

CITIES FEEDING PEOPLE

An Examination of Urban Agriculture in East Africa



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Axumite G. Egziabher; Diana Lee-Smith, Daniel G. Maxwell, Pyar Ali Memon, Luc J.A. Mougeot, and Camillus J. Sawio

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Egziabher, A.G.
Lee-Smith, D.
Maxwell, D.G.
Memon, P.A.
Mougeot, L.J. .A.
Sawio, C.J.

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Contents

Foreword Urban Agriculture is Already Feeding Cities <i>Irene Tinker</i>	<u>vii</u>
Chapter 1. Introduction African City Farming from a World Perspective <i>Luc J.A. Mougeot</i>	<u>1</u>
Chapter 2. Tanzania Who Are the Farmers of Dar es Salaam? <i>Camillus J. Sawio</i>	<u>23</u>
Chapter 3. Uganda The Household Logic of Urban Farming in Kampala <i>Daniel G. Maxwell</i>	<u>45</u>
Chapter 4. Kenya Urban Agriculture in Kenya <i>Diana Lee-Smith and Pyar Ali Memon</i>	<u>63</u>
Chapter 5. Ethiopia Urban Farming, Cooperatives, and the Urban Poor in Addis Ababa <i>Axumite G. Egziabher</i>	<u>79</u>
Chapter 6. Conclusion Leading Urban Agriculture into the 21st Century: Renewed Institutional Interest <i>Luc J.A. Mougeot</i>	<u>99</u>
Bibliography	<u>111</u>

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Foreword

Urban Agriculture is Already Feeding Cities

Irene Tinker¹

Urban agriculture (UA) is wrongly considered an oxymoron. Despite its critical role in producing food for city dwellers around the world, urban food production has largely been ignored by scholars and agricultural planners; government officials and policymakers at best dismiss the activity as peripheral and at worst burn crops and evict farmers, claiming that urban farms are not only unsightly but also promote pollution and illness. Contradicting this image, recent studies document the commercial value of food produced in the urban area while underscoring the importance of urban farming as a survival strategy among the urban poor, especially women heads of households.

The International Development Research Centre (IDRC), with its enviable perspicacity, became the first major international agency to recognize the importance of urban food production. In 1983, the urban section of IDRC under Yue-man Yeung funded a study of six urban centres in Kenya to be carried out by the Mazingira Institute of Nairobi. Additional studies and scholars have been supported over the last decade until the weight of reports and awareness of problems with urban food security has at last brought the issue to the forefront of IDRC's agenda. In the spring of 1993, IDRC organized two events designed to propel this policy concern to a wider audience: a policy and planning conference at the Ottawa headquarters and panels at the

¹ Professor in the Department of City and Regional Planning and Chair of the Department of Women's Studies at the University of California, Berkeley, CA, USA.

annual meeting of the Canadian Association for African Studies (CAAS), held in Toronto.

The decision to organize panels at the CAAS conference with its theme of Urban and Community Development was logical. Africa south of the Sahara is the only part of the world where per-capita food production has fallen during the past decade. Inadequate rural food supplies are exacerbated by pressures of structural adjustment that reduce urban employment; the fall in prices of export crops both encourages urban migration and reduces the government's ability to purchase food stocks due to inadequate foreign exchange earnings. World food emergency supplies are currently under stress as demand grows as a result of widespread famine and war. Changing consumption patterns in the cities provide opportunities for commercial growing of foods not typically grown in rural areas, particularly vegetables. Together, these trends help explain the expansion of urban food production throughout the region.

The CAAS panels brought together scholars studying UA in Ethiopia, Kenya, Mali, Tanzania, and Uganda to discuss their research. The studies done by Axumite Egziabher in Addis Ababa, Camillus Sawio in Dar es Salaam, and Daniel Maxwell in Kampala are based on their doctoral dissertations. Each focuses on a particular aspect of UA. Egziabher completed an intensive study of a cooperative that is growing vegetables commercially. Sawio collected data on socioeconomic characteristics of urban farmers in both squatter and legal residential areas. Maxwell is particularly concerned with the interplay of land rights, size and location of the farms, type of food produced, and characteristics of the farmers. The research in both Kenya and Mali, which emphasized the interrelationships of urban food production and cooking fuel, were funded by IDRC through the Mazingira Institute in Nairobi and the ENDA Énergie (Environnement et développement du Tiers-Monde) in Dakar and carried out by a team.

For a contrasting practical view, an official of the Organization of Collective Cooperatives in Zimbabwe was invited to discuss real-time issues of UA in his country. To provide an international perspective, papers on Bolivia and China were also presented. The four papers on East Africa are presented in this publication; policy aspects of the

studies on Mali, Bolivia, and East Asia are included in the proceedings of the Ottawa meeting (Mougeot and Masse 1993) .

Taken together, this research challenges the assumptions of economic-development theorists, marxist and modernists, who see UA as the inappropriate retention of peasant culture in cities and confidently predict its disappearance. A similar debate over informal-sector enterprises raged during the 1970s and eventually resulted in a new set of policies to support and improve small and medium enterprises in this sector. Excluded from this debate were most family or individual entrepreneurial activity, whether craft or agricultural production or street vending. This exclusion resulted from the focus on employment in the informal sector that was the major concern of the first major funder of these studies, the International Labour Organization (ILO). Current research has recognized individual and family entrepreneurial activity as an important part of the informal sector; the development community has initiated separate support programs for these micro enterprises. It is time that UA becomes recognized as an important part of the urban informal sector because it provides income, or income-substituting food, to a significant number of urban residents.

The papers also challenge development planners who perceive a dichotomy between rural and urban, between agriculture and cities, and so assign food production solely to rural areas. In reality, animals as well as vegetable gardens have long been characteristic of urban life. For example, a recently published study on micro-livestock by the United States National Research Council identifies species suitable for raising in the house or in a confined space. Urban squatters are given free seeds to grow protein-rich legume vines on their huts. Even in industrialized countries, gardens are flourishing. In New York City, gardens grow where urban wastelands existed a few years ago: the South Bronx herb gardens supply gourmet restaurants in Manhattan. The owner of Kona Kai Farms in a commercial area of Berkeley, California, claims an income of 0.25 million USD on less than 0.4 ha of land; his salad greens, herbs, and edible flowers are marketed as far away as Hong Kong. Apartment residents in St Petersburg are countering the collapse of food systems in Russia by growing vegetables in rooftop gardens. [For more information on these examples, see the special issue of *Hunger Notes* on Urban food

production: neglected resource for food and jobs [edited by Irene Tinker (available for 5 USD from the World Hunger Education Service, PO Box 29056, Washington, DC 20017, USA).] Theory needs to catch up to practice; the concept of continuum needs to replace the idea of dichotomy, with a focus on the types of food and animals that are adaptable to the urban or peri-urban landscape.

What is Urban Agriculture?

All panelists emphasized that UA refers not merely to the growing of food crops and fruit trees but that it also encompasses the raising of animals, poultry, fish, bees, rabbits, snakes, guinea pigs, or other stock considered edible locally. But defining urban or peri-urban is more difficult. Municipal boundaries seldom reflect land use. As cities expand, they often engulf existing villages whose residents continue to farm in increasingly constricted surroundings. Transport systems tie even more remote villages to the urban economy through both kin-exchange patterns and market relations. Urban dwellers often maintain their own peri-urban farms, shuttling out weekly or leaving some family members there to tend the crops during the season. China long ago recognized the different land uses in zones surrounding urban areas and created municipal boundaries the size of counties to allow urban control of the hinterland.

Within town boundaries, squatters grow corn in window boxes while middle class residents plant vegetables among their flowers. Even dense metropolitan areas contain river valleys, flood plains, cliffs, and quarries where building is unwise if not impossible, and where urban gardens flourish. Public areas along roads and railroads or under high-tension lines beckon the malnourished but are the most vulnerable to destruction by authorities.

The lack of a common working definition of urban and peri-urban based on density or building characteristics and the absence of similar methods for measuring productivity means that although the studies presented provide invaluable information about UA in specific cities, they are difficult to compare. The next logical stage for urban studies of food production requires standardization of definitions and design so

that quantitative data can be collected and compared. Analysis of such data can have a powerful impact on policy decisions.

Significance of Urban Food Production

Data drawn from all the studies support the importance of urban food production for both income and consumption. In Kenya, 67% of Nairobi's urban families are farmers but only 29% produce food within the municipal boundaries. Home-grown food is critical to maintain the nutritional status of the families: 25% of urban families in the six major cities claim they cannot survive without self-produced food. Although most food is grown for consumption, 23% of the urban farmers sell some of their production, often buying fuel for cooking. About 30% of the women food vendors grow their own food. Livestock is kept by 51% of these urban households, but only 17% in their urban place of residence. In Nairobi, only 7% kept livestock within the urban area, primarily poultry. A few large dairy herds remain within urban boundaries and supply milk to Nairobi.

In Kampala, 50% of the land in the city is farmed by about 30% of the total population: 70% of poultry and eggs eaten in the city are produced there. Even the basic staple crop of tubers is grown in the city: about 20% is consumed by the growers, the rest sold. In Addis Ababa, the cooperative members are primarily growing vegetables commercially, but the families also consume some of their produce, saving 10-20% of their income that would otherwise be spent on food. In Mali, urban gardens are an important source of income and produce sufficient amounts to make Bamako self-sufficient in vegetables. Subsistence agriculture during the rainy season is also common. Zimbabwe takes a less lenient attitude toward urban gardens, particularly in Harare, than the other African countries discussed; around Bulawayo, crops raised along the riverbeds and poultry and pigs raised at home are generally tolerated. In contrast, in Bolivia, the government fosters urban gardening by community groups and in school yards as well as at home.

Surveys by Save the Children in Kampala indicate that the long-term impact on the nutritional status of children from poor homes that produced some of their own food was significant. Both Save the

Children and UNICEF (United Nations Children's Fund) concluded from their surveys that UA supplied sufficient food so that there was no need for supplementary feeding programs despite civil dislocation at the time. In Addis Ababa, the vegetables consumed by the farming families enhanced their diet. A thorough study done in La Paz compares food intake of poor and rich families. The study underscores the increasing dependency of Bolivia on food imports over the last decade. The poor only consume 80% of the recommended caloric intake; 65% of their food is supplied through food aid with 30% coming from rural production and the remainder from UA. In contrast, the rich consume 103% of needed calories, over 50% from imported foods.

Who are urban farmers?

Given the dominant role that women play in agriculture in most societies in Africa south of the Sahara, it is no surprise to find that most farmers are women. The Kenya study records 56% female farmers in all six towns, but notes that the proportion rises to 62% in the larger cities. Of these women farmers, 64% are heads of households, a fact that illustrates how critical UA is to the survival of poor families. In Dar es Salaam, 65% of the women farmers are between the ages of 26 and 45, when their obligation to feed their families is most acute; in contrast, over 30% of the male farmers were over 56 years old, perhaps indicating that they lived alone. Among cooperative members in Addis Ababa, the head of household as the sole member of the cooperative cultivated the communal plots whereas private plots were the responsibility of the woman. Thus, a woman who headed a household had a double burden and often had to transfer a daughter, never a son, to evening school so that she could help cultivate the land during the day.

Urban farmers are not recent migrants; land pressure is such that new arrivals have less access to land than longer-term residents. Further, a large percentage of the farmers might be called the new poor: white collar workers, even mid-level bureaucrats, with larger house plots.

Issues

A major determinant of who farms is who has access to land. In Addis Ababa, the cooperative was set up precisely to try to legitimize the members' rights to the land they had farmed for the last 17 years; the leaders fear that new land policies will privatize land formerly declared nationalized. In Kenya, only 41 % of the urban farmers owned the land they used, whereas 42% primarily of the poorest farmers grew their crops on government land. The land-holding patterns are extremely confusing in Kampala as the traditional land rights are contested against modern land-use rights. Many landowners work out arrangements with urban farmers to use land they are holding until land settlements are concluded so as to prevent unauthorized squatters from occupying it. A critical issue for urban development everywhere in the developing countries is land ownership or use rights as modern systems of land registration clash with inherited patterns.

A second, and related, issue is the attitude of governments toward UA. Colonial governments typically forbade visible UA as unsightly; many of these laws continue on the books. Enforcement varies from country to country and often relates to the existence of a food deficit in the country. The uncertainty created by expected harassment keeps farmers from investing in soil or crop improvement. Even if harassment ceases, land values and zoning will play equally important roles in determining the extent of future urban food production. Could gardens replace some parks as important green space in built-up areas? How should such land be taxed?

Urban agriculture is also condemned for its presumed negative health impact. A myth that continues despite proof to the contrary is that malarial mosquitoes breed in maize grown in East African towns. Livestock left to wander may indeed add to urban squalor. However, all panelists argued that potential health risks were insignificant compared with the benefits of urban food production.

Conclusion

The studies that follow, and others reported at the IDRC panels, demonstrate the importance of urban food production as a source of both income and food. They stress the wide socioeconomic spectrum of urban farmers and the critical importance of self-grown food for the poorest urban dwellers, particularly those living in households headed by women. The studies also emphasize the growing commercial importance of certain foods such as vegetables, poultry, and eggs. Although fishponds are important in Asia, the present studies found little such activity in Africa.

Government response to urban food production has generally been one of neglect if not harassment. Land-use regulations for both public and private land are needed for urban food production to flourish. Improved information about crops and fertilizers, water, and pesticides could greatly increase crop production while immunization and advice on feeding would improve livestock and reduce the wastage by premature death. To encourage such governmental reconsideration of policies toward urban and peri-urban farming, however, careful quantitative comparative studies must be completed to understand current practices.

Chapter 1. Introduction

African City Farming from a World Perspective

Luc J.A. Mougeot

Urban agriculture (UA) encompasses the production of food and nonfood plant and tree crops and animal husbandry (livestock, fowl, fish, and so forth), both within (intra-) and fringing (peri-) built-up urban areas. Vennetier's 1958 survey of Pointe-Noire, Congo, is often credited for having launched a new field of inquiry into urban farming in sub-Saharan Africa and beyond: a sample of 1 013 households (4493 people) enabled him to estimate that UA then was being practiced by 16 500 people (0.6% of Pointe-Noire's population), of whom 4 500 were women (Vennetier 1961, p. 84). Ganapathy (1983) later attempted a short, though very complete, definition of the concept; Smit and Nasr (1992) developed a most comprehensive worldwide farming system typology, while Sawio's dissertation (1993) thoroughly updated UA research in anglophone Africa.

As contradictory as the merging of urban and agriculture into a single expression may seem, urban agriculture as a basic urban function is nothing new. Fieldwork and aerial images of archaeological sites are unraveling massive and ingenious earth and waterworks, within and fringing the larger and more advanced urban settlements achieved by ancient civilizations, for the production of food, feed, and fodder crops; fuel, building, shade, fencing, windbreak trees, and shrubs; ornamental, medicinal, and other utilitarian plants; and livestock for food, traction, transport, and savings.

Under the Persian emperor Darius, walled gardens or *pairidaeze* (paradises) were associated with hydraulic facilities for maximizing the use of scarce water. Greek city-states were self-supplied with goat milk and olive-oil fuel for house lighting. Vast agricultural drainage schemes were revealed on the Roman imperial sites of Timgad in Algeria and Volubilis in Morocco. Under the Islamic empire, the Abbasids turned a postal service into an intelligence system, through which postmasters kept the capital city informed on food prices in their postal districts, so that supplies could be sent wherever shortages threatened. In Andalusian cities, houses were surrounded by gardens and orchards. Cities of the Indus River civilization, such as Harappa and Mohenjo Daro, discovered from under the shifting muds of the Indus, once were specialized agro-urban centres. In medieval Europe, crop-rotation systems were being tested in farms and fields of monasteries, walled cities, and castles.

In North America s Mississippian culture (peak 1050-1250 AD), intensive riverine horticulture supported what Burland (Coe et al. 1986, p. 57) qualifies as true preindustrial cities in the rich alluvial valleys of the Mississippi, Ohio, Tennessee, Arkansas, and Red rivers and tributaries. One of them, the city of Cahokia in Illinois, with a population of 10 000, was the largest pre-Columbian urban centre north of Mexico. Also in the middle course of the Mississippi, the Moundville site (population 3 000) in Alabama contains borrowpits evidently used to store live fish, part of the food needed to support its people (Coe et al. 1986, p. 56).

Four thousand years ago in the pre-Olmec Valley of Mexico, small towns on stone-faced terraces, such as Tlatilco and Ticoman, farmed vegetables and raised dogs and turkeys (Burland 1976, pp. 15-18). The Aztec state was partly dependent on food production within and fringing the metropolis of Teotihuacán and the capital city of Tenochtitlan, southwest of the former and on a man-made island built in lake Mexico (Anton 1993, p. 116). Millon s maps of Teotihuacán (population 125 000-250 000) clearly indicate *chinampas* in one section of the city: these were rectangular plots of land left by canal-cutting in swampy areas, made fertile through periodic applications of pond weeds and mud (Coe et al. 1986, p. 104). Highly fertile and productive *chinampas* were also found in Xochimilco (surviving to the present),

towns on southern shores of lake Xochimilco, and most of the island of Tenochtitlan- Tlatelolco. A 15-km-long dike, built across lake Texcoco, protected *chinampas* from rising saltwater in the rainy season (Coe et al. 1986, pp. 144, 146, 149). The well-spaced layout of outer house mounds probably enabled each home to have its own garden (Burland 1976, p. 40).

At Tairona's Buritaca 200 site in the Colombian Sierra Nevada, an elaborate landscape of retention walls, canals, and drainage systems afforded in-city cropping (Coe et al. 1986, pp. 166-167; Burland 1976, p. 162). In the Peruvian Andes, central plazas of U-shaped structures might have been irrigated or flooded and crops possibly grown; large ceremonial complexes were usually adjacent to cultivated fields (guinea pig remains found earlier than 1800 BC at Culebras, halfway between Trujillo and Lima) (Coe et al. 1986, p. 197). At Cuzco and Machu Picchu, extensive retention walls, terrace gravel beds and stone-lined drainage afforded intensive farming of steep slopes.

The need for reliable, minimal amounts of diverse food and nonfood supplies to ensure the subsistence and trade functions of what were then unprecedentedly large and complex human agglomerations explains the coincidence of ancient city sites with elaborate earth and waterworks for farming. Many of these cities probably provided the incentives and testing grounds where innovations for more intensive and productive farming systems were developed, perfected, and disseminated. Technological breakthroughs included sun reflectors; water collection, storage, and distribution; frost protection; wetland conversion and slope terracing; and multicropped and layered *chinampa*-style systems (Reader's Digest Association, 1974, pp. 58, 76, 96, 119, 152, 154, 158, 162, 195, 198, 217).

Asia: Where the Future of Urban Agriculture is Now

In the late 20th century, the greatest advances in production and marketing systems for UA are found in and around major Asian cities. Here, policymakers and planners for many decades have been overtly promoting food and some nonfood production as a critical urban function.

Japanese censuses closely monitor the performance of city farming. Chinese urban municipalities are oversized to allow room for a city foodshed; most large Chinese cities are nearly self-sufficient in the more perishable food crops. Here UA has become very intensive and highly integrated (vegetable crops are highly structured spatially with intercropping, overplanting, advanced purchasing, and combined contracting). An effective ecological cycle of mulberry-silk worm-pond fish-pig system has been perfected in South China (Yeung 1985, p. 14). In Guangzhou, up to nine crops are grown yearly on any single field and, in Hong Kong, six crops of cabbage a year are not uncommon (Yeung 1985, p. 9). In India, Ganapathy (1983, p. 9) reported that 6 m² could produce all the vegetables needed by a family of four. The Shanghai municipal government has a fully integrated regional food-supply system (Yeung 1985, p. 12).

What about urban forestry? A study of 439 Chinese cities in 1991 put their overall green space at 380 000 ha or 20.1 % of their urban area on average. Beijing has 9.2 million people on 750 km², so there is little space to waste; yet the area of Beijing under tree cover grew from 3.2% in 1949 to 28% in 1991. More than 90 different tree species were identified in metro Beijing in 1990, including 40 varieties of fruit trees that represent 17% of all trees grown in sampled areas, as much as 23% in older residential areas (Ming and Profous 1993, pp. 13-18).

Hong Kong's policy for UA is a high degree of self-sufficiency, no subsidies, and development of large-scale, modern, and fully commercial farming business. Competing urban land development is pressing cropland to shrink, but animal husbandry thrives and crop yields continue to rise, thanks to multicropping, hydroponics, and short-season varieties (Yeung 1985, pp. 9, 12, 23).

What is Happening Outside Asia?

What is really new since the late 1970s is that UA has been growing in many parts of the developing world. A plethora of factors come into play: rapid urbanization, ineffective agricultural policies, crippled domestic food-distribution systems, constrained public spending and subsidies, wage cuts, soaring inflation and rising unemployment, plummeting purchasing power, and lax urban land-use regulations or

enforcement. Civil strife, war, and natural disasters (droughts, earthquakes, floods, and tsunamis) also disrupt rural food production and supply lines to cities.

Urban agriculture is being revisited because these factors, often referred to as exceptional or ephemeral, are multiplying and recurrent. Their compounding effect is becoming so extensive and pervasive that a return to normality is gradually becoming a precarious, if not fading, possibility in many parts of the world. This is why conditions sufficient to dampen, not to say reverse, growth of UA appear increasingly unlikely to arise in Africa. Economist Francis Lungu in Dar es Salaam (personal communication, 27 August 1993) thinks that, should structural adjustment policies ever succeed, UA would not necessarily subside; on the contrary, an increase in UA is probable because of persisting unemployment, retrenched civil service, newcomers added yearly to the local labour pool, sheer population growth, women at home resorting to UA, and a growing urban demand for abundant, regular, and cheap supplies of good-quality food.

In Africa, the large and fast-growing city of Dar es Salaam in one of the continent's poorest countries is a case in point. As in most African countries, the Tanzanian gross domestic product (GDP) declined in real terms throughout the 1980s, from an average annual growth rate of 5.1 % to less than 2.0%. This fall is attributed to falling export commodity prices, the collapse of the East African Community, war in Uganda, and successive droughts. Despite various survival, adjustment, recovery, and social action programs in the early 1980s, the per-capita income averaged 260 USD/year during the 1980s (DSM/ARDHI 1992, p. 4). The Arusha Declaration's emphasis on rural development did not slow the population growth of Dar es Salaam: it nearly doubled in 10 years to 1.4 million in 1988. Some 70% of its population now live in unplanned settlements and 75% of its households rely on pit latrines for disposing of human waste; less than 3% of the city's solid wastes are collected (DSM/ARDHI 1992, pp. 5-6).

According to the 1988 census, UA ranked as Dar es Salaam's second largest employer, after small traders and labourers. Urban agriculture occupied 11 % of the population aged 10 or more, but 20% of those employed, turning out about 100000 t of food crops annually

(DSM/ARDHI 1992, p. 8). The total area under crops reached 33 872 ha (over 500 ha under vegetable crops). Satellite imagery reveals that as much as 23% of the city region is used for agricultural production (DSM/ARDHI 1992, p. 8). Data on other Tanzanian cities show a similar, if not larger, incidence of UA (Mosha 1991; Mvena et al. 1991).

