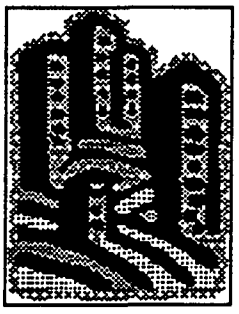
Urban Food Production: Evolution, Official Support and Significance

by

Luc J.A. Mougeot

International Development Research Centre

1994



Cities Feeding People Series
Report 8

Reports Available in the "Cities Feeding People Series"

1. Urban Agriculture Research In East & Central Africa: Record, Capacities and Opportunities *by Camillus J. Sawio, University of Dar es Salaam (1993).*

2. Urban Agriculture Research In East Africa: Record, Capacities and Opportunities *by Davinder Lamba, Mazingira Institute (1993).*

3. Urban Agriculture Research in East & Central Africa I: Record, Capacities and Opportunities *by Kadmiel H. Wekwete, University of Zimbabwe (1993).*

4. Urban Agriculture Research in Earst & Southern Africa II: Record, Capacities and Opportunities *by Admos Chimbowu and Davison Gumbo, ENDA-Zimbabwe.*

5. Urban Agriculture Research in West Africa: Record, Capacities and Opportunities *by Souleymane Diallo, ENDA-Tiers Monde (1993).*

6. Urban Agriculture Research in East & Southeast Asia: Record, Capacities and Opportunities *by Yue-man Yeung, The Chinese University of Hong Kong (1993).*

7. Urban Agriculture Research in Latin America: Record, Capacities and Opportunities *by Julio Prudencio Bohrt, UNITAS (1993).*

8. Urban Food Production: Evolution, Official Support, Significance *by Luc J.A. Mougeot, International Development Research Centre (1994).*

9. Promoting Urban Agriculture: Strategy Framework for Planners North America, Europe and Asia *by Paul Sommers and Jac Smit, The Urban Agriculture Network (1994).*

10. Urban Agriculture and The Sustainable Dar-es-Salaam Project, Tanzania *by Camillus Sawio, UNCHS-IDRC Project Coordinator (1994).*

11. Une histoire de deux villes: Canadian Community Gardening in Montreal and Toronto *by Sean Cosgrove, Toronto Food Policy Council (1994).*

12. Urban Agriculture: Can Planners Make a Difference? *by Timothy Greenhow, SWEDEPLAN/Swedish National Board of Housing, Building and Planning (1994).*

13. Agricultura urbana en América latina: evaluacion in situ para iniciativa regional *por Julio Prudencio Bohrt, consultor del CIID (1994).*

14. L'agriculture urbaine en Afrique tropicale: évaluation in situ pour initiative régionale *by Kando Golhor, consultant du CRDI (1995).*

Copies can be obtained free of charge by writing to Ms. Radha Jagai, Cities Feeding People Series, Environment and Natural Resources Division, IDRC, P.O. Box 8500, Ottawa, Ontario, Canada, K1G 3H9 or by fax at (613) 567-7749.

URBAN FOOD PRODUCTION: EVOLUTION, OFFICIAL SUPPORT AND SIGNIFICANCE (with special reference to Africa)

1.0 INTRODUCTION

Urban agriculture (UA), also called urban food production or urban farming, can be defined as the growing of food and nonfood plant and tree crops and the raising of livestock (cattle, fowl, fish, and so forth), both within (intra-) and on the fringe of (peri-) urban areas (Ganapathy, 1983; Ford Foundation 1993, as per Siau and Yurjevic, 1993: 45). Horticulture is only one of many farming systems which are used in any given city. UA is more than just the production of food and it is being recognised in most of the South and in some countries in the North as an integral part of urban food systems. Other components of UA include: food supplied from rural areas, urban storage and transportation, processing and marketing, distribution and consumption of food in 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 West Africa, and beyond: a sample of 1 013 households enabled him to estimate that UA was being practised by 30.6% of Pointe Noire's population (Vennetier, 1961: 84). Ganapathy (1983) submitted a short, comprehensive, definition of the concept; Smit and Nasr (1992) developed a very complete typology of farming systems, based on observation in 40 cities and towns in 18 countries. Sawio's Ph.D. dissertation (1993) reviewed previous research on the rapidly evolving field of city farming in anglophone Africa.

