **Operational terminology** — Methodologies, baseline surveys and census-taking, best-practice dissemination;
- **Urban food security** — Comprehensive food assistance and self-reliant food supply;
- **Public health and nutrition** — Risk assessment, regulations and enforcement, micronutrient production for the producers’ own use, and nutritional benefits to households;
- **Urban land management** — Productive landscapes, institutional frameworks, flexible and evolving zoning of farming systems, creative private–public tenure and usufruct to expand access to nonbuilt space and use of built-up space, multiple land-use synergies, food production in social housing, and financing of resources;
- **Urban waste management** — Separation at source of compostable waste and decentralized community-scale systems for treatment and reuse, acceptance, and demand for variously composted waste, as well as cost recovery of treated inputs used in urban agriculture;
- **Service provision** — Validation for credit, investment, risk assessment, microfinancing, marketing, extension, and communications;

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• Need for production of specific commodities — The following:
  • Vegetable horticulture — Policy, agronomic and crop production, chemicals in peri-urban systems, and affordability and feasibility of space-confined systems,
  • Fuel and food forestry — Inclusion in city planning, participation of the urban poor, technical bases, and legal protection,
  • Animal husbandry — Baseline data on supply and demand, ecosystem health, zero-grazing intensification, and decentralized processing,
  • Waste-water aquaculture — Cultural, public-health, and socioeconomic issues, with rural-urban comparative advantages of the aforementioned systems; and
  • Gender analysis — Women are often the majority, have added burdens of household subsistence (general food provisioning and child nutrition), may concentrate on home-based or space-confined production of specific crops, or be discriminated against in their access to off-plot natural resources, technical extension, or financial support (Hovorka 1998).

Conclusions

Greater interdependence should not undermine developing countries' abilities to meet their people's basic needs. However, globalization forces are strengthening some urban food systems while making others more vulnerable to international trade. Dr Uwe Werblow (1997), head of the European Commission Department of Agriculture and Rural Development in East and Southern Africa, thinks developing countries must pursue two self-reliance strategies to address their food-security crisis well into the next century: favour a broader product base with more traditional cereals and root crops; and produce in peri-urban and urban areas. In an increasingly urban world, more of the food that people consume will doubtless be grown closer to where they live. Urban agriculture brings about other nonfood self-reliance benefits that have not been discussed here, not the least of which are employment and the use of waste and open spaces. Local authorities have for some time and international agencies have more recently become more responsive to this unfolding reality. In early 1998, the FAO initiated an internal policy-review process, for its forthcoming program of work and budget, that for the first time in its history explicitly addressed urban and peri-urban agriculture. This may have an enormous impact on how Southern national governments develop geographically more comprehensive agricultural and urban strategies in the next century. The already large role of urban food production in many Southern urban food-supply systems, for the producers' own consumption and for the market, is increasingly read as being part of the way the South characteristically appropriates the globalization process, rather than resisting it. Because of the removal of subsidies for export production and because of burgeoning low-income consumer urban markets in the South, food production in and around cities is more attractive than ever. A challenge for governments and agencies alike will be to ensure that their interventions balance requirements for local self-reliance (for basic-needs satisfaction) with trade potentials (for income generation) and make cities healthier and more livable.
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