However, there is probably more UA in any city than meets the eye of conventional air photography; much UA, away from the easily observable crops on open-land surfaces, actually thrives under tree cover, in shelters or on roofed surfaces, on wall shelves and fences, and in basements, or grazes other unbuilt land areas. Tanzania's Ministry of Agriculture and Livestock Development keeps statistics on UA and annual reports of the Livestock Office of Dar es Salaam's City Council show that both livestock numbers and cultivated area grew steadily between 1985 and 1989; chickens from 510 789 to 793 441, pigs from 8 601 to 15 658, goats from 2617 to 6 218, and dairy cattle from 4 200 to 8 517 (Mosha 1991, p. 84). These official data give a conservative picture of reality according to local observers. People in Dar es Salaam are engaged on a large scale in what many other large African cities are increasingly documenting, if not trying to manage more fully.

The Changing Official View on Urban Agriculture

Worldwide, most UA still remains largely unrecognized, unassisted, or discriminated against, when not outlawed or harassed, even in years of food shortage. However, more governments are creating agencies to manage UA and many more are actively encouraging the activity. Between 1975 and 1985, governments in at least 22 countries (00 in Asia, 6 in Africa, and 6 in Latin America) were supporting UA initiatives related to the provision of land and other production inputs, technical assistance, home food production and distribution, tree crops and small-animal husbandry, food-import alternatives, nutrition, and food distribution, storage, and preservation (Wade 1987, pp. 38-41).

Argentina and Peru have national departments and Buenos Aires, Jakarta, and Mexico City have metropolitan agencies to promote UA. In metro Manila, a presidential decree obliged owners, or entitled

others with owners' permission, to cultivate unused private lands and some public lands adjoining streets or highways (Bulatao-Jaime et al. 1981, cited by Yeung 1985, p. 25). To increase food and fuel production, the Lae City Council assigned thousands of allotment gardens on city lands to low-income residents, assisted by city horticultural staff and with tenure guaranteed by council-granted leases and use permits (Yeung 1985, pp. 14-15).

In Africa, new national capitals of Côte d'Ivoire, Malawi, and Tanzania are planning for and encouraging UA (DGIP/UNDP 1992, pp. 2, 25). In contrast with its 1967 version, Kinshasa's 1975 master plan included areas zoned for horticulture in the east, central, and southwest sections of this multimillion-people city (Pain 1985, p. 34). Many Tanzanian municipalities have set aside areas for UA in recent years. The Rwanda government encouraged dooryard gardening and the Bolivian government gave plots to urban schools to produce more food locally (Finquelievich 1986, pp. 10-11). In Nigeria and Zaire—as in China, Japan, Papua New Guinea, and the Philippines—urban farmers have been protected and encouraged through land-use regulations and tax concessions (Diallo 1993; Lado 1990, p. 257).

In Daola, Côte d'Ivoire (population 123000 in 1988), peri- and intraurban agriculture grew tremendously between 1954 and 1988, promoted successively by Chinese immigrants, native ethnic minorities, and local authorities: one official project had 456 rice growers on government-improved and acquired bottomland in 1988. A 1989 map shows 55 poultry farms located within and fringing the built-up area, with 13 pig farms and 110 fish ponds in the city's immediate vicinity. Della (1991) also surveyed Daola's intraurban agriculture: some 121 part- and full-time producers tended 250 ha of well- and tank-irrigated rice paddies and native and introduced vegetable crops on marshland within the built-up area; these plots supply various governmental and public agencies. On the urban fringe, agriculture has adjusted to rapid city growth, with labour-demanding lowland cropping expanding from 52 to 624 ha between 1954 and 1983.

In Harare, 246 out of 298 cooperatives managed by the City Council's Department of Housing and Community Services (DHCS) in 1989 were agricultural cooperatives, 16 in food-catering, distributed in six

major areas, among which was the peri-downtown sector of Highfield-Glen View-Waterfalls. A number of chicken cooperatives were active. The DHCS also managed some 97 women's clubs with about 2 700 members and four youth groups were classified under agriculture. Clientelism and program adequacy are debatable and bylaw enforcement in Harare is among the most stringent observed in East Africa. However, what must be recognized is that, with its activities in housing, home industries, youth and women's clubs, child development, health and nutrition, transportation, markets, and recreation, the DHCS of Harare City Council has an enormous potential to promote UA in a highly integrated fashion, with multiple benefits to a wide range of population groups and economic sectors, both private and public.

In many East African countries recently, ministries of local governmental affairs and agriculture, municipal health and nutrition agencies, associations of urban municipalities, and elected urban-district councillors have become more tolerant, if not supportive, of city farming.

The Bottom Line: Urban Food Security

Food security is defined as access by all people at all times to the food required *for* a healthy life. It addresses the risks of not having access to needed quantities and quality of food (von Braun et al. 1993, p. 3).

Urban food supplies in developing countries (LDCs) can no longer be taken *for* granted: by 1980, nearly 50% of all food consumed by people in the cities of the developing world was imported from other countries (Austin 1980, quoted by Wade 1987, p. 37). In African cities, many imported food products now cost relatively less than local food, at least during part of the year (Vennetier 1988, p. 221). The internationalization of urban food-supply systems, in countries stricken or not by famine, and its effects on diet changes, food prices, infant health, and local enterprises are provoking renewed concern (Drakakis-Smith 1990). In Harare, a former Secretary of Agriculture, now chairman of the Agricultural Marketing Authority, now sees UA as a national food-security issue (Charles Gore, personal communication, Harare, 1 September 1993). *For* the first time in many years, full-

grown maize crops in Harare were not chopped down by Harare City Council staff in 1993: local authorities, through the media, encouraged people in Harare to grow food.

For the urban poor, a large and growing segment of the population, food is turning into a basic luxury. In 1990, households in nearly half (23) of the LDCs' largest metropolitan centres were spending 50-80% of their average income on food (PCC 1990). Among the listed cities, most hard-hit are Calcutta, Ho Chi Minh City, Istanbul, Kinshasa, Lagos, and Lima. Global figures only tell part of the story; specific survey estimates for low-income groups are much bleaker. In metropolitan USA, for instance, households spend 9-15% of their income on food, but the poorest 20% of the population spend 34% of their after-tax income on food (Ethelston 1992, p. 16).

In India, 80% of urban families typically spend 70% of their income on food; master plans of Indian cities rarely, if ever, provide land for food production (Newland 1980, cited by Yeung 1985, pp. 2, 5). In Bangkok, the lowest-income families spend 60% of their income on food (Sukharomana 1988, p. 7). In Ecuador, 74% of urban households have insufficient incomes to afford basic food purchases: percentages vary from 62 in Babahoyo to 84 in Tulcan, with Quito and Guayaquil scoring 67 and 71 % respectively (Fundación Natura 1993, II). A small sample of urban households in Bolivia suggests that, on average, they were spending 32% but the poorer households, 70-89% of their income on food (León et al. 1992, pp. 72, 73, 77). In the low-income urban district of La Florida, Chile, 64% of interviewed households were spending more than 50% of their budget on food; even so, 42% could not fully cover their basic food costs and 63% were not managing to satisfy their basic nutritional needs (Cereceda and Cifuentes 1992, pp. 273, 277).

In Africa, poor urban Kenyan households have to spend 40-50% on food and cooking fuel alone (Lee-Smith et al. 1987, p. 14). In 1983, 34% of 189 surveyed households in Bamako spent 32-64% of their average income on food and cooking (Diallo and Coulibaly 1988, p. 20). In Egypt, food represents 60% of family budgets for more than 50% of all urban households, despite state control of food supply and distribution channels, and state subsidies on basic items (Khouri-

Dagher 1987, p. 37). For low-income households in Dar es Salaam, the percentage of income spent on food rocketed from 50% in 1940 to 85% in 1980 (Sawio 1993, p. 55). In Kinshasa, in 1982, food purchases were already absorbing an average 60% of total household spending (Pain 1985, p. 44).

Dar es Salaam illustrates how badly urban wage purchasing power can trail food price increases. In this city, a daily minimum wage could buy 10 kg of maize or 4.8 kg of rice in 1973, but only 1.3 kg of maize and 0.8 kg of rice in 1985 (Bagachwa 1990, p. 26, cited by Sawio 1993, p. 10). Food-price surveys of five developing countries showed that city dwellers paid 10-30% more for their food than rural dwellers (Yeung 1985, p. 2).

Household food insecurity grows with the share that purchased food takes of the household budget. Also, the fewer the household's alternatives in buying food, the more serious will be its insecurity. If you are poor in cities, your coping strategies are fewer than in rural areas. In the Ecuadorian city of Cuenca, 56.5% of interviewed street scavengers precede the collector-truck runs by 5 or 10 minutes and sort out of residential, office, and public garbage meal leftovers and overripe or rotting fruits and vegetables to feed their families (Fundación Natura 1993, II).

In African cities, to eat a single daily meal is becoming commonplace, and this undoubtedly affects people's nutritional health (Vennetier 1988, p. 222). If you are poor, you will tend to pay relatively more than do higher income consumers for the food you have to buy; more likely than not, you will be forced into inefficient shopping practices (smaller, more frequent buys from various and distant sources, more spent on transportation, more losses from bad storage, and so forth). Vennetier (1988, p. 222) considers the micro retailing of food as a tremendous price-hiking factor in African cities, the higher prices being charged in this way to those who are less able to pay.

How Food-Secure are City Populations?

Available findings are collapsing the myth of urban privilege over rural neglect. Per-capita energy consumption is generally higher in rural than

in urban areas, regardless of income or expenditures. However, poor urban manual workers may have higher energy needs than the average urban resident. Calorie costs are higher in metropolitan than in smaller centres, and, in poor regions, intraurban differences can be greater than rural-urban differences (von Braun et al. 1993, p. 14).

Micronutrient deficiencies can be much more prevalent among lower-income than among higher-income families, as in Manaus, Brazil (Amorozo and Shrimpton 1984, cited by von Braun et al. 1993, p. 18). In some countries, as much malnutrition prevails in large cities as in rural areas; malnutrition is often likely to be higher in urban slums than in a typical rural area. Although some doubted that there were marked rural-urban differences in malnutrition levels in Africa during the 1970s, the experience of the 1980s now has clearly dispelled such doubts in many countries. Schilter (1991, p. 11) and staff of the United Nations Children's Fund (UNICEF) (Francis Kamondo, personal communication, 24 August 1993; Bjorn Ljungqvist, personal communication, 25 August 1993) agree that malnutrition in Nairobi, Lomé, and Kampala are now more acute than in rural Kenya, Togo, and Uganda, respectively. In Cairo-Giza, the rate of malnutrition is nearly as high as in rural areas of Egypt. An eight-country survey revealed that between 25 and 30% of the urban population was malnourished and more so than rural populations in five of the eight countries studied (von Braun et al. 1993, pp. 13,23).

The Booming Business of Urban Agriculture

As a result, urban food production has become a complex, thriving industry. More and more people in LDC cities are trying to grow some of the food they need, even if it is not much. Globally, about 200 million urban dwellers are now urban farmers, providing food and income to about 700 million people – a minority of households farm in North American cities, whereas most do so in Siberian and smaller Asian cities (DGIP/UNDP 1993, p. 3). Estimates are 25% in urban USA but 65% for Moscow in 1991 (Smit and Ratta 1992). In Peru, more than 50% of the households are reported to raise guinea pigs at home (Charbonneau 1988, p. 7). In the El Alto area of La Paz, Bolivia, based on a sample of 266 households representing a range of incomes, from August 1984 to June 1985, between 31 and 55%, depending on the district, raised small livestock for their own use (hens, rabbits, pigs,

lambs, and ducks). Animal husbandry is the main source of animal protein for households, with the low-income group representing as much as 68.1 % of all raisers during the period. Also, between 14 and 68.4% of households grew food crops, mostly tubers, but also produce and vegetables, with the majority again being low-income growers (Prudencio 1993, pp. 226-229).

In Africa, data for Dar es Salaam show that, in 1980, 44% of low-income earners had farms, but in 1987 some 70% of heads of household engaged in some farming or husbandry (Malilyamkono and Bagachwa 1990, p. 126, cited by Sawio 1993, pp. 63-64); another study found that nearly 50% of workers and 59% of all residents of 287 households in Dar es Salaam reported having farms in 1987/8 (Tripp 1989). A three-stage survey of 1576 urban households (57% in low-income groups) in six Kenyan cities found that 29% grew part of their food and 17% raised livestock in the urban area where they lived in 1984/5 (Lee-Smith et al. 1987). According to a senior local UNICEF officer, clearly more of the food sold by street-vendors in Nairobi (spinach in particular) now comes from urban home gardens than was the case years ago (Francis Kamondo, personal communication, 24 August 1993). In Lusaka, a survey of 250 low-income nontenant households in five areas found that 45% of them cultivated food within or on the fringe of the city (Sanyal 1984, p. 198). In Kampala 36% of the households surveyed within a 5-km radius of downtown engaged in some form of agriculture (Maxwell, this volume). In Kisangani, 33% of 426 households responded that they practice UA (Streiffeler 1991, p. 268, cited by Sawio 1993, p. 103). Even space-scarce Cairo in the early 1980s had at least 80000 households home-raising animals (Reed 1984, cited by Khouri-Dagher 1987, p. 41). In Kampala, almost without exception, those engaged in UA said that even if they were offered jobs whose cash remuneration was equivalent, they would not stop farming (Maxwell, this volume). Also, in many of the studies quoted here, large percentages of nonfarming households surveyed said they would farm if they only had access to land to do so.

Urban Agriculture Shouldering Cities Food Self-Reliance

Thus it is clear that UA already makes a significant contribution to food self-reliance in many major cities. Food self-reliance is not self-sufficiency but it can go a long way toward reducing the food insecurity of vulnerable groups of people. No one expects UA to supply largely urban needs for cereals and tubers, which can be stored and transported more easily from rural producing areas with limited losses. However, what is striking and must be recognized is that UA, with little support, already supplements a significant share of cities' needs and the quality foods they depend upon. In the USA, 30% of the dollar value of agricultural production comes from within urban metro areas (Smit and Nasr 1992, p. 142).

Relatively self-sufficient in pork, poultry, and eggs, Singapore grows 25% of the vegetables it consumes (Yeung 1985, p. 22). On 10% of its area, Hong Kong in the early 1980s was producing 15% of pork, 45% of the fresh vegetables, and 68% of live chickens it consumed (Wade 1981, cited by Yeung 1985, p. 19). Shanghai's *neichiao* (inner zone) provides 76% of the vegetables consumed in the city, with only 16% of the cultivated land devoted to this crop (Yeung 1985, p. 12). Within their municipal bounds, six large Chinese cities grew 85% of their vegetable requirements (Skinner 1981, pp. 215-280, cited by Yeung 1985, pp. 8-9), with relatively small waste and wastewater problems and budgets (Smit and Nasr 1992). Karachi produced 50% of its fresh vegetables (Smit 1980, cited by Yeung 1985, p. 9). Calcutta's 4500 ha of fish-stocked wetlands produced 10% or more of metro daily fish consumption (Panjwani 1985, p. 35). In Kathmandu, 30% of the fruit and vegetable needs are met by household production alone (Wade 1987, p. 4). Some Latin American metropolises grow 30% of the vegetables they consume (Heimlich 1989, cited by Sawio 1993, p. 116).

In Africa, a single cooperative in Addis Ababa supplies 6% of cabbage, 14% of beetroots, 17% of carrots, and 63% of the swiss chard consumed in the city (Egziabher, this volume). Kampala produces 70% of all poultry products it consumes (Maxwell, this volume).

Some cities even manage to export to other centres – eggs and chickens and orchids from Singapore, grains and vegetables from Shanghai (Yeung 1985, pp. 14,22), chicken broilers from Bangkok to Tokyo, and fresh fruits from Abidjan to Paris (DGIP/UNDP 1992, p.4).

Development policies nurturing rural-urban dichotomies have been starving cities. Urban agriculture now gives us good reasons for better exploiting rural-urban linkages; fittingly, a recent series on the urban-rural interface in Africa dedicated a full section to UA (Baker and Pedersen 1992). The comparative advantages that rural and urban areas hold must be exploited to meet large cities' growing need for affordable and reliable supplies of sufficient and nutritious food.

Urban Agriculture's Benefits to Households

There are more signs that UA contributes to producers' well-being in several ways, including nutrition, health, cash-saving, and income generation. Regarding nutrition for instance, self-produced food accounted for as much as 18% of total household consumption in East Jakarta (Yeung 1985). However, percentages are much higher in surveyed African cities, as urban farmers produce mostly or largely for household consumption: 77% in urban Kenya (Lee-Smith and Memon, this volume). In Nairobi, over 50% used the entire amount harvested to feed their families or dependents about 25% share or pay helpers with food (Lado 1990, p. 264).

Thus, in the poorer countries and among the lower-income groups, self-produced food can cover a considerable share of a household's total food intake and can save or release an even larger share of the household's cash income to cover nonfood expenses. In Pointe-Noire, 26% of households or 33% of the population supplied all or part of its own needs for cassava (Venetier 1961, pp. 71-72). In Dar es Salaam, nearly 50% of 260 intraurban producers reported that UA contributed 20-30% or more of the households' food supply (Sawio 1993, p. 309). In another study, the lower-income group spent 77% of its income on purchasing food; home-cultivation supplied the equivalent of 37% of their income and saved them 50% of their expenditure in food (Sanyal 1986, p. 32). In Kampala, 55% of 150 producers obtained 40% or more, and 32% obtained 60% or more of their household food from

their own urban garden (Maxwell and Zziwa 1992, pp. 49-50). In Addis Ababa, cooperative households consumption of vegetables was 10% higher than the urban average and this enabled them to save 10-20% of their income (Egziabher, this volume).

The impact of UA on households nutritional status is still underresearched but the few data available are encouraging. More are being collected; however, much could be retrieved from existing sources. According to a 1981 survey of households with children aged 5 or under in 13 low-income districts of Kampala, partial reliance on intraurban food production largely explained why supplementary feeding aid could be discontinued (UNICEF/KCC 1981). This had taken place despite dramatic economic decline during the late Amin regime and a war with Tanzania: 24% of households were engaged in within-city farming. The Save the Children Fund (SCF) survey in one division of Kampala came to a similar conclusion (Riley 1987).

The findings of SCF largely coincide with initial results of a 1993 survey by a team of the Makerere Institute of Social Research, which impressed the Kampala City Council's Public Health Office. This study found a highly significant difference between farming and nonfarming households in the low- and very low-income groups, with respect to stunting among children under 5 years of age (Maxwell, this volume). Areas surveyed coincide with some covered by the World Bank-funded First Urban Project in Kampala (Maxwell 1993a, p. 9). Differences between these non farming and farming groups have also been observed, although they were not statistically significant, on wasting -a shorter-term effect of malnutrition (Maxwell, this volume).

Such results suggest that the poorer a household is, the more mothers may be inclined *to* engage in UA *to* prevent malnutrition. In Nairobi, a 1992 baseline survey commissioned by UNICEF and the Nairobi City Council's Nutrition Section in two low-income sectors found that 21.6% (as much as 33.1% in Gatina) *of* 250 children sampled were nutritionally stunted. It found UA was not adequately addressed and recommended that the promotion *of* UA and marketing *of* UA produce be seriously reviewed with municipal authorities, *so as to* make food more accessible and affordable *to* low-income urban mothers (Mutiso 1993).

Conventional strategies for urban food security need *to* be reassessed in view of UA's potential role: an exhaustive survey of subsidy programs found that income transfers from food subsidies tend *to* provide 15- 25% of the real income of low-income households (von Braun et al. 1993). This is roughly what largely unassisted urban farming is achieving already, as documented earlier. Moreover, UA certainly does this at a much lower *cost* and probably with many more benefits *to* consumers themselves, if not to the general urban economy.

Urban agriculture can also increase a household's cash income. In Bolivia, urban food projects supply women producers with 25% of their total income (Prudencio 1993, p. 15). In Dar es Salaam, UA generated incomes were larger than regular salaries for 67% of respondents (Sawio 1993, p. 312). In Addis Ababa, all urban cooperative farmers showed incomes well above those of half the city's population: 50% earned more than 70% of the city's employed population (Egziabher, this volume). In Nairobi, 47% of the urban farmers had no visible means of support other than their urban *shamba* plots (Lado 1990, p. 263).

The Urban Milk Connection

In Dar es Salaam in August 1993, one *cow* yielding an average of 10 L of milk daily, if this were all sold at 200 TZS/L, would generate a gross income of 2 000 TZS (575 Tanzanian shillings (TZS) = 1 United States dollar (USD)). This, minus an average maintenance cost of 500 TZS daily, would leave a net income of 1 500 TZS daily or 10 500 TZS weekly, when the minimum monthly salary was 7 000 TZS. Anyone wishing to purchase a cow must pay an average of 150 000 TZS (Camillus Sawio, personal communication, 29 August 1993): but cows can be, and many probably are, acquired through various means other than cash purchase. In 1988/89, there were 8 517 dairy cows officially censused in the Dar es Salaam city region. If, in August 1993, there were at least as many dairy cows producing an average 10 L/day in Dar es Salaam, these were worth the equivalent of 2.2 million USD and generated a net overall annual income equivalent to 8.1 million USD. If we assume that only half of the milk was sold, the equivalent to 4 million USD was still accruing to the urban cow owners annually. Small-scale urban farming's annual production in crops and livestock

may be worth tens of millions of dollars. In metro Rio de Janeiro, 172 ha cultivated on lease, under electrical transmission lines, put 10 million USD of garden produce on the local market in 1983 (La Rovere 1986, p. 32). In Kenya, the Mazingira Institute's six-town survey of 1 576 households gave the following estimates for urban Kenya in 1985: 25.2 million kg of crops worth 4 million USD and 1.4 million livestock worth 17 million USD (Lee-Smith and Memon, this volume).

The Spatial Scale of Urban Agriculture

Well-tailored surveys consistently show that the area effectively under UA is very much greater than conventional land-use classifications and maps may capture. Urban agriculture claimed the largest land use within the city boundaries of Waterloo, Canada, in 1981, plus some 6000 ha of abandoned capacity (Dorney 1990, cited by Sawio 1993, p. 121). Some 60% of greater Bangkok was officially under UA in the 1980s (DGIP/UNDP 1993, p. 4). In Bamako, 1 550 ha available for UA were fertilized solely with domestic wastes (Diallo and Coulibaly 1988, p. 30). Five cooperatives produced vegetables on 274 ha in Addis Ababa (Egziabher, this volume). Reported areas often exclude forms of UA in hidden household spaces (individually small but collectively considerable). Also, where surveys are carried out in the dry season, extensive rainfed crops are probably missed.

Urban Agriculture: An Adaptive and Mobile Land Use

Urban agriculture is a major urban land use because it is remarkably adaptive and mobile. It is found on sites of various types (constructible and undeveloped land, physically unconstructible land and voluntarily undeveloped, idle public lands and water bodies, and household spaces); Lado's (1990, p. 262) survey of 618 farmers in Nairobi's open spaces (unenclosed, wholly or partly on public lands) show that private residential land use is chosen most often (32%), followed by roadside verges (29%), river banks (16%), and other public lands (16%). Specific types of farming systems tend to occur more in some zones than in others (city core, corridors, wedges, or periphery).



Produce paddies at the wastewater treatment plant of Pikine on the outskirts of Dakar Senegal.