2.0 EVOLUTION OF URBAN AGRICULTURE

2.1 Pre-Industrial Revolution City Farming

The coupling of "urban" and "agriculture" into a single expression may seem contradictory, but in fact agriculture as a basic urban function is nothing new (Mlozi, 199?: 105-106; Lee-Smith and Memon, 1994: 70). Archaeological fieldwork and aerial imagery have unveiled massive and ingenious earth- and waterworks, within and on the edge of the urban settlements constructed by ancient civilizations. Many of these facilities and infrastructure were used wholly or in part to produce food, feed, and fodder crops; to provide wood for fuel, building, shade, fencing, and windbreaks; to grow shrubs, ornamental, medicinal, and other useful plants; and raise livestock for food, materials, traction, transport, and trade, sacrifices and status.

Uruk, the most important city in fourth-millennium Mesopotamia (possibly with 50 000 people), extended over 1100 acres, a third of which was covered with palm groves; the large majority of Uruk's working adults were engaged in primary agricultural production on their own holdings, on allotments of land from temples or as dependent retainers on large estates; they also had occupations other than agriculture (Adams, 1994: 18). The Neolithic Egyptian settlement of Knossos developed mixed farming (wheat, barley, lentils, sheep, goats, pigs and some cattle); the Minoan town spread over 75 hectares with a population of 12 000; Knossos had isolated farms on its edge (Rodenbeck, 1991: 124, 129). Minoan palaces had a central court around which were grouped storage and production areas; rulers probably controlled much of the agriculture in the surrounding region, about 1000 hectares (Warren, 1994: 46, 51).

Under Persian emperor Darius, walled gardens or *pairidaeze* ("paradises") were associated with hydraulic facilities, thereby exploiting water resources more fully. In Thebes, capital of the new kingdom 1500 BC, walled gardens of prosperous Egyptians provided fresh fruit for the household (including indigenous vine, pomegranate, imported apple and almond), sycamores, date and down palms, fresh fish from lotus-covered pools; larger gardens with water tanks had ducks (Jellicoe, 1989: 25). In the capital city of Akhenatan, Egypt, gardens were everywhere, with additional spaces reserved to storage, underground cellars, breweries and animal keeping (Courtlandt and Kocybala, 1990: 126).

Water shortages may have curtailed urban horticulture in ancient Greece, but ingenious use was made of it wherever some was available. On Crete, the large inland city of Eleutherna was important until the Late Roman period and had a vaulted aqueduct taking water from cisterns under the acropolis and to extensive fields for crops, terraced down along the limestone spur on which the city was erected; some of these terraces are still cultivated (Rodenbeck, 1991: 91). 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 of Volubilis in Morocco. Near the mouth of the Tiber River, in the densely settled ancient Roman port of Ostia, a planned complex of garden houses, surprisingly similar to contemporary counterparts, was erected in approximately 128 AD. The complex was more likely built for middle and lower classes, with 40-100 apartments which probably housed 400-700 people; all that remains of its original gardens are the six fountains from which residents drew their water (Watts and Watts, 1994: 86, 88, 89).

The Roman coastal city of Cosa, 140 km north of Rome, at its height in 100 BC, had its harbour linked by artificial and natural channels to a commercial fishery in a lagoon. The catch was dried, pickled or salted and shipped in amphoras. The fish farm had tanks more than 100 m long, covering about one hectare at the west

end of the adjacent lagoon. Some of the catch of eels, grey mullet, sea bass, gilthead, and sole would have been eaten by the local population. A modern lagoon fishery is in operation a the nearby town of Orbetello (McCann, 1994: 95-96). Elsewhere, Andalusian cities had houses surrounded by gardens and orchards. Cities on the Indus River, such as Harappa and Mohenjo Daro, discovered under the shifting mud of the Indus, were once specialized agro-urban centres.