It should come as no surprise that UA responds to competition for land, as do many other urban land uses. As urbanization proceeds and centrality becomes more valuable, space-demanding forms of UA migrate to more peripheral or less valued locations, much in the same way as do single-storey residences, extensive institutional uses, warehousing and industrial compounds, transportation terminals, and ground-level parking facilities. Urban agriculture that remains at central locations tends to become more labour- or capital-intensive. In 26 km² of central Dar es Salaam, UA initially occupied the vast increase in open public space associated with sprawl; as the urban fabric became denser, UA lost in overall area in 1981/82, but expanded in cultivated valley land, paddy plots, and vacant land under power lines (a substantial amount of open land still remained available within the urbanized area in 1981/82). As a result, the pattern of UA became more dispersed: the 1990/91 ground survey revealed that 64% of gardens were less than 101 m² and 25% under 51 m²; more than 80% of the farmers worked other urban plots 11-20 km from their houses. Household space use intensified with 74% saying they raised livestock; most of the cattle were stall-fed (Sawio 1993, pp. 137-156). Urban agriculture does not obstruct more appropriate land development but puts to use small, inaccessible, unserviced, hazardous, and vacant areas.

That UA is typically opportunistic is anything but the result of chance. Practitioners have developed and adapted a remarkable range of farming systems and crop-selection techniques. This enables them, in principle, to make the best of climate, site, and other locational constraints and assets in the urban fabric. One survey by the United Nations Development Programme (UNDP) identified over 40 farming systems, each with its own technology, investment needs, yield rates, and returns to labour and risk (Smit and Ratta 1992, p. 8): as many as 17 different systems were in operation in a single LDC city. General categories included aquaculture (aquatic plants and pisciculture), horticulture (household, kitchen, community, and market gardening; roadside, rights-of-way, and streamside horticulture; soilless and vertical horticulture; and special crops), livestock (poultry, cattle, and microlivestock), agroforestry (multipurpose wood production), and others (snail-raising, ornamental fish, silkworms, worm larvae, horses, pets, and medicinal and culinary herbs).

Product and technical diversity enables UA to occupy an enormous range of niches in the urban ecosystem. This is best revealed by local surveys. For instance, in three different socioeconomic areas of central Dar es Salaam, over the 1968-1982 period, some 260 urban farmers in six farming categories grew 33 different types of crops and 8 types of livestock, on some 11 major conventional land uses and 22 subland uses identified on 1: 12 500 air photographs (Sawio 1993, pp. 153, 277, 284).

Crop selection is not haphazard, it depends on local water supply, soil conditions, distance from home, plot size, use of product, and the gardener's control over future use of the plot. Over 60 kinds of vegetables are grown by Hong Kong farmers (Yeung 1985, p. 20). Tricaud (1988, pp. 11, 33-34) identified some 74 species in Freetown and Ibadan gardens in short-cycle, annual-cycle, and semiperennial crops, including starchy crops, nuts, legumes, leaf vegetables, condiments for sauces, vegetables eaten raw, fruits, stimulants and medicinal plants, herb teas, spices, extractable products and raw materials, and fencing and decorative plants.

Urban agriculture can be an useful way of preserving, exchanging, and experimenting with native plant biodiversity. A series of surveys commissioned by the UN University's Program on Natural Resources in Africa is assessing the use of indigenous African food crops, introduced

crops, and imported foods in eating outlets in peri-urban and urban areas. One consultant found as many as 71 different species in a single Nigerian homegarden (Bede N. Okigbo, personal communication, 23 August 1993).

Urban Agriculture is Not Only the Poor's Business

Urban agriculture's complexity makes it clear that this is far from being merely a poor person's subsistence, an informal or illegal undertaking. Surveys in middle- and upper-class districts unveil a very different landscape. The UNDP survey, for example, identified seven categories of urban farmer, ranging from low-income survival to agribusiness, including middle-income home gardeners, low-, middle-, and high-income entrepreneurs, and farmers associations and cooperatives. An empirical classification for Kampala ranged from food-security to market-oriented households (Maxwell 1993b). Another typology based on the nature of production clearly indicated that some types require much greater inputs than others (Sawio 1993).

According to the Sokoine University of Agriculture's survey of 1800 farmers in six Tanzanian cities, for instance, animal breeding is a money-maker for top executives; 65% of all livestock kept in Dar es Salaam in 1987/88 were found in a low-density, formerly colonial, now elitist, area (Mvena et al. 1991). A three-district survey in Harare showed that 80% of Glen View (government and services) and Mabelreigh (middle-class suburb) households had gardens with some food crops (Drakakis-Smith 1990). In Dar es Salaam, urban farmers were evenly distributed across educational levels; 86% of interviewees agreed that high-income earners are doing the most urban farming (Sawio 1993, pp. 221, 228).

UA can be extensive. In Bangkok, a single large firm contracts about 10 000 outgrowers of chickens while it runs hatcheries and dressing plants and has a major share in national and international markets. International agribusiness produces mushrooms in Jakarta. Bogotá exports carnations to New York; Shanghai, orchids to Paris. California-based corporations own major shares and assist vineyards inside Santiago, Chile (DGIP/UNDP 1992, p. 23).

Urban Agriculture is Not for the Neophyte

Even among small producers, because of its resource needs, UA is not the accidental or temporary business of mostly recent immigrants from rural areas (Drakakis-Smith 1992, p. 5). Even in the small town of Pointe-Noire back in 1958, Vennetier (1961, p. 72) had found that the largest field area was in the hands of people who had been living for 5- 20 years in that city. More than 60% of Lusaka's urban farmers had been in the city for more than 5 years before starting their plot gardens, nearly 45% had not farmed for the first 10 years (Sanyal 1986, p. 15). In Nairobi, urban farmers average period of residence was 20.4 years and 85% had resided for at least 5 years, 57% for 15 years or more, and 15% for more than 40 years (Lado 1990, p. 262). Tricaud's (1988, p. 8) survey of 100 gardeners in Freetown and Ibadan, Sawio's (1993) in Dar es Salaam and others show similar findings. Most urban farmers have other part- or full-time jobs. In small Pointe-Noire, only 17 out of 266 interviewed farming heads of household were jobless; the rest were nonskilled manual workers, construction workers, and mechanics (Vennetier 1961, p. 72).

Conclusion

Urban farming as a basic urban function is nothing new; in fact it seems to be as ancient as cities themselves. At the dawn of the 21st century, Asia is leading the way in the sector, with highly complex and efficient systems for the production and marketing of urban agriculture. However, since the late 1970s the literature has been unveiling the growth of the sector in many other developing regions. Factors encouraging this expansion were discussed in this chapter. A noteworthy trend is that more governments are introducing institutional and other policy changes that recognize and tolerate, manage, and promote the activity.

Paramount to justifying and encouraging this change of attitude is the mounting evidence on UA's contribution to urban food security. Urban food supplies in developing countries can no longer be taken for granted and there is ample evidence from world cities that food is turning into a basic luxury for the urban poor in particular. These findings are collapsing the myth of urban privilege over rural neglect,

as far as food security is concerned. Urban food production has grown into a complex and thriving industry, in terms of practicing households and its supply of many nutritious food items to urban markets. Also, there is a growing body of data on the benefits accruing to practicing households, in terms of self-grown food intake, child nutritional status and general health, cash savings and generated income. The unfolding evidence should gradually lead the community of humanitarian organizations and others to review conventional food aid approaches and incorporate UA into more sustainable and cost-effective food security strategies.

In an urban planning perspective, surveys systematically point to the fact that the area or space effectively being used by UA activities is very much greater than conventional classifications and land-use maps may capture. Urban planning also needs to recognize that UA is virtually ubiquitous because it is remarkably adaptive and mobile. UA is so typically opportunistic because practitioners have evolved and adapted diverse knowledge and know-how to select and locate, farm, process, and market plant, tree, and livestock types in the urban fabric. What they have achieved and dare to pursue despite minimal support in the very heart of our major metropolises is often a resounding tribute to human genius.

Perhaps some of the more startling revelations of surveys in store is that UA is far from being merely a poor person's subsistence, an informal activity, or an illegal business. It is even less the accidental or temporary pursuit of mostly recent immigrants from rural areas. Above all, UA more generally emerges as the efforts, replicated on a massive scale, of space-starved urbanizing people of developing nations to obtain the very basic, without which there can be no sustainable city, economy, or government: reliable and sufficient supplies of good-quality food affordable by the majority of urbanites.

Chapter 2. Tanzania

Who Are the Farmers of Dar es Salaam?¹

Camillus J. Sawio

Urban populations are growing fast because of natural growth and rapid migration to the cities as people escape rural poverty, land degradation, famine, war, and landlessness. Feeding urban populations adequately is a major problem in developing countries. Rural areas do not produce enough food to feed both rural and urban people and food importation is constrained by lack of sufficient foreign exchange. Moreover, imported foodstuffs degrade the local food-production base and introduce foreign food tastes and unrealistic consumption patterns.

To meet part of the food needs of poor urban dwellers, urban agriculture (UA), defined here as crop growing and livestock keeping in both intra-urban open spaces and peri-urban areas, is becoming a common phenomenon in Dar es Salaam and other urban areas in the developing world (see, for example: O Connor 1983; Sanyal 1984, 1985, 1987; Wade 1986a,b,c; Lado 1990, p. 257; Drakakis-Smith 1991; Freeman 1991; Maxwell and Zziwa 1992; Smit and Nasr 1992; Sawio 1993.)

Urban agriculture has recently become a familiar, almost permanent feature all over tropical Africa and in many developing countries (Sanyal 1985). However, research on this social pattern is limited for five reasons.

¹ I thank Professors Bish Sanyal (Urban Studies and Regional Planning, Massachusetts Institute of Technology) and Robert C. Mitchell (Graduate School of Geography, Clark University) for their invaluable comments and suggestions.

- Social scientists and policymakers have difficulties quantifying its impacts (Sachs and Silk 1987);
- Urban agriculture has always been perceived as transitory;
- Urban agriculture was overlooked as a subject of serious study [because] . . . this form of urban land-use is seasonal and ephemeral, and so may escape the notice of researchers who concentrate on more visible, permanent forms of urban land use (Freeman 1991, p. xiii);
- Research concerns among social scientists are often divided; and
- Practicing UA is perceived by elites, bureaucrats, and urban planners as a health hazard and substandard living (Sawio 1993, p.24).

Although earlier studies assumed that UA was done mainly by the poor, uneducated, and unemployed men and women in urban squatter areas, recent findings show that those involved comprise a complex mix of socioeconomic groups from various backgrounds. This paper attempts to characterize the urban farmers of Dar es Salaam.

Methodology

This paper contains a discussion and description of some of the findings from a survey of 260 urban farmers conducted in three contiguous urban wards Kinondoni, Msasani, and Mwananyamala in the Kinondoni District of Dar es Salaam.

Primary Information

Primary information was obtained from the survey that was conducted from August 1990 to August 1991. Both qualitative and quantitative data-gathering methods were used. The field survey consisted of two parts:

- Over 200 unstructured, informal interviews covering many areas of the city, and

- A structured survey questionnaire administered to a sample of 260 urban farmers on small farms or gardens (*shambas*) in the study area.

The three wards that were selected in Kinondoni District encompass about 2 700 ha (27 km²). This district is a small part of the larger Dar es Salaam metropolitan area, which covers 1 393 km². A small area was chosen to examine in some detail the dynamics of VA activities in open spaces within the built-up areas in the city.

Sampling

The structured questionnaire was developed on the basis of the unstructured interviews. Originally, a sample comprising 360 urban farmers was planned, based on the assumption that at least 20 respondents could be obtained to match six types of expected urban farmers in each ward. However, only 260 farmers could be selected.

The 260 urban farmers were selected from a sampling frame created by an initial nonrandom purposive sample. The sampling frame was created as follows.

- First, the six types of assumed urban farmers (see Table 18) were described to urban ward branch party leaders.
- Next, each branch party leader in the three wards was asked to draw up from his list at least 30 people he believed were urban farmers, including at least five members of each of the six classes of urban farmers. Not all leaders produced a list of 30 urban farmers. In total, however, they identified 580 urban farmers in the three wards and their branches.
- Then, these farmers were selected purposively by the branch leaders.

I intended to select as representative a sample as possible from the sampling frame. Although the sample of 580 urban farmers was not stratified because reliable information about income and other relevant socioeconomic characteristics was lacking, it was decided to draw up a final sample that was proportional to the population of each ward. There were five ward branches in Kinondoni, six in Msasani, and ten in

Mwananyamala. Taking the population of each ward (Kinondoni 42 387, Msasani 51 293, and Mwananyamala 72 508) and the ward branches from which the urban farmers would be interviewed, I calculated a total sample size in the proportion 1:1.33:2. From each ward branch list, I selected every other farmer and obtained a total sample size of 260 respondents distributed as Kinondoni 60, Msasani 80, and Mwananyamala 120. The sample of 260 urban farmers comprised 44% men and 56% women (see Table 4).

About 43% of the sample were leaders of 10 cell-house units according to households organizational structure in both rural and urban Tanzania. Because of this structure, I had to approach the farmers through these 10 cell leaders.

Results

The following sections discuss the characteristics of the urban farmers in the sample and their perceptions of who are the urban farmers and who benefits from UA. The implications of these data highlight three assumptions that:

- Urban farmers are not socially marginal,
- UA has increased in Dar es Salaam and the way it operates can be explained by the logic of survival, and
- UA makes a significant contribution to the well-being of many Dar es Salaam residents.

The assumption that the way UA operates can be explained by the logic of survival is mentioned in several studies (for example, Wade 1986a, 1987; Sanyal 1984; Rakodi 1988; Maxwell and Zziwa 1992). Although UA is practiced by the rich and the poor alike, some of the former may practice it not so much for the need to survive in the city because of poverty, but rather for the lucrative commercial opportunities it offers. Mvena et al. (1991) documented a similar fact. Briggs (1989, 1991) has observed the same situation; he contended that UA in the peri-urban zone in Dar es Salaam is now a vibrant commercial activity. In Dar es Salaam's low-density open spaces, chicken and other livestock rearing is thriving because of the commercial value of such products as eggs, meat, and milk.

Socioeconomic Characteristics of the Urban Farmers

Farmers were asked to answer questions about the population density of the area where they lived and whether the area was planned or unplanned. They were asked to say whether the population density of the area was high, medium, or low. Planned areas are surveyed and developed with such basic infrastructure as electricity, telephones, piped water, flush toilets, a network of service roads, shops, schools, and hospitals or dispensaries. Unplanned areas are unsurveyed, often congested, and usually termed squatter settlements with little or no basic amenities, usually inhabited by low-income people living in substandard conditions.

The urban farmers were distributed in both planned (65%) and unplanned (35%) areas that could be characterized by three levels of residential density: high, medium, and low. Farmers living in high-density areas (plots of about 250 m²) were mostly found in Mwananyamala and Kinondoni (Table 1). Farmers living in medium densities (about 400-800 m²) were mostly found in Msasani and Mwananyamala. Farmers located in low-density areas (about 0.4 or more ha) were found almost exclusively in Msasani ward, because this ward was planned in the colonial days to house European administrators. It has large open spaces, some as large as 3 000 m², which today are good sites for UA in which crops and livestock rearing are booming (Bongole 1988; Mosha 1991; Mvena et al. 1991).

Table 1. Distribution of farmers (%) in planned areas by residential density.

Residential density	% of farmers			Total
	Kinondoni	Msasani	Mwananyamala	
High	30	10	60	100
Medium	20	40	40	100
Low	5	90	5	100

Freeman (1991, pp. 21-33) in his study of UA in the open spaces of Nairobi observed that for health reasons, colonial town planning in Kenya gave Nairobi ample open spaces similar to those in Dar es Salaam. Such large open spaces were in low-density zones meant for

European settlement. The open spaces in Nairobi are larger than those found in Dar es Salaam.

I had expected that planned areas, such as Msasani, Oysterbay, Regent Estate, and parts of Mikocheni, would have few or no agricultural activities. On the contrary, much UA is taking place in these areas, not only in unplanned areas. Urban farmers living in unplanned areas are concentrated in the high-density zones (Table 2).

Table 2. Distribution of farmers (no.) in unplanned areas by residential density.

Residential density	Number of farmers		
	Kinondoni	Msasani	Mwananyamala
High	26	16	48
Low	0	1	0

Distribution of Urban Farmers by Sex

Women farmers predominated in Kinondoni and Msasani but men predominated in Mwananyamala (Fig. 1). That there are more women than men in UA ventures confirms similar findings of other studies of UA in Tanzania (Tripp 1990; Mvena et al. 1991); as well as in Kenya, Uganda, and Zambia (Sanyal 1984; Rakodi 1988; Lee-Smith et al. 1987; Freeman 1991; Maxwell and Zziwa 1992).

Rakodi (1988) argued that UA in Lusaka is primarily undertaken by women who supply most of the agricultural labour. This reflects women's traditional roles in the production and reproduction for the family. Sanyal's (1984, pp. 11, 119-122) study of UA in the squatter settlements of Lusaka concluded that the single most important factor in informal urban food production was the perception that women ought to cultivate because it is the wives' duty to provide the household with food. Figure 1 shows that, in all wards, women outnumber men in urban farming. However, the 210 respondents (81%) who were heads of households were equally distributed (Table 3) between male and female heads of households.

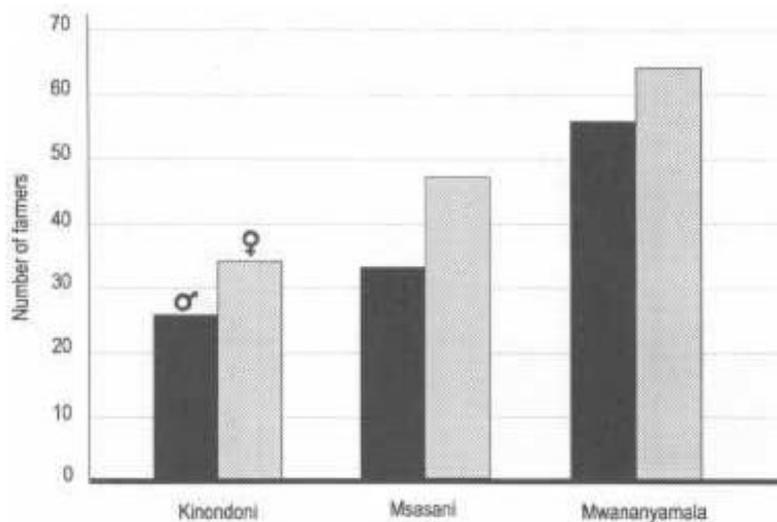


Fig. 1. Distribution of urban farmers (no.) among the three wards by sex.

Table 3. Distribution (%) of respondents who said they were heads of households by sex and by ward.

Sex	Kinondoni	Msasani	Mwananyamala	Number
Male	23.1	29.8	47.1	104
Female	25.5	25.5	49.0	106
Total (%)	24.3	27.6	48.1	
Number	51	58	101	210

Age, Sex, and Marital Status of Urban Farmers

Over 50% of urban farmers of both sexes were in the 26-45 age group (Table 4). Indeed, 75% of women farmers were in that age group. There were generally few farmers in the higher age-groups.

Nearly 75% of the urban farmers in the sample were married (Table 5). About 15% were single and the remainder were widowed or divorced. Within wards, 75% were married in Msasani and Mwananyamala but only 60% in Kinondoni. Although the number of widows and divorcees was small, the percentage who were widows was highest in Mwananyamala: Kinondoni and Msasani were about equal in the percentage who were divorced.

Table 4. Distribution (%) of sample across age, sex, and ward.

Age group (years)	Kinondoni	Msasani	Mwananyamala	All
Males				
15-25	3.8	6.1	8.9	7.0
26-35	34.6	21.2	12.5	20.0
36-45	30.8	39.4	30.4	33.0
46-55	27.0	24.2	14.3	20.0
56-65	3.8	6.1	25.0	14.8
66+	0.0	3.0	8.9	5.2
Number	26	33	56	115
Females				
15-25	0.0	4.3	6.3	4.1
26-35	47.1	42.6	23.4	35.2
36-45	44.1	34.0	43.7	40.7
46-55	8.8	14.9	17.2	14.5
56-65	0.0	2.1	6.3	3.4
66+	0.0	2.1	3.1	2.1
Number	34	47	64	145

Table 5. Distribution (%) of urban farmers by marital status and ward.

Marital status	Kinondoni	Msasani	Mwananyamala	Total
Single	25.0	11.2	11.7	14.6
Married	63.3	73.8	73.3	71.2
Widowed	1.7	2.5	9.2	5.4
Divorced	10.0	12.5	5.8	8.8
Number	60	80	120	260

Ethnic Background, Region of Birth, and Migration of Urban Farmer

The practice of urban farming is related to factors that include cultural ethnicity, place of origin, and migration. Information on these was sought by asking:

Were you born in Dar es Salaam? If you answer **no**, what is the region of your birth? Ethnically, what tribe do you belong to? Did you migrate to Dar es Salaam and when? How long have you lived in Dar es Salaam?

Most respondents were born in regions contiguous with Dar es Salaam and those that are rich agriculturally, such as Morogoro, Mbeya, Kagera,

and Kilimanjaro. Other urban farmers come from all over Tanzania. Eight respondents came from neighbouring countries (Table 6).

On ethnicity, I divided the respondents into 10 geographic-tribal clusters (Table 7). The largest proportion of urban farmers comes from the northeastern, northwestern, and southwestern regions of the country. By coincidence, these are the better developed parts of Tanzania.

It had been assumed that:

- Urban farmers are mostly recent rural migrants to the city,
- They farm in the city and its outskirts to make use of their rural farming skills, and
- That urban farming is their major means of survival because they lack stable and gainful employment.

However, several studies of UA have shown that most urban farmers are well established migrants (Sanya1 1984; Rakodi 1988; Freeman 1991) and the results from Dar es Salaam are consistent with such findings. Of the total number of farmers interviewed, about 16% were nonmigrants. Almost 50% of the respondents migrated to Dar es Salaam between 1971 and 1980 (Table 8). Over 20% migrated in the 1960s. Recent migrants arriving about 10 years ago or less form about 20% of the respondents.

Table 6. Distribution (% , N = 260) of urban farmers by region (or country) of birth.

Region	Number	%	Region	Number	%
Kilimanjaro	57	21.9	Kagera	7	2.7
Dar es Salaam	41	15.8	Tanga	6	2.3
Coast	15	5.8	Arusha	5	1.9
Morogoro	14	5.4	Kigoma	5	1.9
Lindi	12	4.6	Ruvuma	5	1.9
Tabora	12	4.6	Singida	3	1.2
Dodoma	10	3.8	Mozambique	4	1.5
Mara	10	3.8	Kenya	2	0.8
Mbeya	10	3.8	Zanzibar	2	0.8
Mwanza	10	3.8	Burundi	1	0.4
Iringa	9	3.5	Malawi	1	0.4
Mitwara	9	3.5	Rwanda	1	0.4
Shinyanga	8	3.1	Uganda	1	0.4

Table 7. Proportion (% , $N = 260$) of urban farmers by major ethnic group or cluster and general geographical area in Tanzania.

Geographic area	Major ethnic groups	% respondents
Northeastern	Waarusha, Wachagga, Wapare	26.2
Dar es Salaam and environs	Wazaramo, Wamatumbi, Wandengereko	18.2
Western/Lake Victoria zone	Wanyamwezi, Wasukuma, Wakerewe	15.4
Southwestern	Wabena, Walipa, Wakinga, Wangoni, Wahehe, Wanyakyusa	10.4
Southeastern	Wamakonde, Warufiji, Wamakua, Wamwera	8.2
Central	Wagogo, Wairaqw	5.4
West of Dar es Salaam	Wakaguru, Waluguru	4.6
West and Northwestern	Waha, Wahaya	4.2
Eastern/Tanga	Wabondei, Wasambaa, Wazigua	3.2
Other areas	Others	4.2

However, several studies of UA have shown that most urban farmers are well established migrants (Sanya1 1984; Rakodi 1988; Freeman 1991) and the results from Dar es Salaam are consistent with such findings. Of the total number of farmers interviewed, about 16% were nonmigrants. Almost 50% of the respondents migrated to Dar es Salaam between 1971 and 1980 (Table 8). Over 20% migrated in the 1960s. Recent migrants arriving about 10 years ago or less form about 20% of the respondents.

Most migrants in the sample arrived in Dar es Salaam between 1971 and 1980, particularly between 1973 and 1976 at the height of massive villagization campaigns when those who did not want to go into *ujamaa* villages migrated mostly to Dar es Salaam. Unlike the 1970s, Dar es Salaam appears to have been relatively unattractive to migrants

Table 8. Distribution of urban farmers who said they migrated to Dar es Salaam by period.

Migration period	Migrants to Dar es Salaam (%)	Number
1920 — 1930	1.4	3
1931-1940	0.9	2
1941-1950	2.8	6
1951-1960	4.6	10
1961-1970	20.7	45
1971-1980	47.9	104
1981-1990	21.7	47
Total	100.0	217

in the 1980s, mainly because of the economic crisis and harsh urban living conditions. These conditions reflect the party's and government's deliberate policy of turning a deaf ear to urban problems and urban development (Paddison 1988). In the post-Arusha Declaration era, the government concentrated more on rural development to the neglect of urban planning and urban development as a whole. There were campaigns to slow the growth of Dar es Salaam and to clean the city of undesirables -loiterers and the jobless. In the Human Resources Deployment campaigns of 1983, unemployed youth and others were rounded-up and repatriated to their home regions or sent to nearby villages to farm. This exercise reduced in-migration.

Size of Households of Urban Farmers

The number of persons in a household influences the amount of food consumed in the household daily and the amount of labour the household can expend on UA. In this section, the urban-farmer's household is described in terms of those who compose it: total number, children, and other relatives or strangers.

The households in the study area ranged from one person to over ten (Table 9). In Kinondoni and Msasani wards, those with four to six persons represented about 50% of the households. In Mwananyamala, about 50% of households had more than seven persons.

Only in Msasani, did any household have more than seven children (Table 10); however, this was a single household. Households with more children imply that mothers engage more in UA to supplement household food supply so as to prevent malnutrition from sapping their children's health.

Table 9. Distribution (%) of households by size among urban farmers in the study area.

Household size	Kinondoni	Msasani	Mwananyamala	Total	
				%	Number
1-3	18.3	1.3	8.3	11.5	30
4-6	46.7	52.2	36.7	43.8	114
7-9	33.3	31.3	42.5	36.9	96
10+	1.7	5.0	12.5	7.7	20
Number	60	80	120		260

Table 10. Proportion of households (%) with various numbers of children in the study area.

Ward	Number of children in household			Number
	1-3	4-6	7+	
Kinondoni	77.8	22.2	0.0	54
Msasani	69.3	29.3	1.4	75
Mwananyamala	69.6	30.4	0.0	112
Total (%)	71.4	28.2	0.4	
Number	172	68	1	241

Respondents were asked to describe other types of persons or relatives who lived in their households especially adults. A small proportion of households included grandparents (Table 11). Most of the relatives (40% of households) were young people: uncles, nephews, and nieces. Other persons included house servants and security guards in the high-income areas. Obviously, such relatives as uncles, nephews, and nieces supply part of the labour used in UA, implying that some UA operators for example, professionals do not actually have to dig in their gardens because these relatives do the job.

Table 11. Proportion (%) of types of relatives or other persons living in households of respondents by ward.

Relative or other person	Kinondoni	Msasani	Mwananyamala	Total	
				%	Number
Grandfather	0	0	1.0	0.5	1
Grandmother	8.3	3.1	6.5	5.9	13
Uncle	16.7	9.4	16.8	14.6	32
Nephew	12.5	14.0	12.1	12.8	28
Niece	16.7	15.6	12.1	14.2	31
Grandchild	0	6.3	12.1	7.8	17
House servant	20.8	21.9	17.8	19.6	43
Security guard	8.3	17.2	6.5	10.0	22
Other	16.7	12.5	15.1	14.6	32
Number	48	64	107		219

Daily Expenditure on Food per Household

The respondents were asked:

Given your household size, on average how much do you now spend on food daily?

Table 12. Distribution of households (%) by daily expenditure on food by urban farmers by ward.

Food expenditure (TZS/day) ^a	Kinondoni	Msasani	Mwananyamala	Total	
				%	Number
150-400	0	2.5	0	0.8	2
401-650	0	5.0	1.6	2.3	6
651-900	26.7	13.7	12.5	16.2	42
90-150	28.3	27.5	30.0	28.8	75
1 151-1 400	23.3	20.0	19.2	20.4	53
1 401-1 650	10.0	10.0	16.7	13.1	34
1 651-1 900	5.0	7.5	6.7	6.5	17
1 901-2 150	3.3	11.3	11.7	9.6	25
2 151+	3.3	2.5	1.6	2.3	6
Number	60	80	120		260

^a In 1993, 575 Tanzanian shillings (TZS) = 1 United States dollar (USD).

The daily expenditure on food per urban farmer household (Table 12) give insights on why many urban dwellers in Dar es Salaam engage in UA. Almost 30% of households in each ward reported expenditures on food of 901-1 150 TZS/day (in 1993, 575 Tanzanian shillings (TZS) = 1 United States dollar (USD)). This appears to be the average for the study area as a whole. However, 20% of households spend 1 150-1 400 TZS/day and about 2% spend over 2150. As Ethelston (1992) observed, food costs in rapidly urbanizing cities in the world are rising. In a 1990 survey of the world's 100 largest metropolitan areas by the Washington-based Population Crisis Committee (PCC), it was found that food costs exceeded 50% of household income in 23 cities. In another 34 cities, food costs were 30% or more of income (PCC 1990).

For households whose official minimum monthly salary is 5 000 TZS, these data suggest that economic necessity makes UA a survival strategy for the poor. Although in 1987 a household of six spent an average 325 TZS/day on food (Tripp 1990), my survey shows that it is now impossible to feed a household with that amount given current inflation, devaluation of the Tanzanian currency, and the enduring economic crisis.

Education of Urban Farmers

Respondents were remarkably evenly distributed across the six education levels with about 13-20% in each group (Table 13). Only 15% of respondents said that they had no formal education. However,

Table 13. Distribution (%) of urban farmers by education level by sex.

Education level	Male	Female	Total	
			%	Number
No education	21.7	10.3	15.4	40
Completed primary	16.5	22.8	20.0	52
a-level	16.5	11.7	13.8	36
A-level	12.2	23.4	18.5	48
University	14.8	11.7	13.1	34
Other higher education ^a	18.3	20.1	19.2	50
Number	115	145		260

^a Examples of institutions of higher education: Institute of Finance Management, Dar es Salaam; Institute of Development Management, Mzumbe, Morogoro; National Transport Institute, Dar es Salaam; College of National Education, Dar es Salaam; Uyole Agricultural Training Centre, Mbeya; and College of Business Administration, Dar es Salaam.

65% had completed at least O-level (equivalent to North American Grade 10) and 30% had attained education beyond A-level (high school completion). Distribution by education level differed for men and women. More men than women said they had not received any formal education and more women than men had gone beyond A-level.

Within the three wards, the distribution of urban farmers by education level was not uniform (Table 14). In Mwananyamala, about 23% of urban farmers, compared with 10% in the other two wards, said that they had not received formal primary education. Mwananyamala also has more farmers with only primary school education.

In Kinondoni and Msasani, most of the UA operators had received education to the A-level or above. That so many people with higher levels of education are involved in UA at present supports my working assumption that UA is not a marginal activity; this is especially true because my sample probably under-included well educated people.

Table 14. Distribution of urban farmers (%) by education level and ward.

Education level	% of farmers		
	Kinondoni	Msasani	Mwananyamala
No education	10.0	10.0	21.7
Completed primary	11.7	13.8	26.7
a-level	20.0	11.2	11.7
A-level	25.0	21.2	14.2
University	10.0	21.2	10.7
Other higher education	23.3	22.6	15.0

Involvement of such highly educated people in UA also reflects how bad the national economy is in terms of wages. It also suggests that the practice of UA may continue to expand with increasing urban growth and may ultimately be legitimized in national urban policies: the more educated the participants in UA are, the more likely they will be to protect their investments by influencing policies and regulations in its favour.

Occupational Characteristics of Urban Farmers

One goal of the study was to understand who was practicing UA. The survey data provide one source of information. Information was also obtained by talking informally with farmers in the unstructured interviews. These interviews revealed that the average person in the street, even the middle-class regular wage earner, regards engaging in UA as a logical thing to do given the harsh urban economic conditions. One professional worker commented:

There was a time I dreamed I would never have to worry about the hoe and about bending to till the soil to grow my food as I did in the villages in Usangi, Upare. Now my salary is nothing compared with what I must spend daily. Our garden on our house plot has given us all the vegetables we needed this year; the small chicken shed at the backyard has housed 400 birds every 3 months, and our 5-hectare farm in Mbezi has employed our niece, who dropped out of school, and she is happy and out of trouble in this big city. For many of us, urban farming is just the logical thing to do if you want to survive. Everybody is doing it.

As we walked the streets of Dar es Salaam, some respondents seemed to joke about urban farming saying, *Ssiku hizi sate tu wakulima bwana, kabwe/a barabarani na Meneja Mkuu ofisini* [These days everyone is a farmer, the street boy and the General Manager]. Unquestionably, urban farming in Dar es Salaam is a widely accepted fact of life.

To learn about the perceptions our sample held on urban farming we asked:

Who are those involved in urban agriculture in Dar es Salaam? Who do you think is doing most urban agriculture in Dar es Salaam?

Table 15. Respondents' perceptions of who the urban farmers are in Dar es Salaam (% , N = 260).

Assumed urban farmer	Scale of responses				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
High-income earners in government	86.1	13.1	0.4	0	0.4
Middle-income civil servants	10.4	83.4	0	0	6.2
Self-employed women	2.7	71.9	0	0	25.4
Single mothers as household heads	0.4	44.2	0.8	0.8	53.8
Housewives with no regular jobs	1.2	39.6	0.8	1.9	56.5
Jobless and unemployed	0	8.1	7.3	47.3	37.3
School children led by teachers	0	8.1	6.5	4.6	80.8
Poor who earn <2 000 TZS/month ^a	0	1.2	29.5	46.5	22.8
All low-income earners	0.4	0.4	97.7	0.8	0.8

^a In 1993, 575 Tanzanian shillings (TZS) = 1 United States dollar (USD).

Strikingly, the largest number of people (86%) strongly agreed with the view that high-income earners in government positions, an elite group, are doing the most UA (Table 15). This finding confirms results from studies of urban farming in Dar es Salaam and other towns (Mvena 1986; Bongole 1988; Mvena et al. 1991). Mtwewe (1987, p. 9), in a study in which he examined the bottlenecks facing small-scale pig producers around Dar es Salaam, observed that the assumption made that the low-income urban people are the ones engaged in farming does not hold. The high-income people are the majority in the business.

Middle-income civil servants rank second as most involved in UA. Over 90% of respondents agreed or strongly agreed with this statement and 72% of all respondents confirmed that self-employed women were also active UA operators. Single mothers who are also household heads is the next most active group in urban farming, followed by married women who do not have regular jobs.

The jobless, the unemployed, the poor, or other low-income earners were not perceived to be doing the most UA. Arguably, these self-reported perceptions may be influenced by a desire on the respondents' part to enhance their status by claiming that the UA activity in which

Table 16. Occupational characteristics of urban farmers in the study area (N = 260).

Occupation	% of UA farmers saying that they worked regularly in occupation
Small business or trade owner	18.5
Professional	15.8
Cultivator (urban farmer)	11.2
Administrator or manager	8.1
Service giver	7.7
Agricultural worker	5.8
Craft or machine operator	5.0
Clerk	4.6
Mixed farmer	4.2
Other	19.2

they engage is one that is done by high-status people. That this is not the case is supported by the respondents' own occupations (Table 16) resulting from answering the question:

What is your occupation? Select the class of occupation you belong to from the list shown.

Based on the classification used in the population census in 1988,² the urban farmers came from diverse occupations. However, three occupational categories dominate: small businesses and owners of trade operations, 19%; professionals (teachers, doctors, architects, and so forth), 16%; and urban cultivators (most likely full-time farmers), about 11 %.

The occupational category referred to as 'other' (Table 16, 19.2%) includes casual workers who were farmers as well: they represent a large number of the urban poor. By casual labourer, we mean a person engaged in precarious self-employment that is characterized by undesirable instability and insecurity.

² In the 1988 census data (URT 1989), the following occupations were recognized: Legislators, Administrators and Managers, Professionals, Technicians and Teachers, Clerks, Service and Shop Sales, Cultivators, Mixed Farming, Agricultural Workers, Craftsmen and Machine Operators, Small-scale Traders and Labourers, Other Workers, and Not Employed. The 'Not Employed' category included all persons who did not work during the 12-month reference period (Population Census: Regional Profile of Dar es Salaam, 1991. Bureau of Statistics, Census Division).

Table 17. Urban farmers who reported themselves as casual workers by ward (%).

Ward	Type of casual worker (%)				Number
	Labourer	Cart-pusher	Unskilled brick-layer	Other	
Kinondoni	41.7	8.3	41.7	8.3	12
Msasani	18.8	12.5	37.5	31.2	16
Mwananyamala	22.7	50.0	22.7	4.6	22
% of total	26.0	30.0	32.0	14.0	
Number	13	14	16	7	50

The casual labour group, which was quite small (50 respondents), was divided into four subcategories – labourer, cart-pusher, unskilled brick-layer, and other (Table 17). The other here refers to all kinds of unspecified jobs or simply not employed. The proportion of urban farmers who described themselves as labourers was highest in Kinondoni and Mwananyamala as was another subcategory of casual workers, the unskilled brick-layers. Half the respondents in



This plot of amaranth (foreground) shows a typical transformation of roadside space in Dar es Salaam into an urban vegetable garden.

Mwananyamala described themselves as cart-pushers.

It is known that, in Dar es Salaam since the mid-1980s, people holding important government posts practiced UA activities in areas such as Masaki, Msasani, Oysterbay, and even in the Ada and Regent Estates. About 10% of respondents in the sample were administrators and managers and another 16% were professionals, which suggests that UA is not restricted to the urban poor or simply casual labourers (Table 16). These findings are likely to underestimate the actual proportion of high-income urban farmers because those in this class were most reluctant to be interviewed for this study.

Another way of explaining the dynamics of UA operators is to look at how the respondents perceived the mix of UA operators within six categories of urban farmers that I assumed existed in Dar es Salaam. Urban farmers were asked:

When you think about urban agriculture in Dar es Salaam today, probably you will find a type of urban farmer that is important or dominant and a type that is less important. Using the scale provided, assess the six categories suggested to show how important or unimportant these urban farmer types are. If you previously said you are interested in urban farming, what type of urban farmer are you?

According to the respondents' perceptions who are, indirectly, assessing themselves because they are in fact self-identified UA operators the UA practice of combining crops and livestock (mixed farming) was identified as the most important (Table 18) and 90% of

Table 18. Urban farmers' belief about the importance of the six categories of urban farmers (% , N =256).

Type of urban farmer	Respondents' assessment of importance			
	Very important	Important	Neutral	Not important
Crop and livestock farmers	96.1	3.1	0.8	0
Livestock keepers only	27.3	70.8	1.5	0
Farm workers who are not landowners	23.9	56.4	19.3	0.4
Crop growers only	22.8	75.3	1.9	0
Land owners leasing land	0	27.8	71.0	1.2
Land owners who do not farm	0	3.7	60.9	35.4

respondents said it was the preferred practice among the elite and better off. In fact, many urban farmers said they belonged to this category.

Although owners of land who do not farm it (the sixth type) were not held in high regard, the practice of land owners employing farm workers to do UA for them seemed to be a popular activity.

- It creates jobs for many jobless youths who migrate to the city annually in search of better lives ;
- It keeps unemployed people out of trouble; and
- It enables them to get part of their food as pay in kind.

On the whole, urban farmers in Dar es Salaam included small-scale crop growers in small spaces, roadsides, and around houses; livestock keepers from those with a few wild chicken to those with dairy cattle; single persons (men and women); school children; unemployed people working as farm workers; professionals using family and hired labour; and some who practice market gardening.

The Beneficiaries of Urban Agriculture

This study intended to identify the people who are perceived to be the greatest beneficiaries of UA. Respondents were asked:

From your experience, who is benefiting most from the practice of urban agriculture in Dar es Salaam?

Respondents' perceptions show that those getting the most out of UA are the well-placed people in government and informal employment positions (Table 19). Migrants into the city rather than the native

Table 19. Urban farmers' perception of who is benefiting most from urban agriculture in Dar es Salaam ($N = 260$).

Category of major beneficiary	% responding Yes
Government and parastatal workers	92.7
Migrants not natives of Dar es Salaam	92.7
Women heads of households	69.2
People without transport	2.3
Landless	1.5
Urban poor	0.4

inhabitants of Dar es Salaam, the Zaramo, Ndengereko, and others were perceived to be benefiting more from UA because they brought with them their farming skills and traditions. Although women household heads are involved in UA a lot, they were not perceived to be benefiting the most. Finally, the poor and the landless were not seen to benefit from UA.

Conclusion

In Dar es Salaam, urban farmers are perceived to be very diversified in social structure, to come from all the socioeconomic groups, and to include some recent migrants, as well as more established ones.

Cutting across broad socioeconomic, ethnic, educational, and occupational statuses, the urban farmers in Dar es Salaam include professionals, teachers and administrators, government officials, decision-makers and urban planners, married women, single mothers as heads of households, students, casual labourers, the unemployed, and part- and full-time workers.

That urban farming involves such a complex mix of operators implies that urban farmers are not socially marginal as is often assumed. This was not true because UA:

- Plays a key role in urban household survival in all social groups,
- Supplements daily food expenditures by saving money to buy other basic items, and
- Creates employment for the jobless.

Regarding the assumed typology of six types of urban farmers, mixed farming was perceived to be the dominant type and to be the preferred practice among the relatively better off. As a result, most respondents believed that those benefiting most from UA are the wealthy and the well-placed people in government positions and in the private sector. This implies that the poor are benefiting only tangentially. Therefore, more must be done to formulate planning policies that will directly increase the chances of the urban poor to enhance their livelihoods by supporting UA, a promising but largely undeveloped sector.

Although intervention to promote UA is desired in the management of urban ecosystems, policies must account for such issues as air and water pollution, possible health hazards such as food poisoning by contaminated urban water used for irrigation, and other untreated refuse and water-borne diseases if UA is done haphazardly. It is hoped that any future plans and policies to support UA will attempt to integrate community participation, self-reliance, food and income creation, and poverty-alleviation strategies while emphasizing gender issues as well.

Chapter 3. Uganda

The Household Logic of Urban Farming in Kampala¹

Daniel G. Maxwell

Among the various claims in the literature on the impact of structural adjustment programs on the urban poor and wage-earning classes in Africa is that made by Pinstrip-Andersen (1989). He refers briefly to Kampala to suggest that access to land for semisubsistence production may buffer or prevent the decline in nutritional status and household food security that is widely believed to be the product of the urban economic crisis, or structural adjustment, or both. The source to which Pinstrip-Andersen refers is an article by Jamal (1988, p. 684), who claims that Kampala is twice as self-sufficient in calories now as it was in 1972. Although this statement may well be true, Jamal does not present evidence on either caloric intake or nutritional status of farming families within the city.

The depth of the economic crisis in African cities in the 1980s has been well documented (Gamal and Weeks 1987; Stren and White 1989). In the case of Kampala, the urban economic crisis began much earlier than in many other cities in the region, as a result of the Amin regime's economic war in the early 1970s, which created space for an indigenous bourgeoisie, but undermined much of the formal economy (Banugire 1985; Mamdani 1990). Wage income fell precipitously in relation to the cost of living between the end of the 1970s and the

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present, and the major response at the household level was to diversify sources of income as a buffer against inflation and falling real wages (Bigsten and Kayizzi-Mugerwa 1992).

Only comparatively recently have donors and governments become aware of the potential risks to short- and medium-term food security and nutritional status of vulnerable groups in the process of adjustment. The conventional argument is that structural adjustment is designed to make farming a more economically attractive livelihood, and to solve the urban food problem through increased incentives for rural production. However, in the short- to medium-term, the burden on low- and middle-income urban households is increased.

The objective of this paper is to evaluate the various claims made about urban agriculture (UA) in Kampala. This includes reviewing the limited literature on the importance of UA in Kampala; attempting to assess what direct evidence is available on the question of nutritional status; examining the means of access to the critical land resource for UA; and understanding the logic of different kinds of households involved in urban food production to interpret why different groups of people engage in it.

The Importance of Agriculture to the City's Economy

Slightly over 50% of the land within the municipal boundaries of Kampala is used for agriculture (GTZ/DPP 1992). However, this includes areas that cannot be described as urban, with population densities as low as six people per hectare. Nevertheless, all the area within the municipal boundaries is subject to the same urban bylaws, which technically do not permit the use of land for agricultural purposes.

Various estimates have been quoted for the prevalence of agriculture among Kampala's households. Our own previous work (Maxwell and Zziwa 1992) estimated that 36% of all households within a 5-km radius of the city centre engaged in some kind of agricultural production, but our sampling technique did not permit statistical extrapolation. The current study estimates 30% of households in the city are involved in

agriculture. UNICEF/KCC (1981) estimated 25% of low-income households farmed and Save the Children Fund (SCF) put the estimate at 28% (Riley 1987). However, in both these cases, households surveyed included only those with small children. Taken as a whole, these studies indicate at least a general range of the proportion of Kampala households that engage in farming.

Crops grown are largely staple food crops: cassava, sweet potato, beans, maize, *matooke* (plantains), and cocoyams, in order of descending prevalence. Vegetable crops and fruit trees are also grown and a limited number of commercial producers grow coffee and even vanilla beans in the city. Among livestock producers, poultry raising (for both meat and eggs) is most common, but cattle, small ruminants, pigs, and rabbits and other microlivestock are raised as well (Maxwell and Zziwa 1992).

Reliable data on levels of production or total value of production are not available. Our earlier study indicated that roughly 20% of the staple foods consumed within the 5-km radius of the city centre were produced within the same area. Because this is the most built-up area of the city, the estimate would probably be higher for the whole area within the municipal boundaries. Jamal (1988) estimated that the city is 40% self-sufficient in calories, but presents no evidence to back up the claim. Government statistics indicate that some 70% of the poultry products consumed within Kampala are produced there.