Of medieval Europe, Susan Reynolds (1984: 200) writes: "The provision of food in sufficient quantity, sufficiently fresh, and at a reasonable price, was a constant anxiety...". Crop-rotation systems were being tested in farms and fields of monasteries, walled cities, and castles. Medieval tapestries suggest ladies' castle gardens included herbs on raised beds and rabbitries (Jellicoe, 1989: 34). A fifteenth-century College of the Vicars Choral in the city of York, England, had buildings surrounding a garden; behind it lay orchards (Addyman, 1994: 117-118). Nearly perfectly preserved medieval Novgorod in Russia is depicted in a seventeenth-century icon, showing well-spaced housing, gardens and orchards, within its outer and inner walls (Yanin, 1994: 123).

In North America's Mississippian culture (peak 1050–1250 AD), intensive riverine horticulture supported what Burland (cited in Coe et al. 1986: 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 10 000-people city of Cahokia in Illinois, 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 borrow-pits apparently used to store live fish, which were part of the food needed to support its people (Coe et al. 1986: 56). In Central America, authority was exerted from major centres to terrace steep hills and drain swamps into fields on the edge of Nohmul; this was a large late pre-classic city near the Belize-Mexico border. At the city of Edzna, on the coastal plain of Campeche, waterworks of staggering proportions (2.25 million m^3 of water storage) supported a highly organised agricultural economy (Hammond, 1994: 132).

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: 15–18). The Aztec state was partly dependent on food production within and on the periphery of the metropolises of Teotihuacán and the capital city of Tenochtitlán, south-west of the former and on a man-made island built on Lake Mexico (Anton 1993: 116). In 1519, Diaz marvelled at the agricultural nature of the city he discovered, an island capital extending over 20 square miles, with five times the population of Henry VII's London (Redclift, 1987: 109). Teotihuacan itself at the height of its power (500 BC) was larger (more than 4000 buildings and 50-100 000 people) than imperial Rome (Millon, 1994:

138); Millon's maps of Teotihuacán (population 125 000 to 250 000) clearly indicate *chinampas* in one section of the city: these were "rectangular raised-beds anchored with planted fences of willows, filled in and periodically fertilised with piles of marshy vegetation removed through canal-cutting, topped with canal-bottom mud." (Coe et al. 1986: 104).

Chinampas carried fruits, vegetables, trees and houses, supplied most of the produce consumed in the city at the time of discovery and still supplied some vegetables as late as 1900. Three harvests were possible, with transplanting from reedbeds. Animals were kept and their manure and that of humans applied to organic gardens (Redclift, 1987: 109-110). Highly fertile and productive *chinampas* were found in Xochimilco (surviving to the present), towns on southern shores of Lake Xochimilco, and in most of the island of Tenochtitlán–Tlatelolco. A plan to recover the Xochimilco region has prompted new interest for the *chinampa* economy which has survived to the present (Millon, 1994: 139; see also Canaval, 1992). A 15 km-long dike, built across Lake Texcoco, protects *chinampas* from rising saltwater in the rainy season (Coe et al. 1986: 144, 146, 149). An aqueduct raised water to irrigate a hilltop orchard in the northeast of Tenochtitlan (Haas, 1993: 22). The well-spaced layout of outer house mounds probably enabled each home to have its own garden (Burland, 1976: 40). In Haas' Gardens of Mexico (1993: 22), a nineteenth-century painting depicts a woman in her central Mexico City rooftop garden, attended by her mestizo and native maids, and a water seller approaching the group. Haas finds that secure rooftop potted plants are an enduring phenomenon in provincial urban and rented houses of Mexico.

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: 166–167; Burland 1976: 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: 197). At Cuzco and Machu Picchu, extensive retention walls, terrace gravel beds and stone-lined drainage afforded intensive farming of steep slopes. In our times, the Yoruba of western Nigeria maintained sizeable cities that were largely self-sustaining because "most of the productive inhabitants were full-time farmers" (Adams, 1994: 15).