Evidence on Nutritional Status

Several studies in the past 12 years have gathered data that can be used to assess the impact of UA on the nutritional status of children. In 1981, in the aftermath of the war with Tanzania and a politically turbulent period, the United Nations Children's Fund (UNICEF) attempted to assess the need for supplementary feeding of children in 13 low-income Kampala neighbourhoods, and included on their brief questionnaire questions about whether the family had access to a *shamba* for home production of food. Their conclusion was that despite the war and the dramatic economic decline of the later Amin years, supplementary feeding was not needed. They mentioned food production within the city as a major contributing factor

(UNICEF/KCC 1981), although their analysis did not include an explicit comparison of farming and non farming groups.

In 1987, SCF carried out a similar nutritional survey in Kawempe Division of Kampala, to determine whether their supplementary feeding program for war-displaced children should be continued. This study also concluded that supplementary feeding programs were not needed, and that urban food production was a contributing factor (Riley 1987), but again, farming and nonfarming groups were not directly compared, even though the data collected would permit such a comparison. Two other studies (Kakitahi and Zimbe 1990; Biryabarema 1994) have obtained baseline data on malnutrition on children in Kampala and have included, as background information, questions about whether food is produced by the family of the children being assessed.

The SCF data suggest that the long-term growth (height-for-age) of children differed significantly between farming and nonfarming households, with children in the former category on average half a standard deviation higher in terms of comparison with a reference median (Table 1). However, the rate of short-term growth (weight-for-height) did not differ significantly (Table 2). It should be noted that these data were collected in March, during the rainy season; thus it is to be expected that little supplementary food would be available for household consumption from the household's own production within

Table 1. Height-for-age Z-score comparison (indicative of stunting or long-term malnutrition).

	Observed value	Mean	Variance	Standard deviation
Farming	104	-1.186	2.029	1.424
Nonfarming	143	-1.613	2.309	1.520
Difference		0.427		

Source of variation	Sum of squares	Degrees of freedom	Mean squares	F statistic	p value
Between	10.994	1	10.994	5.017	0.024419
Within	536.915	245	2.191		
Total	547.909	246			

Source: SCF nutrition survey (Riley 1987).

Note: The p value is equivalent to that for Student's t-test, because there are only two samples.

Table 2. Weight-for-height Z-score comparison (indicative of wasting or short-term malnutrition).

	Observed value	Mean	Variance	Standard deviation
Farming	104	-0.070	1.153	1.074
Nonfarming	143	-0.068	1.309	1.144
Difference		-0.002		

Source of variation	Sum of squares	Degrees of freedom	Mean squares	F statistic	p value
Between	0.000	1	0.000	0.000	0.986674
Within	304.543	245	1.243		
Total	304.543	246			

Source: SCF nutrition survey (Riley 1987).

Note: The p value is equivalent to that for Student's t-test, because there are only two samples.

Note: These data were collected in March 1987, during the early part of the rainy season. With the exception of swamp agriculture where certain crops are grown during the dry season, it is not a time of year when people would be harvesting and consuming food that they had produced themselves in the city. The study included about 1 200 children in 30 enumeration areas in Kawempe. Because of technical difficulties in data retrieval, this analysis includes six of those areas that were selected randomly.

the city. Both farming and nonfarming households alike would depend on market sources for food during this period.

The 1991 Kawempe Community Diagnosis Survey data indicate some difference in the long-term nutritional status of children in farming and nonfarming households, but not a statistically significant one. Again, because the data were collected in the rainy season, there is virtually no demonstration of the impact of farming on short-term nutritional status (Tables 3 and 4).

Of course, this is only a crude comparison, and does not consider such factors as income, parental education, or household composition, nor amounts of land farmed or length of time in farming, all of which might be expected to have an impact on stunting or prevalence of long-term undernutrition. However, if there are indications of a relation between urban farming and improved nutritional status to be found in simple bivariate analysis of data from past studies in the city, it seems reasonable to conclude that the claim made by Pinstrup-Andersen (1989) is sufficiently valid to warrant further investigation.

Table 3. Height-for-age Z-score comparison (indicative of stunting or long term malnutrition).

	Observed value	Mean	Variance	Standard deviation
Farming	366	-0.594	3.043	1.744
Nonfarming	936	-0.702	2.681	1.637
Difference		0.109		

Source of variation	Sum of squares	Degrees of freedom	Mean squares	F statistic	p value
Between	3.098	1	3.098	1.114	0.291546
Within	3617.250	1300	2.782		
Total	3620.348	1301			

Source: 1991 Kawempe community diagnostic survey (Biryabarema, 1994).

Note: The *p* value is equivalent to that for Student's *t*-test, because there are only two samples.

Table 4. Weight-for-height Z-score comparison (indicative of wasting or short-term malnutrition).

	Observed value	Mean	Variance	Standard deviation
Farming	367	-0.470	1.395	1.181
Nonfarming	950	-0.421	1.571	1.254
Difference		-0.049		

Source of variation	Sum of squares	Degrees of freedom	Mean squares	F statistic	p value
Between	0.647	1	0.647	0.425	0.521805
Within	2001.737	1315	1.522		
Total	2002.384	1316			

Note: The *p* value is equivalent to that for Student's *t*-test, since there are only two samples.

Note: These *data* were collected in November 1991. This is during the short rains, and not a period when very much food would be available for immediate consumption, with the exception of cassava or crops such as cocoyams that can be grown in swamps.

Household Logic in Urban Agriculture

In the view of people who farm in Kampala, the logic of UA can be described, following Mingione (1991), as a form of semiproletarianization, or relying on a measure of both labour-market participation or petty trading, as well as home-production for consumption. However, there are two distinctly different forms of agriculture within the city. The first, occurring within the central city, the older suburbs,

and City Council housing estates, represents a long-term movement away from the labour market in both the formal and informal sectors of the city's economy, with increased effort over time devoted to production for direct consumption. The other, occurring within the newly built-up areas and the peri-urban parts of the city, represents movement toward either the labour market or informal trade, but a reluctance to become entirely dependent on either.

Across the spectrum of people who farm in the city, whether commercially oriented or not, whether male or female, whether low or middle income, farming is an important spoke in the wheel of economic life. Nevertheless, the logic of how farming is incorporated into the economic strategy of the household or individual varies greatly. At least four major categories of household logic emerge from an analysis of interviews: commercial production, household food self-sufficiency, a measure of food security, and a 'no-other-means' logic.

Commercial Production

Although scattered examples exist of commercial production of exotic crops such as coffee or vanilla beans within Kampala, by far the largest category of commercial production in Kampala is in livestock, particularly in poultry. Although current commercial producers may have begun farming for home consumption, almost without exception, the capital invested in commercial production comes from a source outside of agriculture. Hence, commercial agricultural production is a lucrative investment of capital, rather than the evolutionary outgrowth of small-scale production.

Commercially oriented households tend to have a high level of income and access to sources of large-scale credit. Evidence from household case studies suggests that commercial producers may be either men or women, and that male and female household members may well collaborate in commercial production, treating income and expenditures as any business would. The income and expenditure pattern from the business may have little effect on other household roles.

Urban Food Self-Sufficiency

Food self-sufficiency here is taken to mean self-sufficiency in staple foodstuffs and sources of protein. Certain food items are still purchased but this kind of household is largely insulated from the high cost of food in Kampala. Even though its income may be very low in monetary terms, it is relatively food secure, except in the event of bad growing seasons or drought. These households are almost without exception well established and the family has been living in Kampala for a long time. These households must have access to a significant amount of land, including some land in swamps or low lying areas to permit year-round production of certain staple crops, such as cocoyams, that both tolerate flooding during the rains and grow on swamp land during the dry season. Almost without exception, the land used for farming is not owned by the household (if it were, it would imply a level of wealth that would permit a more leisurely lifestyle than farming). This requires well-established social relations with land owners or long-term residence in previously sparsely populated areas.

Although there is hardly a commercial logic to production, this type of farming household does sell some of its agricultural produce to generate income for other needed purchases, but the sales tend to be based on having a surplus after household needs are met or raising cash for an emergency, rather than on maximizing profit. Otherwise the selling of casual labour is a more frequent form of providing a source of cash.

With the notable exception of households in areas where the city has literally grown up around their customary land holdings, the family or the head of household reported engaging in either wage labour or some other nonagricultural occupation for some period of time after migrating to the city, before beginning to farm, and long before reaching a level of self-sufficiency in farming.

Food Security

Production for food security is by far the most common category where members of a household have gained access to some land either within the compound on which their house or flat is located, or

elsewhere and someone within the household is producing food on it. However, the amount of food produced does not constitute the majority of what the household consumes. Almost without exception, persons within such households who are responsible for food procurement and preparation say that the market is their major source of food, with the garden or farmed plot being a secondary source, but one that provides an important buffer against a short-term shortage of food or cash.

In some cases, the land used for farming may be owned by someone in the household, and the farming may genuinely represent a household allocation of resources both land and labour, and in some cases, income from other sources is used to pay for hired agricultural labour. The more common case is that of the senior woman in the household gaining access to land on her own basis through an arrangement of borrowing, renting, squatting, or purchase of use rights. Providing some amount of food for the household both increases the food security of the members of the family for whose welfare she is responsible, as well as permitting her to use her own cash income on items other than the purchase of food. It is particularly this group of women farmers who insist that they would never stop farming in exchange for another job that, in monetary exchange values, payed at the same rate.

Unlike the other categories, this group almost never sells any of the food produced. Other sources of income are usually present in the household often even other sources of female income. In fact, protection of that income for nonfood uses constitutes a major part of the logic of this kind of agricultural production.

No Other Means

In a sense, the group whose logic is based on no-other-means is a more extreme form of the food-security group. This group often includes low-income female-headed households, widows, and families suddenly abandoned by a primary wage earner. As a group, they are very low-income, food-insecure, and land-insecure households. Although there is nothing like profit-maximizing logic, this group is often forced to sell some of what it produces to meet other expenses. In fact, it is this aspect that distinguishes this group from the former one:

the former can afford to always eat the food they produce; this group is often forced to sell some, even if they don't have enough to eat.

Such households are often not well enough connected to gain access to land through any means other than squatting. This means that they are often subjected to evictions without compensation. Farming, for this group, constitutes something of a survival strategy in the most literal sense.

Land Access and Tenure

Kampala is a combination of two cities: Kampala itself, the commercial capital of the Uganda Protectorate, largely planned and built by the colonial power; and Mmengo, the capital of the Kabaka of Buganda. Until 1968, they were two separate municipalities. Tenure practices in the two were quite different. In Mmengo, the Mailo system prevailed, which allowed for private ownership of land, and in which public land was held in trust by the Kabaka himself or other notables. In Kampala, other forms of freehold (including allowing land to be held by institutions such as churches or hospitals) prevailed, and much of Nakawa Division (the eastern quarter of the city) was public land held by the state (West 1972).

Amin's expulsion of Uganda's Asian community in 1972 radically altered urban land holding. Muench (1978) calculated that because of high transaction costs of legal sales as a result of the breakdown of fundamental institutions of law and order during the Amin era, 80% of the urban land transactions in Kampala during those years (1971-79) were illegal. These informal or illegal land transactions were cheaper initially, but led to numerous disputes in the long run. In an effort, ostensibly, to promote agricultural development, the Amin regime abolished (at least on paper) the Mailo system in 1975 through the Land Reform Decree, making owners into holders of long-term leases, and making *kibanja* tenants into sublessees at sufferance (Barrows and Kisamba-Mugerwa 1989). *Kibanja* simply means a plot or piece of ground; *bibanja* is the plural. The Land Reform Decree has never been fully implemented, and confusion over its status, as well as the level of litigation caused by informal land transactions during the period 1971-86 have led to proposals for broad reforms of tenure (Bank of Uganda

1990). With regard to urban land, the current proposals under discussion include converting all urban land to freehold.

Categories of land occupancy for UA vary from formal and legal to a variety of informal and illegal arrangements, and can be briefly outlined as follows:

Owner Occupancy

Private ownership of Mailo land actually prevails on about 45% of Kampala's land area today (GTZ/DPP 1992). Although formally altered to long-term leaseholds, this land is treated for all intents as private land; and it is bought and sold accordingly. The most common form of agricultural land usage on private land is simply the owner of a plot engaging in some cultivation on his or her own land. If a household or individual both owns the title and occupies the land, it is a fairly sure indication of relative wealth.

Long-Term City Council Leaseholds

Over half the land within the city limits of Kampala is public land, on which an applicant can be allocated a long-term, renewable leasehold. Although few people acquire a leasehold on land for purely agricultural purposes, there is evidence of leased land being farmed. Kampala City Council will not issue a lease if the proposed land use is agricultural, but the evidence is that City Council does not interfere with people farming on leased land, so long as the formal purpose of the lease is residential or commercial.

Renewable Annual Rental Arrangements

Major areas of the eastern part of the city are devoted to City Council housing estates, in which houses are rented to both civil servants and the general public. Most of these houses have small plots, which today are covered in gardens and plantations. Formally, these are annual leases, but, in practice, people who occupied the houses 20 or 30 years ago may still be found there.

Bibanja

Under the Mailo tenure system in Buganda, where Kampala is located, *kibanja* meant a plot of land granted in a kind of long-term rental of use-rights to a tenant by either a private land owner, or by a chief or official of the Kabaka's government. After the Land Reform Decree, both Mailo and Official Mailo *bibanja* holders were legally reduced to tenants at sufferance: the sufferance of landlords in the first case, and the sufferance of the state in the second. In both cases, *bibanja* holders are legally referred to as customary tenants, with rights to compensation for improvements to land. In practice, their circumstances vary.

Under the Mailo system, a landlord allowed peasants to settle on land so as to collect *busuulu* and *envujjo* rent from them—literally, ground rent and crop rent. In later years under the Mailo system, landlords actually sold long-term use rights to a tenant, and this is the more commonly implied sense of the term *kibanja* as it is used on Mailo land in Kampala today. In spite of the Land Reform Decree, the system of *bibanja*-holding of land continues. Much of the privately owned land in the parts of Kampala where Mailo land exists (or existed) is occupied by *bibanja* holders. Technically, the buying and selling of *bibanja* is not legal, but the practice continues, and in fact much agricultural land is used under this kind of tenure.

In the more peri-urban parts of Kampala, this has created a dual market in land rights. Titles to Mailo land are often bought and sold both for speculative purposes and to use as collateral to acquire bank loans, and the land owner may never even see the piece of land being bought. At the same time, *kibanja* rights are bought and sold, often for the purpose of cultivating, although semipermanent housing may also be constructed. The value of land in Kampala suburbs appears to be increasing at three to four times the overall rate of inflation in the economy.

A second category of *kibanja* rights continues to be widely recognized, but is without current legal status. In Buganda, before the Kabaka was deposed by the Obote government in 1966, much of the land was held in public trust by the Kabaka or chiefs and other notables. Although

individual incumbents did not get personal title to the land, rent from the land was payment for their chiefly duties, and so chiefs, ministers, and the Kabaka himself had land on which they settled bibanja-holding peasants. When the Kingdoms were abolished, ownership of this land reverted to the state, and most of the land that fell into this category in Kampala is now administered by Kampala City Council. Hence, someone who had acquired a *kibanja* on this so-called official Mailo land before 1966 may still be occupying such land, and is quite likely to refer to it as his or her land, even though they have no legal basis for the claim of land ownership. Of course, such people are free to apply to the City Council for a leasehold on the land, but the process is expensive and time-consuming, and few customary tenants have managed to acquire leases.

Borrowing

Land borrowing is a very common form of land access for agricultural purposes. It offers access to land with the consent of the owner or caretaker, and the assurance that even if future use-rights are withdrawn, the labour invested in a given year's crops will not be lost through summary eviction. In some cases, a small amount of money is paid to the owner or caretaker; more commonly, some of the food harvested is given as a token of thanks or rent. Occasionally, the use of such land appears to be completely free, although this is mainly among close friends or relatives.

Lending land serves the interests of land owners in that there are specific short-term agreements with users albeit often verbal and the clear understanding that when the owner wants the land, either to sell or to build on, the users will be asked to leave. In the meantime, lending the land prevents more permanent squatters from taking up residence, whose removal might either be financially costly or involve litigation. Owners sometimes put caretakers on the land, and expect them to earn some portion of their living from looking after the land hence the token payments of rent.

Purchasing Use Rights

There remain in the city large tracts of land, both public and private, that are not built up, and which the owner has reasons for not wanting to sell. In the case of Kampala City Council land, Council lacks the means to care for this land, and tolerates people's informal use of it for agricultural purposes. Some private land owners also tolerate agricultural land users, so long as they keep their gardens weeded. In areas where such tolerance has long been practiced, an informal land market in buying and selling use-rights has emerged, but it has emerged between users, not between owners and users. Users refer to the plots as 'my land' even though they know that the land owner can repossess the land, and in most cases, the issue of compensation is an unknown factor in the decision to 'buy' such land. However, the prices are low, reflecting the unknown quantity of tenure security. On the other hand, the use and exclusionary rights on such land seem to be quite strong. There are unwritten rules about usage – perennial crops are not permitted, for example – and the existence of an active land market may also serve the interest of the owners by preventing any occupant from claiming *kibanja* rights.

Squatting

Informal occupancy without permission occurs on both public and private land in Kampala. On private land, the Land Reform Decree stipulated that previous *bibanja* holders became tenants at sufferance – and hence there is only scant legal distinction between former legal *bibanja* holders and people who have occupied land without permission of the owner since the Land Reform Decree. Occupants who do have the permission of the owners and who have occupied the land since the 1975 Land Reform Decree are more aptly described in legal terms as borrowers, although there is quite often an exchange of money or some other form of rent. The issue of squatting on private land in Kampala is most clearly demonstrated by the issue of compensation upon eviction.

In the perception of the land owners, squatting is a strategy to make short-term use of land as well as to ensure that the squatters get something in return for being evicted. The perception of the *kibanja*

holders, or the squatters (depending on the background of the individual case) is somewhat different. Several cases were documented in which *bibanja* holders, whose rights to land-use had been recognized by a previous title owner, were summarily evicted from land after a new owner had purchased the title, without compensation, notice, or even the chance to harvest the crops they had planted. Although the number of cases documented is not sufficient evidence to make generalized claims about relations between squatters or informal occupants of land and the land title owners, the evidence would seem to suggest that the relationship has more to do with power than with legality.

On public land, the situation is somewhat different. Here occupants generally know that the land can be reclaimed at any time by City Council, or it can be granted as a leasehold to a private buyer. At the same time, however, prior occupancy bestows use-rights until such time as City Council either repossesses the land or grants it as a leasehold. Neighbours, and in most cases Resistance Councils, will back up the claim and are usually in a position to verify who the prior occupant was.

Land Access and Household Farming Categories

In general, commercial agricultural producers operate on land that they own or lease, although several cases were noted where the farming operation was being carried out on the plots of rented houses but here again, there was a formal rental agreement. It is fairly clear that commercial agriculture does not rely very much on informal access to land. On the other hand, much of the commercial agriculture in the city involves livestock and poultry production in confinement, and physical space requirements are fairly small. This would not be the case, however, for coffee or vegetable producers.

Households in the category self-sufficient rarely own their land. It requires a sizable amount of land to achieve relative food self-sufficiency, and if a family owned and occupied that much land, it would be fairly wealthy, and probably would not need to farm for a living. Such households tend to be well connected to land owners and either

have *hibanja* rights dating from before 1975 or have long-term borrowing arrangements that amount to actual *bibanja* in terms of the relationship between owner and user. Many are also making use of public land.

The measure of food security group showed two different tendencies. In one group, the family or an individual in the family may own land (either by holding a title or a leasehold) and another member of the household farms it. The modal example here would be the husband, or the father of the husband, owning land, and the wife farming the land. However, other combinations of the provision of land and labour were noted.

The second group does not own land in the formal sense, but an individual within the household obtains land through a borrowing or squatting arrangement, or through purchase of use rights from someone else. Again, the modal example would be either the wife or a female head of household being the one to obtain land in one of these manners, but other cases exist.

The no-other-means group tended to rely either on squatting as a land-access strategy including the use of land from which they were almost certain to be evicted or used tiny remnants of *bibanja* holdings with which they were left when widowed or abandoned. In several cases, widows reported having been forced to sell pieces of *kibanja* either before their husband's death because he was sick and could not work, or immediately after his death because they had no other way of raising money for the family. In other cases, a male head of household sold off most of a *kibanja* before pocketing the proceeds and leaving.

Formalization of Tenure: Prospects for Urban Agriculture

Given the confusing array of land-tenure arrangements within the city, and in particular the overlapping rights of various parties in Mailo land, urban planners have long been concerned about unplanned subdivision and fragmentation of land holdings, and with how to make sufficient land available and acquirable for urban development (Litherland 1966;

KCC 1972, 1990). In Mmengo, before its incorporation into Kampala in 1968, the concern goes back even further (Gutkind 1960). In 1965, Kampala City Council recommended that broad-ranging powers be granted to ensure that sufficient land was available for development purposes that is, commerce, industry, and housing (Litherland 1966, p. 21): In order to implement any rational schemes for urban development, there must be adequate means to completely change the present land [tenure] pattern. This will entail considerable interference with the existing rights of property owners and tenants.

The 1972 Kampala Development Plan reiterated many of these concerns, and proposed a land-exchange policy to move land out of the Mailo tenure system and into the public land category, under which owners would have been offered 99-year leases on a portion of their land that was of equal value to that of their interest in the Mailo land.

Current proposed land legislation affecting the entire country proposes that urban land be converted to freehold tenure. The presumption underlying the proposals for tenure reform (both rural and urban) in Uganda is that the ambiguity over property rights is a fetter on both urban development and rural agricultural productivity. Formalization of the rules (and the ability to enforce them) is presumed to be a necessary, though not necessarily sufficient, condition for future economic growth.

The consequences of tenure formalization for UA in Kampala will undoubtedly entail a loss of land for cultivation. It is clear from the above discussion of land access that urban cultivators have taken advantage of interstitial institutional space created in urban land both by the complexities of the Mailo tenure system and by the turmoil of the Amin and post-Amin eras. Some of this loss of land is already occurring: many of the access strategies of current cultivators that is, access strategies that have worked at some time in the past are no longer available to newcomers to the city or to current noncultivators. The perception was expressed repeatedly by interview respondents that land is all used up.

As the security situation has improved dramatically in the city in the late 1980s and early 1990s, land owners have begun to build rapidly on land that previously sat idle.

It is not clear yet whether the rate of increase in land values will follow a generally decreasing rate of inflation. If it does, holding land purely for speculative purposes is likely to decrease as the cost of doing so goes up. On the other hand, although economic indicators are generally improving for Kampala's economy, formal employment has shrunk and wage remuneration has not kept pace with inflation, making reliance on economic activities such as UA more salient than ever. This situation presents several policy options regarding UA in Kampala.

A major conversion from the current variety of tenure types in Kampala to freehold will be an expensive and administratively complicated process. Strong vested interests in the Mailo system remain at many levels of government: so far, the conversion of tenure is only a proposal and a controversial one at that. At issue is whether the City Council is capable of enforcing the Town and Country Planning Act, which would be the sole instrument controlling urban development under a freehold system.

There are influential interests, planners and political leaders included, who see some value in retaining UA as a part of the city's economy in the long term. This might entail rezoning certain areas of the city for specifically agricultural uses (on the green-belt model); or simply alter existing bylaws to permit farming in certain parts of the city – most notably in the residential suburbs and the more peri-urban areas where current bylaws make little sense and have little impact. Rezoning to create agricultural land-use areas might make sense in terms of the city's topography; however, attempting to rezone informal economic activities is a notoriously difficult task.

Another approach might involve a two-step process, leaving the long-term use of land to be decided upon at a future date, but recognizing the current squeeze of urban residents. Urban farming could be granted short-term legitimacy in its current form, while issues of land-use planning, rezoning, and compensation, and a review of municipal bylaws could be undertaken at a specified time in the future. The evidence on the food security and nutritional status of households that have had some access to land in the city for farming should strengthen the case to be made for such a policy option.

Chapter 4. Kenya

Urban Agriculture in Kenya¹

Diana Lee-Smith and Pyar Ali Memon

Cultivation and livestock keeping are widely practiced in the towns of Africa. Spatially juxtaposed with other urban activities and competing for land, labour, and resources, urban agriculture (UA) makes a vital contribution to the household economy of the urban poor. Although UA is nearly ubiquitous, it has remained almost invisible. Until recently, it has been generally ignored by academics and planners. This reflects the fact that subsistence production, undertaken in the domestic economy, has not been considered to be of great significance.

The article analyzes the characteristics of UA in Kenya within a wider conceptual and socioeconomic context and is based on a recent survey by the Mazingira Institute (Lee-Smith et al. 1987). The survey encompassed both food and fuel, the two major components of the domestic economy in Africa. This article, however, only focuses on the food component of the survey – crops and livestock. It emphasizes the significance of incorporating this consequential aspect of urban reality into urban theory, and it also raises questions of policy for sustainable urban development.

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Conceptual Issues

A study of UA raises many concerns regarding theory and policy. The conceptual context of UA resides in understanding the informal sector, and it also has a significant bearing on the question of the role of women in Third World cities.

Urban farming is virtually excluded from the definition of the informal sector in the literature on African cities. This is true even though it shares a number of characteristics with other elements of the informal economy including ease of entry, reliance on indigenous resources, small scale, labour intensive and adapted technology, lack of formal training, and unregulated markets (ILO 1972).

More importantly, scholars of the dependency school criticize the dualist model of separate informal and formal sectors of the urban economy, which implicitly or explicitly advocates the informal sector as a solution to the problem of urban unemployment. A number of critics are of the opinion that the informal sector cannot improve the living standards of its operators because linkages between the formal and informal sectors are characterized by a dependent and subsidizing relationship (Gerry 1979). One basis of the debate between such dualist and dependency conceptualizations has revolved around whether the informal sector or petty commodity enterprises have a capacity for growth, and thus make an economic contribution or whether they are basically parasitic and transitory (Moser 1978, 1984).

Urban farming is seldom considered worth examining within the context of this debate because it is assumed to be a subsistence activity. As discussed in the following case study, such an assumption is valid: 77% of urban farmers in Kenya produce entirely for their own consumption. The important question is whether such subsistence activities, carried out mainly by women, should be dismissed as irrelevant and economically unimportant.

In many rural areas in Africa, the women's mothering role in providing food for her family is of crucial importance. Her role in food production both provides labour and is critical to nutrition. It has been demonstrated that cash cropping does not support subsistence but

competes with it for land, labour, and resources (Bassett 1988). The relative and absolute losses in women's production and incomes as a consequence of expansion of cash-crop farming bear on the food crisis in African countries. Current policies and recommendations for the African food crisis are likely to fail because women's work and subsistence production are largely ignored, and the situation therefore remains misunderstood. Evidence indicates that capitalist penetration has simultaneously depended on women's food-providing role and undermined it (Trenchard 1987). The situation in urban areas with respect to urban farming must be understood as part of this wider crisis.

The running-together of the meanings of production for subsistence with the reproduction of the work force, and their identification with women's work, has obscured the economic significance of these activities. Women's work links reproductive and productive activities in an inextricable way (Rakodi 1988). Women's and men's work in urban and rural areas is first directed toward self-sustainment. Subsistence farming needs to be better understood within the context of the global environmental crisis and the sustainable development debate (Lee-Smith and Hinchey Trujillo 1992). It is evident that urban farming is of widespread economic importance to the survival of many Africans. Within such a context, the Kenyan study in this paper examines the attributes and significance of the urban farming sector and the related policy implications.

Political Economy of Urban Farming in Kenya

Today, Kenya is one of the world's more rapidly urbanizing nations. The momentum of urban growth has been sustained by a high rate of national population growth, inadequate access to farm land, and large-scale rural to urban migration. According to the 1989 census (provisional data), the current urban population comprises 14.8% of the total, compared with 7.8% in 1962 and 4.5% in 1948. The urban population is projected to grow to 8.6 million by the year 2000 (24.7% of the total population). Although the large cities of Nairobi and Mombasa continue to dominate the urban system, the medium and smaller cities, such as Nakuru, Kisumu, and Kakamega, have more recently also become destinations for an increasing number of migrants from the rural periphery.

It could be argued that the root cause of the current reticence to accept the presence of agriculture as a legitimate urban activity in Kenya is historical. In many respects, the development of the Kenyan urban system, as well as the planning ideologies that have shaped its evolution, can be attributed to influences emanating from abroad. Initially, prior to the mid-19th century, these forces originated from the Indian Ocean seaboard and resulted in the development of the Afro-Arab city states along the East African coast line. However, since then Western influences have predominated.

From a global perspective, archaeological evidence indicates that agriculture and livestock keeping were developed in cities and not in rural settlements. The early cities of hunters required food storage and this led to the selective domestication of animals and to the regeneration of seed stock (Jacobs 1970, p. 47). Urban agriculture was an important phenomenon in many preindustrial cities, and a close relation prevailed between a city and its hinterland (Sjoberg 1960). Today, in Western countries, urbanism excludes agriculture, except as a recreational activity or in times of crisis. Specific cultural connotations have become attached to the notions of the city and the countryside (Holton 1986). Although the roots of such cultural values may extend back as far as the Greco-Roman period, their predominance has been reinforced by the recent history of urbanism associated with the industrial revolution.

Cities have played an important role in the development of modern capitalism and are closely associated with an urban industrial way of life. The Western industrial city is a product of capital accumulation, derived initially from the surplus of primary sector activities in the rural countryside and later from urban-based secondary and tertiary activities (Castells 1977). Agriculture became displaced and divorced from the growing urban nexus because it proved uncompetitive in relation to the demand for land for housing and industry. Ideological biases against UA were also apparent in models of urban land use, based on assumptions derived from economic theory (Carter 1983).

British economic institutions were transplanted from Europe to the Third World within the framework of the Empire. Capitalist penetration reshaped the production process, organization of space, and gender

roles. With the advent of European colonization of Kenya from the late-19th century, the Highlands were developed as the basis of an export-based farming economy. The European-settler agricultural enclave was surrounded by traditional African homelands, a source of cheap labour.

Within the context of such an economy of space, the genesis of many of today's main urban centres in Kenya can be attributed primarily to administrative considerations, the beginning of the railways, or both. Several of these urban centres were gazetted as townships under the Townships Ordinance of 1903, as centres of colonial authority and rule and as islands of health and security, over which strict sanitary control could be maintained under the Township Rules provided in the Ordinance. Based on these origins, the growth of the urban system during the 20th century was primarily driven by exogenous forces, within the framework of an international mercantile economy and a dependent colonial relationship (Memon 1974, 1975).

The boundaries of these urban areas were carefully defined by the early administrators to avoid existing areas of subsistence farming and settlement. In the upper-middle-income suburbs of cities such as Nairobi and Nakuru, residential areas were laid out on the basis of the garden-city model, with large quarter-acre (0.1 ha) allotments and treelined avenues. Frequently, these salubrious neighbourhoods were protected from competing urban uses by buffer zones of public open space. In this new urban setting, the presence, on a permanent basis, of the indigenous African population, let alone their traditional means of livelihood, was proscribed and carefully policed.

Nevertheless, urban farming in the upcountry towns was begun as early as 1899 by the immigrant Indian railway workers who sold their surplus to Europeans. Some of their African employees started their own cultivation and also became hawkers (Mitullah 1991). However, it was only during the past 40 years that the African population was permitted to reside permanently in urban areas in Kenya. Since then, the growth of the urban population has consistently far surpassed forecasts. This has been paralleled by an expansion of informal and farming activities and an increasing ruralization of the cities: the boundaries between the city and the countryside have become clouded.

Urban farming is undertaken by two groups, traditional farmers, who have been engulfed by urban development, and recent migrants. During the last 20 or 30 years, relatively large areas of peri-urban land have been annexed from contiguous rural local authorities and incorporated within urban municipalities. To a large extent, this has been necessitated by land-use changes in the urban fringe, as well as by local political pressures. Although the rigid definition of urban boundaries during the colonial period enabled local government councils to exercise control over the ownership and use of land within the designated municipalities, such restrictive policies could not contain the overspill of urban growth into the peri-urban areas. To the contrary, these areas sustained the latter by encouraging the location of unauthorized, lower-grade housing in such areas, and later these were incorporated into existing municipalities.

Consequently, the larger urban centres include territory characterized by a mixture of predominantly low-income residential and agricultural land uses. Traditional land owners in these locales may grow crops and keep animals for personal consumption as well as for sale. Increasingly, however, many of these land owners have found it more profitable to build cheap rental housing on their former farm land (Memon 1982). This group of urban farmers is small, but in many cases includes quite prosperous and politically influential persons.

The second major group of urban farmers comprises urban migrants and their families. Although these urban farmers come from all income groups, the poor dominate. The majority of urban households in Kenya are unable to feed themselves adequately from their earnings, and those who are able cultivate land in backyard spaces near their dwelling, on roadside verges, or on other publicly owned vacant land.

Subsistence farming is an economic imperative for them. Hence, satisfaction of basic needs is the primary motivating factor governing their behaviour, rather than profit making and capital accumulation. The number of urban dwellers is large and will grow even larger with projected population growth. These farmers are not represented by any organization, either in any town or at the national level, even though they constitute a substantial portion of the urban population (about 30%). In contrast, hawkers and vendors, who are represented by a

relatively powerful Nairobi-based association that has recently become national in scope, comprise only 6% of the population in all towns and only 5% in Nairobi.

Urban Crop Farming

Almost two-thirds of urban households (64%) who participated in the Mazingira survey grow part of their food in the urban areas where they live, or in rural areas, or both (Table 1). This underlines the significance of rural-urban links at a household level for food production for a majority of urban Kenyans. Furthermore, a substantial minority (29%) grow these crops within the urban area where they live. The proportion practicing urban farming is much higher in the smaller towns, such as Kitui (57%), than in the larger cities of Nairobi (20%), Mombasa (26%), and Kisumu (00%).

However, 29% of all urban households interviewed had no access to land, either rural or urban, where they could grow crops. An even higher proportion (69%) had no access to urban land for growing crops. Smaller town residents generally had better access to urban land, while those with the least access to urban land were the very low-income earners, particularly residents of the capital city of Nairobi.

Of all urban households surveyed, 17% formerly farmed but had ceased for a variety of reasons such as change of residence, pressure by the landlord or the municipality, crop destruction by animals, or crop theft. Clearly, commercial pressures from both formal and informal

Table 1. Access to urban and rural land for crop production for selected towns (as % of total households).

Town	With access to land (%)		Growing food (%)	Total urban households
	Yes (Urban)	No		
Isiolo	68 (55)	32	60 (50) ^a	113
Kakamega	71 (51)	29	66 (51)	109
Kisumu	78 (35)	22	70 (30)	132
Kitui	81 (59)	19	79 (57)	112
Mombasa	64 (29)	36	55 (26)	332
Nairobi	71 (22)	29	65 (20)	778
All towns	71 (31)	29	64 (29)	1576

^a % in urban areas.



A large garden plot adjacent to a cinema in downtown Nairobi.

businesses and other urban land uses have eroded the supply of urban farm land in Nairobi and other towns.

Although urban farming is practiced by all income groups, the incidence is higher among lower income people. In contrast with better-off households, who tend to farm on private land, mostly their backyards, the very low-income groups tend to use public land.

These findings are comparable to those from the 1970s and 1980s from low-income residential areas in Zambia, mainly in the capital city of Lusaka. There, the proportion of households growing crops on their plots, or unused land elsewhere, varied between 25% and 56%. The proportions in some areas were even higher (73-80%), depending on local circumstances, such as encouragement by the authorities or the availability of mining-company land (Rakodi 1988) .

Most urban farmers in Kenya are women (56%), with the proportion of women being higher in the larger towns (62% in Nairobi). Only in Kitui were there fewer women than men among urban farm workers (47%). Among household heads engaged in urban farming, women form an even higher proportion (64%), whereas men were the large

majority among hired urban farm workers (82%). Women also made up the majority (56%) of unpaid household labour, other than the household heads.

Overall, an estimated 25.2 million kg of crops, worth about 60.9 million KES (about 4 million USD in 1985), were produced in urban areas in one season. This represents a considerable contribution to national economic production, especially if it is assumed that most urban areas have two crops per year. Most of this production was consumed by the households and only 23% of urban farmers sold even a portion of what they produced. This is broadly consistent with Freeman's data on Nairobi urban farmers' intentions to sell crops. Freeman (1991) also found that 26% of his sample had other informal sector work and concluded that a number of urban farmers, especially women, used the produce to supply their own small businesses selling cooked or uncooked food. A recent study of Nairobi hawkers, 68% of whom were women, found that 13% of them grew their own food, although most were commuters from outside the city (Mitullah 1991).

Inputs and Commodity Exchange

Clearly, the level of investment in urban farming is very low, and the level of agricultural inputs correspondingly so. Only 11% of urban farmers indicated that they used fertilizers, for example. However, many more said they use organic inputs because they can obtain access to them at low or no cost. For example, 30% of urban farmers used manure. It was employed more in Kisumu (44%), Isiolo (43%), and Kitui (33%), all pastoral areas. About 50% of the urban farmers used manure from their own animals, but more than half obtained it through informal gift or barter from friends or relatives: only 2% bought it. Chicken droppings were used by 16% of urban crop farmers, 76% getting it from their own chickens. However, in Nairobi, unlike other towns, over 50% of the farmers acquired it through informal barter.

Similarly, compost was used by 25% of the urban farmer sample; almost all (96%) said they produced it themselves, except in Nairobi where it was even found in the market and Mombasa where it was acquired by barter. Mulch was employed by 19%, almost all of whom (90%) had their own source, except in Nairobi, where it was exchanged.

The pattern that emerges is of a relatively simple self-sufficient peasant economy, based on petty commodity exchange existing in the larger urban centres. The study indicates that agricultural productivity is higher in the capital city (9 000 kg/ha) compared with the norm for all towns (3 200 kg/ha), which is higher than rural peasant productivity. These findings are indicative of the high intensity of land use. They are consistent with Nairobi urban farmers, higher use of inputs on smaller plots than is the case in the other towns. The trend is consistent for Mombasa, the second largest town, but not for Kisumu, the third largest, which has a large land area enclosing many underutilized *shambas* (farm plots) in outlying areas.

Higher usage of water by urban farmers also shows the advantage of urban over rural farming, and perhaps explains why the former may be more productive. Almost half (45%) of Kenyan urban farmers water their crops and 71% of these used piped water to do so, although 50% of them carry the water in buckets from the source to the crops; the rest employ hose pipes or dig furrows. Again, the highest use of water is in Nairobi (66%), with 87% of these using piped town water. The second highest use of water is in Isiolo, which is in a drought zone; almost the only agriculture here is concentrated around the seasonal river that flows through the town, and this activity is supported by the urban local authority, which assists in the digging of furrows.

The pattern of self-sufficient urban peasants in the smaller towns and more exchange in the capital is repeated in the case of seed and seedling sources. The trend is again not consistent with the size of the town, although generally the larger the town the greater is the exchange. It is also worth noting that Nairobi farmers buy much more of their seed from formal sources such as shops and markets than is the case in other towns.

Sale of seedlings is a common informal sector business in Nairobi, although the majority of plants and seedlings on sale seem to be trees and decorative shrubs. These are popular products among middle- and high-income Nairobi households, and the trade appears to be well supplied by gardeners who take cuttings and thin out natural growth from the well-established gardens where they work.

Urban Livestock

Just over 50% of the urban households in the six towns surveyed keep livestock in the urban areas, back in the rural areas, or both (Table 2). This emphasizes the significance of urban-rural household links. However, in contrast to urban farming, only 17% of the respondents keep livestock in the urban areas. The figures range between a high of 36% in Isiolo, a small town in a region of pastoralists, to a low of only 7% in Nairobi. There were an estimated 1.4 million head of livestock, worth about 259 million KES (about 17 million USD), kept in all towns in Kenya at the time of the survey: others were disposed of in various ways during the year. In fact, these livestock represent only 47% of the total number of animals that were kept or disposed of in various ways. They are kept for investment, livestock products, or stock maintenance and reproduction. A further 16% were eaten during the year and 8% were sold. Surprisingly, an even higher percentage, 20%, died. The remaining 9% were either given away or stolen.

The value of the animals eaten for subsistence in urban Kenya is calculated as 23 million KES (about 1.5 million USD) in 1985. The loss in value attributable to livestock deaths in the same year was 36 million KES (about 2.4 million USD). Large numbers of small animals, mainly chickens and rabbits, die. Nevertheless, analysis of the data by type of livestock indicates that fully 17% of cattle, 21 % of goats, and 26% of sheep die. This represents a massive loss of investment in cash and labour for the households concerned and for the domestic sector of the economy generally.

Table 2. Households keeping livestock (as % of total households).

Town	Keeping livestock (%)		Keeping urban livestock		Total urban households
	Yes	No	Yes	No	
Isiolo	52	48	36	64	113
Kakamega	49	51	28	72	109
Kisumu	55	45	30	70	132
Kitui	59	41	32	68	112
Mombasa	47	53	22	78	332
Nairobi	51	49	7	93	778
All towns	51	49	17	83	1576

As these values indicate, livestock, like crops, were mainly kept for subsistence purposes. However, livestock products, particularly eggs and meat, were produced for both subsistence and sale.

Although it was hard to obtain precise figures of domestic consumption, it seems that only around 50% of the milk and about 25% of the eggs were consumed.

Poultry was the most common livestock in all towns, though goats, sheep, and cattle were fairly numerous in the smaller towns. There were a few pigs, especially in Kakamega and Nairobi, and a very small number of donkeys used for draft purposes in Isiolo and Mombasa. Very few urban households kept fish or bees. Even Nairobi had an estimated 23 000 cattle in the town, although most belonged to dairy farmers at the upper end of the income scale. The poorer Nairobi households keep chickens and rabbits in poultry sheds and hutches because of lack of space. Livestock keepers in the other towns usually let their animals roam freely, particularly during the rainy season, eating grass or whatever they can find.

Cattle, sheep, and goats are, in fact, used as a form of capital investment by many Kenyan rural households. Traditionally, they represent wealth and status and in the present economy they are sold at times of financial need, for example, to pay for school fees or for other capital expenditures.

Livestock are kept for these reasons in urban Kenya, but also, and primarily by the poor, as a source of protein. Few urban poor Kenyans can afford to buy meat. The numbers of animals dying may be attributed to disease and the lack of urban veterinary services: less than 25% of the urban farmers dip, spray, or vaccinate their livestock. Another cause of animal mortality is starvation. If the livestock are kept because there is no money for food, little is likely to be invested in animal feed: about 65% of the animals are free-ranging. However, about 25% of the households buy animal feed in the wet season and almost 30% in the dry season. Despite this, many animals may be underfed. Chickens and goats can survive if there is enough household or neighbourhood refuse, but cattle and rabbits require more care and attention. The reasons why such large numbers of livestock are dying in Kenyan towns needs further investigation.

Nutrition

Food is the most fundamental of all human needs. Although past studies have demonstrated that, in general, Kenyans receive adequate food, data on availability at the national level tend to conceal the fact that a significant proportion of households do not have access to adequate food (Collier and LaI1980). The urban poor are the most affected and are the most disadvantaged of all the groups with serious nutritional deficiencies. However, their particular needs have received only marginal recognition in formulation of nutrition policies. For example, although pastoralists may benefit from improved animal husbandry techniques, there is no comparable specific program targeted to improve the nutrition of the urban poor in Kenya. They do not form an effective political constituency, and even famine relief efforts ignore them.

Among the urban poor, preschool children and pregnant and lactating women are particularly vulnerable. Of the children under 5 years of age in the sample, 6% were undernourished, 2% being severely malnourished. As many as 4% of the children were sick in the 2 weeks before the survey, and 15% of all households indicated that their food supply was inadequate. Of the urban farmers, 40% said they would starve if they were stopped from farming. Table 1 shows that a significant proportion of urban households have no access to land for growing food. This emphasizes the importance of urban farming in the household economy of the poor in terms of meeting their nutritional requirements.

The high proportion of subsistence food production, both crops and livestock for protein, is consistent with the proportions of urban families with incomes below the level at which they are able to buy food to meet their domestic needs. Subsistence production is a common, but poorly documented, strategy adopted by the urban poor to feed themselves. Similarly, it is difficult for the urban poor to spend money on fuel with which to cook the food, and they therefore look for the subsistence alternative, or cook and eat less often.

Moreover, a very high proportion of urban households, 100% in the smaller towns, consume indigenous vegetables, which tend to be grown

wild and not cultivated. A large number of varieties were identified in each town and there is a rich variety of cooking combinations used in different parts of the country. These vegetables are mainly found in the rainy season on road and rail reserves, river banks, and similar sites. Although many people in small towns gather their own, most of what is consumed in the larger towns is bought in markets from traders who collect from the wild. There is even a trade in local varieties between different parts of the country. A very small proportion of the urban population (9%) grow their own indigenous vegetables, indicating that they are beginning to be domesticated. These vegetables play an important role in urban nutrition: some are very high in protein and are generally resistant to disease.

Policy Implications

At present, despite the increasing ruralization of Kenyan towns and cities, many Kenyans and their leaders continue to associate cities with modernity. Urban inhabitants are expected to enjoy higher living standards and better amenities than rural folk dependent on subsistence agriculture. Such values have been reinforced by recent public-sector urban-development and planning policies. These have sought, in the face of considerable adversity and lack of success, to maintain artificially high urban standards inherited from measures designed to protect public health.

Likewise, macroeconomic strategies to promote the expansion of the formal sector have only been marginally successful. In response to increasing urban unemployment and poverty, many informal sector activities, hitherto unauthorized, have been accorded partial recognition and even some degree of assistance. However, this is usually limited to artisanal activities, mostly conducted by men, and still excludes the hawking trade, mostly carried out by women (Mitullah 1991).

With a few exceptions, such as dairying and conventional commercial farming, urban-farming activities continue to be harassed or ignored, particularly in the larger urban areas: farming can either be permitted or restricted by local authority bylaws. The Nairobi bylaws only prohibit cultivation on public streets maintainable by the city. Regardless, city folklore maintains that cultivation of public land is illegal and both the

Mazingira and Freeman studies found physical and monetary harassment occurring as a result. Large livestock may be kept in Nairobi only with written permission, but small livestock can be kept unless someone complains of a nuisance.

Councils in a few of the smaller urban areas have been innovative and proactive. For example, in Isiolo, a town where most residents are traditionally pastoralists and lack farming skills, there is active public-sector support for urban farming, including irrigation. As well, Kitui has crop extension services in town. In contrast, the municipalities of Kakamega, Mombasa, and Nairobi have a laissez faire attitude, whereas Kisumu authorities actively prevent urban farming, except on private land.