The above overview suggests that food production in the more advanced urban settlements of ancient civilisations, was not a rare, temporary activity sited haphazardly in the urban fabric. UA was not socially demeaning or technically primitive when it was practised. Quite contrarily:

- Being vulnerable to supply disruption or insufficiency, malnutrition or famine, food provision throughout history has been a pervasive concern of city populations. Under the Islamic empire, the Abbasids even 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. Cities have always had to ensure that a reasonable share of their food needs be supplied from within a controllable hinterland.

- Throughout most of mankind's history and in different civilisations, urban populations have engaged to variable extents in producing at least some of the food they require, close to or at their own residence, within or just outside the city. Reliable, minimal amounts of food and nonfood items were needed to ensure subsistence and trade by what were then large human agglomerations; this may explain the frequent coupling of elaborate earth- and water-works with food production in ancient cities.

- Archaeological remains and artists' depictions highlight the living conditions of ancient urban elites more than any other human group. Clearly, food production was not only carried out by better-off individuals; those in authority also commissioned, built and managed massive food-producing systems, even making room for food production when designing lower-class living quarters.

- Urban food production took a variety of forms, making ingenious use of space, site conditions, closeness to equipments, facilities and markets, natural light, water, soil and waste resources. The scarcer these resources, the more valuable have been the products chosen to be grown or raised by city dwellers. Many cities probably did offer the incentives, conditions, market and testing grounds for more intensive and productive farming systems to be experimented, perfected, and disseminated. Technological breakthroughs included sun reflectors; water collection, storage, and distribution; frost protection; wetland drainage and slope terracing, multi-cropped and layered *chinampa*-style raised beds. In his review of recent archaeological findings on ancient cities, Adams concludes (1994: 15) that large-scale canal networks clearly seem to have followed the advent of fully established cities.

2.2 Post-Industrial Revolution City Farming

It follows that the divorce of agriculture from cities, of food production from urban economies, is very recent in the urban history of humanity. It also has not been universal and is showing signs of weakening both in the North and the South.

The reasons for which UA is sometimes disregarded by governments and planners of western urban economies has yet to be clarified. Lee-Smith and Memon (1994:70) recognise that the exclusion of agriculture as a permanent urban function in western contemporary urbanism can be explained by cultural connotations assigned to country and city dating back to the Greco-Roman period, which was later reinforced by recent urbanism associated with the Industrial Revolution. On the other hand, Greco-Roman archaeological remains, current liberal practices in the Mediterranean heartland, plus garden-city paradigms transferred from Europe to colonies or ex-colonies (greenbelt towns of US and garden-city colonial cores of Asian and African cities), point to a very complex arena of visions. Zoning started to sanitise the medieval core of Dutch cities as early as in the 17th century (Wagenaar, 1992: 165-176). However, the sanitation argument of West European colonial powers against large-scale food production in many African cities was wrongly aimed. In the industrialising metropolises of the North, pathologies and epidemics had their origins in hazardous and polluting manufacturing technologies and in workers' substandard living conditions rather than in urban food production itself.

The prevailing eighteenth-century philosophical view in Western Europe opposed natural to artificial, nature to civilization, natural man to urban man (Marshall, 1992: 223). This view, along with the privatisation of land ownership, the privilege to grow food on private land by the elite who least needed to, might better explain the divorce between urban and agriculture. This separation was being formalised when cities and urban workers could have gained much from urban agriculture. Wartime rationing induced exceptions to this rule in Europe and North America, not dissimilarly to situations which post-colonial African cities have been facing more enduringly.

In the North and South, particularly in the last twenty years, urbanisation has been putting the practicality of cities' exclusive reliance on often distant and unreliable rural food production into question; urbanisation has also been challenging the morality of depriving the urban poor from accessing unbuilt urban land for feeding themselves and others. The divorce is being revisited and changes are being considered, albeit based on different arguments. In the urban areas of several newly independent countries of the South, particularly those where local governance is representative and progressive, bylaws inherited from the colonial era are being changed and urban food production is tolerated if not supported. In the North, urban governments are rediscovering UA as a means to recover and utilise more fully resources such as space and energy. In both North and South, cities may eventually reduce food brought in from other areas, while extending the useful life of the resources they still require. For many decades now, this utopia has become a reality in major Asian metropolises.