Although high- and middle-income residents usually benefit from low density, which enables them to practice backyard farming legally, most low- and very low-income urban neighbourhoods are zoned for high-density housing, thus precluding urban farming. Worse still, those who live in unplanned and unserved areas, and those who live one family to a room in these or legal tenement buildings, are too overcrowded to be able to grow food easily or legally.

The existing urban-planning practice of high-density development for low-income areas, dictated by economics of sewer sanitation, needs to be re-examined. New sanitation technologies, based on low water use, could be used to develop urban layouts that incorporate farming and livestock. These could be combined with supportive local authority action, including crop extension, veterinary, and other support services.

The city of Kitale has experimented with allotments for urban food growing. Such policies, common in some Western cities, have relevance to Africa to encourage UA and increase food supply. Underutilized urban land, road, rail, river, and power-line reserves provide ideal sites for short- or medium-term allotment of land to the urban poor. Women, particularly heads of poor households, should have priority access. A recent initiative by Kisumu municipal council, which successively targeted this group with nutrition, income generation, health, and family-planning services in the 1980s, could also include urban farming.

Crop- and livestock-extension services need to be made more available in urban areas. At present, their targets tend to be the better-off peri-urban farmers and not the urban poor. Specifically, they need to be directed to poor urban women. Extension services could specifically focus on urban water harvesting and reuse, as well as aiding the fledgling trade in organic inputs and indigenous vegetables.

Conclusions

Subsistence production and petty commodity exchange have been neglected and are ignored in economic and spatial planning to the point of being outlawed. Yet, this study demonstrates that the economic value of urban subsistence production nationally is both significant and crucial to the survival of the poor. The study also illustrates how petty commodity exchange operates in an urban setting.

Urban farming is one of the ways in which the domestic economy functions for survival in modern Africa. The domestic economy of the urban poor is an intricate mix of productive and reproductive activities. No urban programs, policy, or planning can work without an understanding of the complex character of this economy.

Urban farming is a reality that has not been incorporated in theories of Third World urbanization. These types of economic activity have been ignored in analysis of the informal sector because they are thought to only deal with basic survival and are carried out within the domestic economy, mainly by women. Urban farmers are mainly, but not exclusively, women producing for their own families' consumption. However, this is no reason to discount the conceptual significance of these activities or the value of their primary economic production.

Chapter 5. Ethiopia

Urban Farming, Cooperatives, and the Urban Poor in Addis Ababa

Axumite G. Egziabher

In Ethiopia, like many developing countries, the increasing concentration of population in the urban areas, coupled with drought, famine, and war, has put enormous pressure on food supply systems in both urban and rural areas. The preliminary report of the 1984 population and housing census (carried out by the Ethiopian Central Statistical Agency) shows that there were then 635 towns with a total population of 4.7 million. Comparing this value with that from 1975 (3.2 million people) shows an urban-population growth rate of 46.5% over a 9-year period. Addis Ababa accounted for 30.2% (0.4 million people) of the total urban population in 1984. From 1970 to 1984, the major urban areas in Ethiopia, including Addis Ababa, grew at 4% per year (Addis Ababa Master Plan Project Office, AAMPPO).

The study on industrial activities showed that, on average, 58% of establishments, 62% of employment, 61 % of output, and 79% of the fixed assets of modern manufacturing activities (including medium-and large-scale industries) of the country were located in the Central Planning Region, of which Addis Ababa is a part (AAMPPO). It further indicated that 85% of those establishments and 83% of employment were located in Addis Ababa and its environs. Although the concentration of manufacturing activities in Addis Ababa is quite striking, employment opportunities seem minimal compared with the demand. For example, the 10-Year Perspective Plan projected that only

3 250 new industrial jobs were to be created in Addis Ababa in the period between 1984/85 and 1993/94.

The Wages and Work Organization Board has indicated that the urban minimum (subsistence) wage per family was 123.85 ETB/month in October 1983 with 56.6% allocated for food and 43.4% for nonfood items (in 1993, 12.26 Ethiopian birr (ETB) = 1 United States dollar (USD)). Although it seems that the Board probably overestimated the poverty line, it is clear that expenditures on food take up a large share of the family budget. Considering the income structure of the major urban areas at the time these figures were calculated, this means most urban dwellers can be legitimately categorized as urban poor.

The study of distribution of Addis Ababa households by income group conducted by AAMPPO in 1984 shows that about 60% of all the households in Addis Ababa were in the low-income bracket (that is, less than 200 ETB/month). In fact, a survey of 8 200 households in one of the upgrading areas in the central part of Addis Ababa in 1983, carried out by the École technique supérieure des municipalités, revealed that 65% of all heads of households in the area earned below 100 ETB/month. The predominance of households in this income group is crucial for policy formulation because nearly all those in this income group lack adequate food, shelter, and services. Lack of access to food that is adequate both in quality and quantity leads to problems of malnutrition and undernutrition.

Urban agriculture (UA) is defined as the practice of food production within a city boundary or on the immediate periphery of a city. It includes the cultivation of crops, vegetables, herbs, fruit, flowers, orchards, parks, forestry, fuelwood, livestock (cattle rearing for dairy products, sheep, goats, poultry, swine, and so forth), aquaculture, and bee-keeping. In this research, we use the term to mean one particular element in this category of production, that is, vegetable production within the city boundaries. Addis Ababa produces a considerable proportion of such perishable products for its own needs, while depending on more distant sources for its grains and staple foods.

Many of the urban development studies in developing countries concentrate on housing, urban services, and nonagricultural informal

activities. However, they mainly exclude or give little attention to UA. Despite its existence and its ability to provide maintenance to the urban poor, UA has been underestimated and treated as an imperceptible temporary phenomenon. It has been disregarded by researchers and little understood by urban planners and decision-makers.

Indeed, it is possible that the real potential of UA to satisfy basic needs – that is, providing food (through improved production and distribution systems), income, employment, and environmental protection – and its role in the wider context of savings on transport costs, especially foreign currency savings for developing countries, has not been well understood. Despite the fact that there is no other issue that receives such consistent attention and priority as feeding people, the relation between the nutritional priority and the balance between sources – that is, imports, rural production, and urban production – is not clear.

UA is a traditional practice in Ethiopia. The urban-based population is used to keeping cattle, sheep, and chickens, or growing rainfed crops such as maize and vegetables, on the plots adjacent to their houses. This production is mainly for household consumption, with a small proportion for sale. Thus, although its overall contribution to the urban economy might be limited, UA makes a considerable contribution toward satisfying the basic needs of the urban population.

The Livestock and Fishery Corporation in the Ministry of State Farms runs dairy, sheep, and poultry farms in the city. Dairy husbandry and other agricultural activities, such as keeping poultry, bees, and swine, vegetable farms, and floriculture, are mostly carried out on an individual basis within a residential compound. Such UA activities appear to provide practical solutions to some of the major problems of shortage of income, poverty, unemployment, and food insecurity faced by the urban low-income population. However, information on these activities is scanty. Thus it was apparent, at the beginning of the research, that all empirical work in this field must necessarily be exploratory, not only because of the problem of definition but also because of lack of adequate statistics on important aspects of the phenomenon.

A survey of household consumption of vegetables in Addis Ababa in 1983 showed that 17% of the 1 352 surveyed households produced their own vegetables (Hormann and Shawel 1985). It also indicated that the area under cultivation in all income categories was usually less than 25 m². Cultivation was not the only means of survival for those households, however. The reason for cultivation is not clearly indicated in the study, but about 90% of those who were not cultivating stated their reason as lack of access to land.

During the field survey for this research, about 1.25% (about 274 ha) of the urban land in Addis Ababa was occupied by five vegetable producers cooperatives, using irrigated cultivation beside the rivers Gefersa, Tinishu Akaki, Tiliku Akaki, Kebena, and Bulbula and other small streams in the city:

- Mekanissa, Furi and Saris Cooperative;
- Kefetegna 24 and 25 Cooperative;
- Shan kill a River Cooperative;
- Keranio Medhane Alem (or Kefetegna 24) Cooperative; and
- Kebena Bulbula Cooperative.

These cooperatives are involved in intensive farming and are usually located on the banks of small rivers, using natural waterfalls or intake canals, with production destined mainly for the local market and a small amount for household consumption. During the survey, the five cooperatives had about 485 members. Taking an average household size to be 5.2, this means that the livelihood of about 0.18% of the population of Addis Ababa depends solely or wholly on vegetable production.

This research is intended to investigate and explain the character and role of UA in Addis Ababa. In particular, it explores the situation when UA is the only means of survival. Thus, the major objectives of the research were:

- To focus attention on a relatively neglected, but potentially significant, area of concern for urban development planning and management;



Agricultural cooperatives in Addis Ababa are located along streams in the city.

- To present evidence on patterns of migration and on the role of UA in the survival process of migrant households;
- To analyze the production and management organization of UA cooperatives and their implications for understanding UA as an activity and a distinctive process in household survival;
- To examine the income, employment, and consumption effects of UA on cooperatives and individual households;
- To analyze the structure and division of labour within low-income urban farmer households; and
- To examine the effect of VA on urban poverty in general.

Here, the household is taken as the main source of information as it is assumed that only the household can be in a position to know and consider all the relevant factors (at the level of the household and external to it) that affect its cultivation and investment decisions. As formation of the cooperative is also taken as one of the urban farmers survival strategies, the process of the cooperative's production and distribution is analyzed based on the data from the records of the cooperative and interviews with the executive committee members of the cooperative.

The research deals not only with individual households producing vegetables for themselves, as is the case in most of the existing literature, but also with the combination of the household and the cooperative system of organization in VA survival strategies. The research base is exclusively an investigation of this combined household-cooperative structure; the literature suggests that this kind of situation has never been investigated. Therefore, the originality of the investigation lies in the fact that it is not adding another case of VA in another city but is introducing something qualitatively different. The study exposes at least one case in which there is another kind of VA activity, that is, combined household-cooperative urban farming, rather than the individual household itself.

The research is based on a survey of a sample of members of one of the vegetable producers' cooperatives—the Mekanissa, Saris, and Furi Producers' Cooperative, and detailed case histories of a representative sample of 30 member households. At the time of the study, 242 heads of households were members of this cooperative. Of these, 17% were women who replaced their husbands over the years for various reasons including death, illness, or separation; 83% were male. With a total population of 1 727, the average household size can thus be taken to be 7.1. Of the total population, 52% were males and 48% were females.

The total population of the selected sample of households was 282 during the survey period, and a little more than 50% of these were males. The size of the households varied from a minimum of 5 to a maximum of 16. Generally, the household members included the head of household, who in most cases was the husband, his wife, children, and other relatives living within the household. The household members who were considered as relatives constituted slightly less than 20% of the total population of the surveyed households.

A little fewer than 25% of the surveyed household members were under the age of 10 years, slightly more than 33% were aged 10-19 years, nearly 40% were 20-64 years, and nearly 3% were 65 years and above. The age structure shows that the population of the selected households is characterized by a high proportion of young people, which might be taken to indicate a strong potential manpower supply but also implies high consumption needs and other social requirements.

Significant Findings of the Research

Results from the representative sample of households and the Mekanissa, Furi, and Saris Producers Cooperative clearly show the importance of UA for the producers and for urban consumers.

Migrants Transition

At a theoretical level, we see that UA is not an occupation taken up by recent migrants, as proposed by the modernization theorists. In fact, the study has revealed that people come to the city and gradually move on from their basic or most immediate situation through coping strategies for their immediate problems. They pass through a process whereby they eventually find positions in better circumstances in agricultural employment. UA is not normally considered in accounts of the life improvement of migrants after their immediate entry into the city. In fact, in all the discussions about urban poverty, migration, and employment, the contribution of UA is normally excluded; where it is included it is seen in terms of continuity with the previous rural existence before migrants become fully adjusted urban dwellers.

This research shows that, on the contrary, the movement into UA may happen later, after an initial stage, when migrants find that their initial adjustment to the first-stage possibilities are limited or unsatisfactory. They cannot cope properly, particularly when they begin to have families, and so they move into UA as a way of improving their situation.

The study has identified a distinctive pattern of decisions in the process of evolving survival strategies for low-income urban-farmer households. For example, the sample of urban farmer households passed through three common sequential stages while looking for better income and better survival options for themselves and their family members. Most heads of households worked in the informal service sector, then they became tenants and waged farm labourers, and finally they all became state-land occupiers, after which they formed a producers cooperative. The stages were not the same for male and female heads of households and the progression was not smooth for some. However, they all had one thing in common: they were all faced

with poverty and lacked enough food and other basic necessities because of unemployment and shortage of income.

In the selected households, UA was not the first but usually a second or third stage in the process of seeking options within the urban economy. Urban agriculture has been undertaken by these households as a final stage in their sequence of survival strategies. Although UA was not taken as a full-time occupation, it was used as a survival strategy by the urban poor in Lusaka when incomes failed to keep pace with prices (SanyaI1984). It was also demonstrated that UA was not an occupation of recent migrants.

In fact, in the particular circumstances of the full-time producer households, UA can be a long-term permanent adjustment and a better survival perspective for low-income households. However, it must be emphasized that no comparable study was made of the strategies of other urban low-income households.

Urban Agriculture as a Survival Strategy

The study demonstrates that the urban low-income households' decision to cultivate was led by the need to feed their families and the expectation of improved returns in the absence of better paying jobs – that is, it was a matter of survival. UA is the response of low-income urban households to the crisis of scarcity, as has been the case of the low-income full-time producer households in Addis Ababa and also the low-income part-time producers in Lusaka (SanyaI1984) and Nairobi (Freeman 1991).

Thus the determination, the ability, and the willingness to cultivate urban land – that is, the motivation and application of the household and its members – must be viewed as a factor of equal significance with the availability of land and water in relation to the overall resource capacity. In the past, the focus has been solely on the provision of land and water.

Household Division of Labour

Once UA was adopted as a survival strategy, the analysis indicated that there was no paid labour, as all the work was done by the household members. However, much of the decision-making and control of access to resources was vested in the heads of the household, who were normally men.

Of the total area that the cooperative occupied, about 150 ha of land has been used by the cooperative members as communal plots, with about 50 ha of land allocated to all members as private plots. Because they were the members of the cooperative, the head of households worked on communal plots, while women and children worked on private plots. The women heads of households were also responsible for all the domestic work, unless daughters or other female relatives were available to help. The women household heads had a double burden, as they had to participate in the cooperative as heads of households and to cultivate the private farms, as well as fulfill their domestic duties. They worked more hours than the male heads or the women in other households. The school schedule of some of the older children was also affected in these households: they were forced to join evening classes to be able to help their mothers during the day. The sexual division of labour was rigid for domestic tasks; boys still virtually never helped their mothers.

Household membership and headship gave the privilege of access to a cash income when revenues were shared after the sale of products, and also entitled members to a share in any investment that the cooperative made. Although the annual income derived from the production of the private plots (women's) appeared to be higher than the annual share from the cooperative (mainly men), even the smaller share that the men received was spent on improving housing and utilities, while the women's income was used for consumption. The cultural tendency that men should invest and women would have to feed the family seemed to have been taken for granted.

Households tended to favour an extended family system. The reasons for sustaining this system included the need to share domestic and farm work, the responsibility of helping dependents and equipping relatives

with knowledge and skills in vegetable production, and finally the hope that the family will in turn receive some help when the need arises – that is, a form of household self-insurance. Thus, the decision or preference toward extended households incorporates both the short-term need for labour in the farms and in domestic work and the long-term prospects of household self-insurance, survival of their relatives, and the personal or cultural satisfaction of fulfilling their social obligations. On the other hand, such a multifaceted strategy helps the migrants (relatives) to have an entrée into and experience of urban life.

Comparing the findings of this research with that of the sample of households studied in Nairobi (Freeman 1991), it is apparent that there is similarity in the family size of low-income urban farmers.

This suggests that UA allows greater absorption of labour allowing the households to take full advantage of their resources.

Cooperative Formation

The formation of the Mekanissa, Furi, and Saris Vegetable producers Cooperative was inspired by the members themselves, that is, on their request and interest. It was not imposed on the members. The decision to form the cooperative was a strategy to strengthen the members' protection against any threat in their survival process.

Thus, the strategy to organize themselves into a producers cooperative has created a situation where the urban farmers will not always be the most exploited sector or the most dependent on other people. Being members of the General Assembly, which made the final decision on such matters as annual production and distribution plans and programs, the members had equal rights and responsibilities in all the activities of the cooperative. Each member had the right to elect and be elected. Shares from the cooperative were distributed on an equal basis depending on the number of points the individual members had earned for tasks performed for the cooperative.

The cooperative has created unity and solidarity among the members and the aspiration to strengthen themselves, to solve their common problems, and to fight against perceived common enemies. The

cooperative has enabled the members to understand the importance and advantages of organizing themselves, and of discussing and solving their own problems. The knowledge and building of self-confidence that it has initiated will help them to become more independent. Regardless of its contribution to the low-income households, however, the cooperative has not been legalized, and lack of legal recognition has hindered the possibility of getting credit to improve the productivity of the farms. It is true that the cooperatives had temporary title deeds. Although they are obliged to pay urban land tax because of this deed, it does not give them the right to invest in permanent structures. It is clear that such a situation, together with the high urban land tax, does not encourage the producers to invest and thus improve their productivity.

Urban Agriculture as an Employer

Because UA is a labour-intensive activity, if it is given the necessary support, it can have significant employment-generating potential. For example, the combined household and cooperative strategy of the urban producers has created full-time employment for the heads of the households and their spouses, and part-time employment for the children and other members of the households. It has reduced unemployment within the family group and improved the overall levels of family income. The fact that women-headed households have been participating equally in urban cultivation and that there was no need for special skills and training indicate that there is a workable prospect for unprivileged sections (that is, women, the illiterate, and so forth) of the society to participate or engage in UA.

The estimated average income of the selected representative sample of urban farmer households was above about 50% of that of the population of Addis Ababa. None of the urban farmers had an average monthly income below 125 ETB/month. In fact, 50% of the selected households had an estimated monthly income greater than that of 70% of the employed population in Addis Ababa salaries were frozen during the same period. This income does not include the value of the vegetables consumed by the households themselves, or the investment allocation of the cooperative.

Household Vegetable Production

On the whole, Ethiopians consume limited quantities of vegetables, not only because of their relatively high cost and limited availability, but also because of traditional eating habits. It was estimated that all the selected urban farmer households consumed a minimum of 10% of the main products from their private plots. The households explained that this limited consumption of vegetables was determined by the prioritization of their needs. They could purchase additional foodstuffs and satisfy other basic needs with the money that they obtained from the sale of the remaining produce. Thus the amount of vegetables consumed by the households was determined not only by availability but by decisions on priorities among overall household needs for consumption (even if it meant suppressing some other basic needs).

The estimated annual consumption per person of vegetables (such as potatoes, carrots, beetroots, lettuce, swiss chard, and Ethiopian kale) in the selected households was about 0.25% less than that of others in Addis Ababa (as estimated by Hormann and Shawel 1985). However, Hormann and Shawel (1985) indicated that the demand for vegetables in Addis Ababa was strongly dependent on the income of the households: [in] a household with monthly income of less than or equal to 150 birr [ETB], 1.030 kg per head was demanded in the 2- week reference period; with more than 1 100 birr [ETB], the demand was 2.940 kg. Therefore, if one considers the households with a monthly income of up to 300 ETB, the average annual vegetable consumption per person in the selected sample of urban farmer households is in fact about 10% more than the annual average vegetable consumption per person in households of similar income in Addis Ababa.

Consumption of fresh leafy green vegetables supplements the diet of the households. In addition, consumption from their own production reduces their expenditures on food and leaves them with spare cash that otherwise might have been spent buying vegetables. For example, the estimated consumption of vegetables per person (a minimum of 33 kg/person per year) in the selected households has enabled them to save an average of 10-20% of their income: that is, they would have spent this much on vegetables had they not been able to consume their own produce.

The remaining production was sold and the cash proceeds were used to buy other foodstuffs and to satisfy other pressing basic needs of the household. Together with the shares the heads of households receive from the cooperative, the households have been able to improve their socioeconomic conditions and standard of living in the city. For example, the education level of the family members has improved; about 60% owned their houses, almost all the households had made improvements to the facilities in their houses, and about 70% owned livestock. Culturally, housing and livestock are taken as a form of investment that can be sold in time of need. However, the tendency to own a house could also be explained by the shortage of rental housing and because urban land for housing has been provided free of charge since 1974. In the case of livestock, the manure is also used as fertilizer in the private farms. Thus, the urban farmers were motivated to cultivate out of sheer necessity, and they have been able to transform their situation from one of immediate survival to that of consolidating their lives and future prospects.

The Cooperatives Effect on the City

Urban farmers are in a good position to change their products according to the demand of the market. The fact that they sell fresher vegetables than those obtainable from other sources that must rely on more distant production areas is a further advantage in marketing their products.

The Mekanissa, Furi, and Saris Producers Cooperative provides a significant proportion of the supply of fresh vegetables to Addis Ababa. For example, in 1983, it was estimated that the cooperative provided about 63% of the swiss chard, 17% of the carrots, about 14% of the beetroots, and 6% of the cabbages supplied to the Addis Ababa market.

As the prices of the cooperative are often lower than those of other sources, and the cooperative shops are located in the relatively accessible area of the Kefetegnas concerned, it is possible that most of the urban population would be able to satisfy their vegetable needs from the nearest cooperative shop. It is also understandable that a majority of the low-income population would make good use of the cooperative shops because traveling to the central markets would mean additional transportation costs. The cooperative shopkeepers also

confirmed that they never faced any problem in selling their produce. It was not only cheaper but also the freshest as it did not travel any long distance.

Further Potential Contributions of Urban Agriculture

The production process is traditional and is mainly based on the accumulated experience of the members. Thus, yield per hectare from the communal farms is very low. It varied from 350 kg for pumpkins, to 250 kg for onions, 200 kg for swiss chard, cabbages, and beetroots, 180 kg for potatoes, 150 kg for carrots, and 100 kg for lettuce. Although the yield per hectare from the private plots showed a high variation due partly to physical factors and also to the differences in the care given, time spent, and the households' knowledge of cultivation the yields were much higher than those from the communal plots. The estimated yield per hectare of the private plots of the sample of urban farmer households varied from 1 300 to 4 800 kg/ha for cabbages, 1 300 to 8 300 kg/ha for potatoes, 1 100 to 8 300 kg/ha for carrots and beetroots, and 700 to 4 000 kg/ha for pumpkins.

However, experiments on the potential for intensive agriculture have given surprisingly high results. Wade (1987) has indicated that the Mayaguez Institute of Tropical Agriculture in Puerto Rico found that a circular garden 6 m in diameter could produce 167 kg of vegetables, root crops and greens in an 8-month growing season. Experimental gardens in California produce 36-65 g of protein and up to 2 500 calories/day on only 127 m² of land.

The potential for higher productivity in UA is further illustrated in the work of Yeung (1985), who, quoting Ganapathy, has estimated that a 6- m² space can produce all the vegetables needed by a family of four. Taking the forecast population of Addis Ababa to be 3.5 million, theoretically it would mean that about 210 ha of urban land would be necessary to satisfy the vegetable needs of the population by the year 2000. Already about 32% (6 990 ha) of the existing municipal area of Addis Ababa is permanently green. Therefore, as long as there is the determination and willingness to cultivate, and the necessary official support, the potential for maximum use of the urban land could be

enhanced to satisfy the basic food needs of the majority of the population in the city.

The fact that there is a possibility of waste recycling, and the implications of this for ecological sustainability in urban food production, is likely to promote environmental protection and means a reduction of solid waste for disposal. In organic gardening, the materials can be recycled to feed the soil and produce healthy plants without the use of artificial chemicals. Apart from using unused land for productive urban green spaces, it is assumed that urban gardens are also excellent vehicles for urban oxygen replenishment.

The possibility of recycling urban solid and liquid wastes could also create a situation in which the local authorities or urban managers are involved in organizing and implementing projects that generate wider employment opportunities for the urban poor.

At the national level, it has been indicated that cereal imports to Ethiopia increased from 118 000 t in 1974 to 609 000 t in 1987 and that food aid increased from 54 000 t in 1975/85 to 570 000 t in 1986/87. Such a situation, coupled with population pressure, drought, famine, environmental degradation, and massive unemployment, is a threat to food security. Food security requires an increase in domestic production to meet domestic demand, thus reducing the demand for food imports (and the resulting loss of foreign exchange) and reducing the need for food aid (Wade 1986a, b, c). Given the potential of higher productivity of UA, policies to improve food security in the country should consider production in urban areas. It is possible that UA might help to regulate the problem of undependable supplies of food in cities.

Allocating more land for UA activities and encouraging more production might also initiate the possibility of the use of more distant, larger scale production areas for export.

Implications for Future Government Policy Planning and Management of Urban Agriculture

At present, there is no stated policy regarding UA in Ethiopia. If the necessary credit and inputs are available, the potential of UA is high. With the existing financial structure of the country, credit can be provided only if the cooperative is legalized. Therefore, it is important that urban managers understand the potential of UA and try to take responsibility for legalizing producers' cooperatives.

Modern agricultural production techniques can only be developed through the technical assistance of experts from the Ministry of Agriculture or other concerned agencies through extension workers. However, this needs special coordination or an integrated development scheme at the city level. Such an organized body of experts could be involved in training, follow-up, and advice to urban farmers in improving their productivity and managing their farms.

With regard to the development of UA, one has to consider other possible ways of accommodating urban land tax based on the level of productivity of the particular activities and what urban farmers can afford.

Promotion of the producers' cooperatives must, therefore, be supported with the necessary legalization, rules, and regulations that would encourage and enable them to improve their productivity. Cooperatives can only obtain credit or financial resources to improve their productivity if they are legal entities. Support for the cooperatives means building the communities, which would then be able to help themselves, the general development of the urban areas, and above all accepting the reality of the urban economy.

With the new economic policy, the cooperative could introduce a quota system that would provide some benefit to any member who is capable of producing more than a given amount. For example, a definite prospect of obtaining additional income for each additional output might generate a better working dynamic. In this way, the cooperative could be encouraged to increase its yield at least to the level of the

private plots. The members of the cooperative would become aware of the relation between better productivity and greater reward. Given that decisions are taken on the basis of the interest of the cooperative members, the cooperatives may survive in any system: they avoid wholesalers, the income is received directly, and the prices they charge are likely to remain affordable to the majority.

Together with raising the productivity of UA, there is a need to encourage the population to change its eating habits. Consumption levels of vegetables in Ethiopian households are relatively low, as indicated earlier. This is not only because of their limited availability and high cost, but also because of traditional nutritional habits and low preference for vegetables.

Future overall land use in the cities should include space for the production of perishable products. The feasibility of this production should consider costs such as transportation and fuel. The more distant the production area from the point of sale, the more expensive the product would be. There is a general impression that vacant land is seldom available in urban areas. However, only 47% of the municipal area of Addis Ababa is currently built-up and the economy does not promise any drastic changes to this in the immediate future. The remaining area could, therefore, be allocated to compatible uses including UA based on assessment of the needs of the population. What is needed is a change of attitude and a willingness to understand the value of land in relation to human needs. River banks which are usually used as garbage dumping areas sites that are unsuitable for construction (or where it would be too expensive), and other peripheral areas of the city could be used for UA.

UA has the potential to use recycled sewage water and solid wastes. Comprehensive land-use planning must reflect the possibility of using vacant land for agriculture in urban areas, and must be encouraged in this through regulations. The existing structures of the urban farmers need to be supported by extension workers, technical assistance, and training, including the sorting, packaging, storing, and marketing of vegetables. Research on the productivity of UA needs to be expanded, and the possibilities for improvements in tackling plant diseases, identifying disease-resistant plants, developing new seeds, increasing

yields, improving soil conservation methods, and developing other environmental methods need to be investigated.

As indicated in the case study, UA creates self-reliant employment and fuller utilization of human resources. In a labour-rich but capital- and energy-poor country such as Ethiopia, UA should be encouraged, strengthened, and given its rightful place, not merely tolerated. It can be a more effective use of resources and can reduce energy consumption and the need for capital. The ability of the urban farmers to produce perishable products that satisfy the special needs of low-income households is of great importance, as such products are offered for sale at relatively low prices.

The efforts of urban planners and city governments should centre on responding to the needs and views of residents and on improving the inhabitants' quality of life. For example, it has been indicated that the nutrition levels of urban residents by and large depend on sufficient food being available in the markets at affordable prices. In light of the analysis of the marketing system of the urban producers and the increasing population of Addis Ababa, one can generalize that there is a growing demand for vegetables and there will be a ready market for fresh produce in the city for some time to come. Increasing the production and marketing of perishable products such as vegetables is a realizable goal. Compared with produce from rural areas, the cooperative has contributed not only fresher and better quality, but also cheaper vegetables to the urban market.

Policies on UA must also look into the benefits to households, especially to women who lack alternative economic opportunities. Measures to assist women to improve their economic status through UA activities should ensure that women are involved in the management and decision-making of the whole production and distribution process.

Although land might be scarce in central parts of the city, the use of vacant areas for UA within new low-income housing schemes should be encouraged. Also UA in small-scale cooperative farms should be promoted in the peri-urban or metropolitan areas as one of the policies on land use and management of urban development in the country.

Security of land tenure should be provided to enhance the incentives for investment in improvements. This, in turn, might increase productivity and encourage year-round cultivation.

For the low-income urban population, UA is an ultimate survival strategy. Therefore, any land-use and housing policy that is intended to support urban low-income people to help themselves in such an activity would have to ensure land security and the availability of a water supply. As long as there is a positive will, UA could be performed on rooftops, balconies, in backyards, parks, school and hospital compounds, and so forth as has been widely reported.

The lesson from the experience of the selected households at the Mekanissa, Furi, and Saris Cooperative (a combination of cooperative and household systems of organization) is that, given the determination and willingness of the household members to cultivate, plus the availability of land and water, a minimum capital requirement, locally learned technology and official consent, the urban low-income population would seize any opportunity to produce its own food and improve its socioeconomic position in the city. However, there is no doubt that government support for research and development, provision of extension workers, inputs, and credit facilities are also critical factors in the improvement of such productivity and in the successful development of agriculture.

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Chapter 6. Conclusion

Leading Urban Agriculture into the 21st Century: Renewed Institutional Interest

Luc J.A. Mougeot

A rapid shift can be expected throughout the 1990s toward more multidisciplinary and policy-oriented efforts, through regional and global networking, as several research centres, public agencies, nongovernmental organizations (NGOs), and external support agencies collaborate to create a more enabling environment for the proper management of agriculture and food production in and around cities. This will build on individual studies in the late 1970s and early 1980s, later followed by more institution-sponsored projects. Original research was largely carried out by social scientists, who described the extent, location, practice, benefits, and constraints of urban agriculture (UA).

In mid-1983, following the East-West Center's documentation of UA practice in the Pacific Basin (Bardach 1982), IDRC held a seminar on UA in Singapore. In 1984, it commissioned a literature search by Urban Resources Systems, which produced some 227 annotated entries (URS 1984). In the latter half of the 1980s, IDRC funded projects on urban food production in Kenya, Tanzania, and Uganda. The Sokoine University of Agriculture project was undertaken at the Tanzanian government's request.

Concurrently, in 1988, the UN University's Food-Energy-Nexus Programme completed a series of major surveys in various countries (Sachs and Silk 1988) and the Cities and Ecology project of the Man

and the Biosphere Programme of the United Nations Educational, Scientific and Cultural Organisation (MAB/Unesco) was carried out. The Swiss DDA (Direction de la coopération au développement et de l'aide humanitaire) has funded UA research by the Institut français de recherche scientifique pour le développement en coopération (ORSTOM) in francophone Africa (Schilter 1991). The UNDP's UA project surveyed 21 countries in 1991/92 and launched a networking effort to further the development of city farming. UNDP has funded hydroponics projects in many LDC cities. With the Food and Agriculture Organization of the United Nations (FAO), it recently published a hydroponics manual (Marulanda and Izquierdo 1993).

The Forestry Department of FAO examined changing perceptions of urban forestry, the role of trees in and around densely populated areas, and opportunities and challenges related to their planting (Kuchelmeister and Braatz 1993). Components of the Consultative Group on International Agricultural Research (CGIAR), such as the International Food Policy Research Institute (IFPRI), are assessing the potential role of UA for more comprehensive food-security strategies (von Braun et al. 1993). The International Union of Forestry Research Organizations (IUFRO) has a project group on arboriculture and urban forestry (Kuchelmeister and Braatz 1993). The Centre international de l'enfance has been exploring links between UA, street-food vending, microenterprise development, food security, and child health (Kaddar 1991).

Many nongovernmental development organizations are already active in UA, particularly in Latin America, and others are reviewing their rural agricultural record and available expertise in preparation for taking on UA development (van der Blik 1992). Active in urban areas of Peru for more than a decade, Oxfam (formerly the Oxford Committee for Famine Relief) is now becoming more involved on the Kenyan urban scene. The Developing Countries Farm Radio Network has released four radio scripts for broadcasts on UA. Various offices of UNICEF are reviewing their own record of UA projects for future policy directions.

Major UN programs, such as the Healthy Cities (World Health Organization) and Sustainable Cities (United Nations Centre for

Human Settlement) provide enabling operational frameworks for research on UA to guide better urban management. Multilateral agencies that support programs to alleviate structural adjustment have recently become aware of the potential of urban food production to ameliorate the declining nutritional status of vulnerable groups (Maxwell 1993b, p. 5).

Since early 1993, IDRC's new Urban Environment Program has focused on urban water-waste-food production linkages. In May 1993, external support agencies and LDC specialists assembled in Ottawa to specify key information needs and identify collaboration mechanisms. IDRC has about 1 million CAD in active projects on UA production and urban nutrition: many past studies have explored links between waste treatment and recycling and farming, others have examined urban food-circulation systems.

Comparative and Longitudinal Studies on Urban Agriculture Benefits

We lack longitudinal and comparative analyses between farming and non farming households, on nutritional status of the urban poor and their strategies for coping with food insecurity, as well as the current and potential impact of UA on households and their members more exposed to malnutrition risks (women, children, and the elderly) .

Surveys from UNICEF, SCF, and the Makerere Institute of Social Research (MISR) are some of the few examples on which many more studies need to build. In Africa, specialized institutes – such as the Child Health and Development Centre of the University of Makerere in Kampala and the Tanzanian Food and Nutrition Centre, both supported by UNICEF – or major food-security and nutrition information systems – such as the Dutch-funded regional system being set up by FAO – do or may collect relevant data that need to be tapped more fully.

More generally, we lack systematic comparisons among communities and cities regarding the effects of UA on nutrition, income, employment, health, waste management, and other policy issues. Few studies with limited data find that the poor try to avoid food insecurity

through bulk purchases by groups, small-quantity purchases by individuals, home-production, stocking or processing, food exchange, food-waste use, food donations from local or rural relatives or foreign countries (as much as 67% of daily caloric intake of lower-income families in La Paz) (León et al. 1992; Prudencio 1993). Extreme measures to reduce the food bill include reduced quantity and quality of food consumed, limited cooking and cool-storage, increased spacing of meals, reduced number of meals, resorting to off-home meals often accepted in lieu of wages for work, and stealing food or valuables for purchasing food. These strategies do not affect household members equally across gender and age groups. Assessments and evaluations of UA's potential must tap the expertise of agricultural, nutrition, and health specialists.

Urban Agriculture Technologies

Farming in the city is not a straightforward business. UA requires much finer technological and organizational precision than rural agriculture because it must be more intensive, more tolerant of environmental stress, more responsive to market behaviour, and more carefully monitored to protect public health. Many high-value UA systems need to be adapted to smaller-scaled operations, including animal husbandry and limited-space farming—hydroponics and stall feeding (DGIP/UNDP 1993). Where little land is available, technologies must be adapted for the poorer urban households to make more efficient use of household spaces: backyards, patios, walls (mural hydroponics), rooftops, basements, windowsills, and indoor containers.

We also need to optimize food-crop selection and production technology under different site and area constraints, devise multifood production systems, and further the upstream and downstream benefits of the full-cycle system (from growing to marketing) to improve the nutrition of the urban poor. The distinct needs of urban animal husbandry are still very much underresearched. Microlivestock strain development is discussed in a report by the US National Research Council (Tinker and Friedberg 1992).

Urban Agriculture's Contribution to the Urban Ecosystem and Economy

We need to account for the costs and benefits for UA, thoroughly and comprehensively, both as a land use (including environmental, social, and health benefits) and as an industry (job multiplier). Schilter's (1991) study contains one of the few detailed attempts at estimating UA profitability so far. Horticultural businesses were 10-20 times more profitable than staple-crop farms of equal size in all farm-size categories; the more profitable ones used an average plot size of 1 001- 4000 m² and kept production costs to a minimum. Economic returns to UA must also account for the fact that UA affords food savings and generates employment.

The economic or monetized trade-offs of encouraging UA must be shown; various methods exist to assess the value added to land and saved to private and public sectors by UA. City farming can protect land against pests, thieves, squatters, garbage dumping, and vandals; it can reclaim, service, and improve, thus raising use and rent value of land. In Baltimore, USA, community tree-planting can fetch savings of 1.29 million USD per yearly planting if done through community forestry programs; additional savings to city and taxpayers can be realized when the thousands of trees that must be removed every year are ground into wood chips and mulch that, in turn, are used by groups in tree nurseries, community gardens, and street tree plantings (Burch and Grove 1993).

How do we account for the fact that UA accommodates a variety of essential household and community activities recreation, bathing, washing, laundering, playgrounds, child-care, social interaction, cooking, repairs, carpentry, processing, vending, and even an open-air church in Ibadan (Tricaud 1988, p. 19)? Such assessments should help argue for savings in land investment and management either through adjoining or incorporating UA into conventional land uses, or through assigning land to UA in new developments and laying out utilities accordingly.

Urban agriculture is not a 'black hole' in the urban economy but we need to quantify the up- and downstream employment and income effects. These often take place in its vicinity and may benefit nonfarming neighbours or the larger local community. Open-air and

street-food vending, for instance, is a bustling yet often repressed business with a large market: it is a critical feeder of specific groups and an important employer largely of women (Tinker 1989). The more disadvantaged groups are the main clientele of the street food business; for those groups, food eaten on the street is a larger share of total food intake. In Indonesia, 79% of clients resort to street food for three meals a day. In the Philippines, as much as 20% of all household expenses is devoted to street food, all income groups considered (Chauliac et al. 1993, p. 31). Community kitchens in Peru encompass food self-production, handcrafts groups move into UA in Nairobi, and self-help housing groups include UA as an industry in Zambia (Smit and Nasr 1992, p. 24). Surveys also point out that UA supplies staff canteens at public (schools) and private enterprises, as well as quality-demanding consumers: restaurants, hotels, hospitals, embassies, and so forth.



Urban farmers spend less money on food and are thus able to afford better schooling for their children.

Innovative Arrangements for Greater Access to Land, Crop Security, and Credit

The lack of access to land is a greater problem than lack of land. Most surveys found that most of those who farm could use more land if they had access to more; those who once farmed, but did not anymore, had abandoned the activity primarily because they had lost access to land. Many of those who had never farmed said they would if they could gain access to land. Farmers may also be prevented from farming their own land by zoning laws.

The amount of vacant and underutilized land was enormous in most large cities in the 1980s (Sawio 1993, p. 86): 200 km² in greater Bombay, 338 km² in Bangkok, 203 km² in Metro Manila, as much as 600 km² in Sao Paulo, and 48.5 km² in Karachi. Urban agriculture is practicable on many constructed lots: some infrastructural, recreational, and institutional developments make very liberal or extensive use of the land they own.

Many official agencies are becoming important players in UA. As major landowners and managers of wastewater and solid waste, they provide irrigation, lease land, become landowning partners, or are themselves actively engaged in farming. Mexico City water authority, Calcutta Port authority, Maputo municipal government, Indonesia's toll highway, and Jakarta's water authorities, Canadian electrical utilities, and military bases in the USA (Smit and Nasr 1992).

We should take at least the same care in setting aside land to enable the living to feed themselves as we do in reserving land in the cities for burying our dead, said a former City Council director in Dar es Salaam. He now runs a consultancy that caters largely to poor local urban farmers. Better urban planning both in central and peripheral areas can accommodate UA. Upgraded housing often moves cultivation away from the homestead (Rakodi 1986, cited by Maxwell and Zziwa 1992, p. 13). In central cities, areas too small, shaded, steep, or barren can be planted with trees providing fruit, animal fodder, timber, fuelwood, shade, and culinary and medicinal products. Urban agriculture often exploits land or water areas in transitional use or of lesser quality, where crop security and usufructuary rights are at issue. Farmers

counter-insecurity strategies for lack of protection (low-value cropping, guard posting, and premature harvesting) hinder further development of UA. There is need to support local authorities, NGOs, and community groups so that together they can devise creative and flexible solutions for improving access to land, through usufruct and leasing agreements, multiple or flexible zoning, agrosidential planning, land leasing, and land banking (Wade 1987). Commissions could provide new plots to cultivators who will have to leave the ones they currently farm.

Agricultural credit is almost universally unavailable to urban farmers, even where credit is granted to poor urban businesses. Urban agriculture often entails lower lending risks than many rural farming operations: it is closer to market, less vulnerable to climate vagaries, it focuses on products with stable and substantial demand. Lack of credit results in high failure rates, low yields, intermittence, and noninvestment in higher-yielding systems for animal protein (DGIP/UNDP 1993). Current credit programs for housing and small-enterprise development could broaden their coverage, particularly when targeting micro- and small-scale female entrepreneurs. In Dar es Salaam, the African Rural Development Bank has provided 400 loans to better endowed urban farmers and is looking for ways to reach lower-income groups as well. Studies on UA in and around Dar es Salaam, commissioned by the Canadian and Danish international development agencies (CIDA and DANIDA), the German Agency for Technical Cooperation (GTZ), and the local National Bank of Commerce, have identified technical and marketing problems and these groups are looking at how UA enterprises can reduce their risk rating through diversifying their activities.

Solid and Liquid Waste Reuse and Health Risks

An estimated 10% of the world population eats food produced on waste water (Smit and Nasr 1992, p. 143). Dakar spews out some 35 000 m³ of untreated domestic wastewaters every day; four of its five water-treatment plants are almost ineffective, defeated by sediment overloads, but horticulturalists densely crop surrounding depressions. At the Pikine plant, producers water their lettuce paddies with untreated wastewaters hosed downhill from the hilltop plants intake; lower-lying

producers hand-draw water from the upper watertable, which is highly contaminated with nitrates (Niang 1992, p. 4). Professor Niang analyzed wastewater composition, examined treatment-plant effectiveness, surveyed some 360 households in six districts on their water supply sources, means of disposal, and the perceived effect of wastewater on their health. He also identified indigenous hydrophytic plants and their local uses; now he plans to test-use some at the Camberene plant to biotreat wastewaters to make them and the food grown on them less harmful to both producers and consumers.

Everywhere in Asia, UA is a major user of human and other organic wastes: in the late 1970s in Hong Kong, 130 000 t of food wastes from restaurants and food-processing plants were used yearly to feed pigs (Newcombe 1977, cited by Yeung 1985, p. 21). One out of three street garbage scavengers in Quito, Ecuador, specializes in meal-waste collection to feed pigs from central and outer districts; half of dump scavengers in Cuenca sort meal leftovers to feed cows, lambs, and guinea pigs (Fundacion Natura 1993, II). In both cities, most scavengers are women.

Dispersed small-scale farming can benefit from and increase returns on the community or neighbourhood scale and to labour-intensive waste management systems (for example, integrated organic recycling systems). UA is not a major competitor for high-quality water and could be even less so if sewage systems were designed less to remove sewage from the city and more to recycle it locally (DGIP/UNDP 1993). New sewer technologies based on low water use affect sewer sanitation economics and the need for high-density zoning, with layouts that can include farming and husbandry (Lee-Smith and Memon this volume).

Irrigation with untreated wastewater is a problem and we must adapt low-capital intensive pathogen- and vector-elimination processes and assess crop susceptibility to contamination. This is particularly true along transportation corridors and in city centres, as roadside horticulture and aquaculture are developing rapidly (DGIP/UNDP 1993). We must also guide crop selection (food versus nonfood, human food versus feed or crop input, and leaf versus nonleaf). Alternative systems can best serve city sectors with poor or no sewage networks.

Solid waste is already used in various ways in UA but the practice should be further encouraged. Current centralized management systems may hinder reuse of solid waste by UA, as it is collected over large areas and dumped unsorted at a few major, often distant, sites with restricted access. Composting is often inefficient and large-scale ventures have frequently failed. Management systems usually do not sort organic from inorganic, or toxic from nontoxic waste; a lot is being disposed of through sewage and is less recoverable. There may also be legal obstacles to retention and reuse of solids for near-source UA. In turn, watertable and soil pollution because of agrochemical use may be curbed through resorting to biological insecticides, multicropping, and supply of compost and treated sewage. Schilter (1991, p. 61) found in Lomé that some systemic and toxic pesticides were seriously misused by horticulturalists. Animal-waste management must be improved: a single cow kept under zero-grazing produces 30-40 kg of waste daily, which in Dar es Salaam amounts to 267 to 356 thousand kg of waste daily (Mosha 1991, p. 89).

Ethnic and Gender Equity Aspects

More research is needed on those who stand to benefit most from expanding and improving UA with attention to gender and ethnic inequities. Farmers must know how to organize to have their rights respected, to afford such common services as irrigation and caretaking, and to secure access to land elsewhere (Tricaud 1988, pp. 24-27). Ethnic minorities are major agents of technological transfer but are frequently neglected by ruling groups in host urban settings. Depending on a number of factors, women may make up at least 50% of urban farmers; yet very few researchers have focused on the needs of female urban farmers. In Dar es Salaam, at least 80% of extension officers are women (Salim Tindwa, personal communication, 28 August 1993). In Lomé, 92% of urban street-food vendors were women in 1970 (Schilter 1991, pp. 135-159). Woman street-food vendors may also be involved in UA; although connections between UA and open-air or street-food vending exists, documentation remains scant. In Nairobi, about 30% of the women vendors grow their own food (Lee-Smith 1987).

The urban nutrition program of UNICEF in Nairobi is headed by a woman and promotes credit to women's groups who market food. In

Kampala, the new Secretary of Agriculture is a woman and has assigned 17 extension officers to the Kampala district: there is reportedly less harassment of UA practitioners in the city. DANIDA funds are being applied by the Young Women's Christian Association (YWCA) in Kampala to promote biointensive gardening, while in Dar es Salaam they are used as Cooperative Rural Development Bank loans to UA women's groups.

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