3.0 OFFICIAL SUPPORT FOR URBAN AGRICULTURE

3.1 The Asian Leadership: City-Farming Today as it Will be Tomorrow

In the late 20th century, the largest advances in production and marketing systems for UA are found in and around major Asian cities. There, policy-makers and planners have for many decades been overtly promoting food and some nonfood production as a critical urban function. Chinese UA is expected to further develop because it has become very intensive and highly integrated (vegetable crops are highly structured spatially with use of intercropping, overplanting, advanced purchasing, and combined contracting) (Honghai, 1992: 5). The Shanghai Municipal Government has a fully integrated regional food-supply system (Yeung 1985: 12). UA is also being integrated with other sectors of the urban economy. The City of Dujiangyan, Sichuan, is known to have diverted its surplus labour force to farming on wasteland, barren mountains, roadsides and field edges, as well as food processing, handicrafts and small restaurants (Liu Hing as per Honghai, 1992: 7).

In China, ancient household urban gardening has provided the seed for the development of urban farming in yards which later, with the support of planning, grew into full-scale UA as an integral function of urban spatial economies. In northern China, the Siheyuan is a traditional residential compound with rooms built around a courtyard. Plants are grown in the latter which supply starch, fruits, herbs, flowers and medicines; often with small livestock of which wastes are applied to the gardens; garden wastes are fed to the livestock (Hou, 1991, as per Honghai, 1992: 2). From the Opium War in 1940 through to the 1960s, Soviet-style urbanisation and centralised industrialisation considered urban farming as backwardness and farming yards were eliminated (Honghai, 1992: 3). Since the end of the 1950s however, strategies promoting rural industrialisation and decentralised urbanisation have encouraged the incorporation of food production into urban economies. Honghai (1992:5) estimates that urban agriculture now feeds about of third of China's total population. Chinese urban municipalities are "over-sized" to allow room for a city "foodshed"; most large Chinese cities are nearly self-sufficient in perishable food crops. City and town farming has been using slightly more than one third of the State's budget for agriculture (Honghai, 1992:7).

Extensive biological recycling, vertical planting and mixed farming make full use of solar energy and organic wastes. According to Honghai (1992) these practices are enabling UA to further develop in Chinese cities, . These systems include three-stage recycling (organic waste for animal forage, livestock dung for methane generation and methane tank residues for crop manure) and multiple-stage recycling (crop-livestock-biogas tank-mushroom/earthworm), plus full ecological recycling (fibrous organic waste to cultivate edible bacterium, conversion of coarse

cellulose into rich forage, animal dung into tanks to generate methane, tank residues fed to earthworms, in turn fed to poultry, or are applied as crop fertiliser). An effective ecological cycle of mulberry–silk worm–pond fish–pig system has been perfected in South China (Yeung 1985: 14). In Guangzhou up to nine crops are grown yearly on any single field; in nearby Hong Kong, six crops of cabbage a year are not uncommon (Yeung 1985: 9).

An environmental monitoring network is being set up and perfected for UA in China (Honghai, 1992: 11-14, 19). In Shanghai, more and more backyards, roofs, balconies, walls and vacant space near houses are used by orange trees, vegetables, leguminous plants, grapevine, gourds and melons (Deng, 1986, as per Honghai, 1992: 8); a growing number of households are recycling organic wastes using earthworms, edible mushrooms, flies, methane-generating bacteria; underground air-raid shelters and cellars for long have been used to grow mushrooms (Deng, 1986 and Shi and Cun, 1990, as per Honghai, 1992: 8). Pig farms, as one in Beijing (Honghai, 1992: 9), produce methane out of pig waste to heat and cook, methane-based organic fertilizer and pig forage; earthworms grown on methane forage are fed back to chickens, of which droppings are reprocessed into pig forage. Major companies, such as Beijing's Capital and Steel Corporation, are actively involved in UA. Over the last 12 years, this company has planted 3.4 million trees, 904 000 m^2 of grass, 8.6 million flowers; over 46 500 m^2 of the factory's inner-walls are covered with climbing plants (Honghai, 1992: 9-10).

Urban forestry is very much part of Chinese approach to UA in confined space. A study of 439 Chinese cities in 1991 put their overall green space at 380 000 ha or, on average, 20.1% of their area. Beijing has 9.2 million people on 750 km^2, 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 and as much as 23% in older residential areas (Ming and Profous, 1993: 13–18).

Other Asian countries have intervened in different ways. Japanese census offices closely monitor the performance of city farming. Hong Kong's policy for UA is a high degree of self-sufficiency, no subsidies, 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 multi-cropping, hydroponics, and short-season varieties (Yeung 1985: 9, 12, 23). In metro Manila, a presidential decree obliged owners, or entitled those with permission of the owners, to cultivate unused private lands and some public lands adjoining streets or highways (Bulatao-Jaime et al. 1981, cited by Yeung 1985: 25); community gardens were established, one of which supplied 800 squatter families with 80% of their vegetables from an area

of only 1500 m^2 (Wayburn, 1985:6, as per Rogerson, 1993: 36). 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: 14–15).

3.2 Expansion of Urban Agriculture Outside Asia

Since the late 1970s, UA has been growing in many developing countries, in terms of numbers of practitioners, space used, contribution to household welfare and to the urban economy in general. A plethora of factors come into play to supplant this growth: rapid urbanisation, 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. External (civil strife and war) and natural (droughts, earthquakes, floods, and tsunamis) disasters also disrupt rural food production and supply lines to cities.

One of the regions of the world for which the most data on UA are available is sub-Saharan Africa. Conditions sufficient to dampen, not to say reverse, the growth of UA appear increasingly unlikely to arise in most of Africa and in sub-Saharan states in particular. Research and policy sectors are re-visiting UA because of the aforementioned factors. Until recently, UA was largely dismissed as exceptional or temporary. Researchers and policy-makers are increasingly recognising urban farming as a growing and a permanent feature of cities. The multiple benefits to urban populations is such that a return to the previous view of the city as nonagricultural is becoming an increasingly unlikely, if not vanishing, prospect in many parts of the world.

The growth of UA in sub-Saharan Africa will be discussed with evidence from specific cities in the subsequent sections. In the section below, the cases of Nairobi in Kenya and Dar es Salaam in Tanzania illustrate that UA is expanding in urban economies of the region, regardless of differences between countries.

3.2.1 Nairobi - Kenya

Recent studies indicate the growth of the urban informal sector (UIS), but also the growing contribution of farming to both informal and formal urban employment in Africa. ILO statistics for 17 African countries show that in 1989 the majority of the urban labour force was being employed by the urban informal sector. During the 1980-5 period, the UIS grew much faster than the formal sector, employing twice as many people and creating 12 times as many new jobs as the formal sector. Formal market contractions during the 1985-7 period

probably have further increased, since then, the lead of the UIS (House et al., 1993).

In Kenya in particular, 1986 data from the Central Bureau of Statistics reveal that 17.5% of self-employed workers and unpaid family workers and 3.5% of paid employees in urban areas worked in agriculture and forestry (House et al., 1993: 1207). Both the numbers of self-employed and unpaid workers and their dependence on farming are probably larger than recorded by the Bureau. A breakdown of whether agriculture and forestry was urban or rural was not provided, but it can be assumed that most workers cannot afford to farm at great distances from their city residence. In cities, agriculture and forestry are the second largest of eight occupational categories (after sales workers), among urban based self-employed and unpaid family workers. Agriculture was also the second largest of nine economic activities listed, among self-employed and paid employees, absorbing 24.4% of Nairobi's and 33.6% of urban Kenya's formal sector jobs (based on Ritter and Robicheau's 1988 samples of 216 households and 1 100 cases respectively, cited by House et al., 1993: 1208). Furthermore, agriculture provided the highest self-employment earnings in small-scale enterprises in Nairobi and the third highest earnings in all of urban Kenya (House et al., 1993: 1209).

Binns (1994: 115, 122-123) notes that, while tropical Africa only had three cities with more than half a million people, twenty years later there were no fewer than 28 cities of that size, including 7 with over one million inhabitants. He notes that peri-urban areas are often zones of intensive market-oriented food production and he stresses that urban and rural development should not be treated on isolation one from the other. Reports available from capital cities of western and eastern Africa concur that UA is not a transitional or temporary activity.

3.2.2 Dar es Salaam - Tanzania

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 very possible because of persisting unemployment, retrenched civil service, newcomers added yearly to the 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. The large and fast-growing city of Dar es Salaam in one of the continent's poorest countries illustrates Lungu's opinion. Similarly to 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: 4). The Arusha Declaration's emphasis on rural development did not slow the growth of Dar es Salaam: its population nearly doubled in 10 years to 1.4 million in 1988. Some 70% of its people now live in unplanned settlements and 75% of the households have to use pit latrines; less than 3% of the city's solid wastes are collected (DSM/ARDHI 1992: 5–6).

Satellite imagery reveals that as much as 23% of the city region is used for agricultural production, with nearly 34 000 ha under crops in 1988 (more than 500 ha in vegetable crops) (DSM/ARDHI 1992: 8). Data on other Tanzanian cities show a similar, if not larger, incidence of UA (Mosha 1991; Mvena et al. 1991). According to the 1988 census, UA ranked as Dar es Salaam's second largest employer, after small traders and labourers; it occupied 11% of the population aged 10 or more, and 20% of those employed, turning out about 100 000 tons of food crops annually. 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.

3.3 Local Authorities' Changing Attitudes Toward City Farming

Changing attitudes is no doubt is turning to be a crucial vector in bringing about more sustainable urban policies in the North and the South. Worldwide, most UA still remains largely unrecognised, unassisted, or discriminated against, if not outlawed or harassed, even in years of food shortage. However, several governments are creating agencies to manage UA and some governmental and other organisations are actively encouraging the activity. Between 1975 and 1985, governments in at least 22 countries (10 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: 38–41).

3.3.1 North America

Beyond typical backyard gardening, a growing number of North American and European city governments are now encouraging community gardening on city and institutional land. The number of community gardens for nine major North American cities recently totalled 2 475, ranging from 1 000 in New York City down to 30 in Seattle and metro Toronto (Archibald, 1993: 33). The governments of cities like Montreal, Boston, Chicago, Cleveland and Pittsburg, now provide some start-up funding and accept gardens in parks.

In Canada, the City of Toronto's Department of Parks and Recreation currently provides a total of 358 allotment gardens at three locations, including

utility lands; metro Toronto has 14 community allotment gardens with 2 000 available allotment plots (total metro Toronto area in allotment gardens: 6.2 ha Eguillor, 1993, as per Cosgrove, 1994a: 6). Two CityHome projects of the Housing Department already have gardens with composters, raised beds and soil supplied by CityHome to tenant growers. The Department of Public Health nutritionists support urban food production and community gardening. They also monitor city school-gardening and composting.

In response to demands by community groups the Toronto Food Policy Council and the Healthy City Project helped to establish an Interdepartmental Working Group on Urban Food Production composed of the Departments of Housing, Planning and Development, City Property, Buildings and Inspection Public Health, Parks and Recreation and Public Works and the Environment. This group assessed capacities and expertise of various city government units and issued recommendations for these to support fully food production in the city. These recommendations, contained in the Garden City report, were passed by City Council in December 1993 (Cosgrove, 1994a: 4). Social housing agencies had sponsored community-garden projects in the mid-1980s (Cosgrove, 1994a: 3). Now a community coalition called Grow T.O. recently obtained permission to plan a new garden in City parkland (Cosgrove, 1994a: 3).

Cosgrove considers Montreal's community garden program "by far the largest, best organised program in Canada" (1994b: 2). When Italian and Portuguese immigrants initiated illegal gardening in North Montreal in the early 1970s, the city attempted to regulate and organise community gardening. The movement, sheltered and championed by The Montreal Botanical Garden, blossomed. A review in 1985 clarified city policy and the Department of Recreation and Community Development is now responsible for the program, coordinating other departments' involvement as well: Habitation & Urban Development, Provisioning & Buildings, Public Works, and Planning and Policy. The gardens are very productive and have long waiting lists; the city provides insurance and horticultural animators; organic methods are mandatory, gardeners must grow at least five different types of vegetables; some of the food produced is donated to community kitchens. The City of Montreal has 75 community garden sites, totalling 6 654 plots (plus 30 other sites elsewhere in metro Montreal, Archibald, 1993: 33).

In contrast with Toronto, urban food production in Montreal is an official and permitted land use, with about one third of "community garden" sites zoned as such and 13 of these 22 sites are located on city parkland (Archibald, 1993: 11).

3.3.2 Latin America

A 1994 IDRC survey of institutional capacities and ongoing UA activities revealed growing official support in the region. Fifty-five senior officials of 41 institutions (U.N. and regional agencies, public and private research centres, national government departments and local development NGOs and consulting firms) were interviewed in the Dominican Republic, Mexico, Costa Rica, Colombia, Ecuador, Peru, Bolivia, Chile and Argentina (Prudencio, 1994).

In Costa Rica, the Food and Nutrition Division of the Ministry of Education supports 1 500 gardens countrywide, which supply food to school cafeterias feeding half a million students; it is looking for ways to produce under growing space constraints. Nutrition Department officials believe urban food production must be encouraged above food donations given to child care centres. In Argentina, the Instituto Nacional de Tecnologia Agropecuaria, with Ministry of Health funding until at least 1997, cooperates with over 800 institutions to support nearly 56 000 gardens in 1 300 localities (61% urban and semi-urban); these reportedly benefit directly 430 000 people.

In Lima, a central hospital lends training and crop-testing facilities to Peru Mujer, a women's NGO supporting some 252 produce gardens (household, communal and school-based) in three low-income districts of Lima. The municipality of the San Juan de Miraflores district, in agreement with the Pan-american Centre of Sanitary Engineering and Environmental Sciences, operates a waste-water treatment plant coupled to fish tanks yielding 4 tons/year of algae-fed Nile tilapia, which are in great demand on Lima markets; the plant also irrigates 60 ha of field crops and 290 ha of forest land (Prudencio, 1994). In Brazil, more backyards, vacant plots, road and streamsides are being converted to food production in low-income districts, as observed by Yves Cabannes (personal communication, August 1994) in Fortaleza, Agnès Serre (personal communication, September 1994) in Belém, and Martin Coy (1994: 10) in Cuiaba. The Municipality of Cuiaba, which owns 143 green areas, is elaborating a municipal environmental plan to be coupled to the city's master plan.

3.3.3 Africa

While gardening and some animal husbandry have been permitted on private plots since colonial times, official initiatives have been minimal for incorporating UA to low-income housing plans, the management of institutional and open public space, as well as citywide zoning. What Lee-Smith and Memon (1994: 71) say of Kenya may well apply to other East and Southern African countries: Kenyan urban centres were gazetted as townships under the Townships Ordinance of 1903, to function as centres of colonial authority and rule, over which strict sanitary control could be maintained. Boundaries were carefully defined to reduce existing areas

of subsistence farming and settlement; upper-income residential districts were laid out according to the garden-city model, often protected from less salubrious land uses by buffer zones of public open space. Permanent settlement of indigenous Africans was proscribed and carefully policed.

However, like post-Russian nationalist China, a growing number of newly independent African countries are departing from colonial approaches to urban planning. The new national capitals of Côte d'Ivoire, Malawi, and Tanzania have been planned to accommodate UA and their authorities are encouraging it (DGIP/UNDP 1992: 2, 25). As for major existing urban centres, local governments have commissioned special sectoral studies on urban agriculture as part of master planning processes, in Maseru, Lesotho (Greenhow, 1994: 2), Kampala, Uganda (NEIC, 1994) and Dar es Salaam (DSM/ARDHI, 1992). In contrast with its 1967 version, Kinshasa's 1975 master plan did set aside areas for horticulture in the east, central, and southwest sections of this multimillion-people city (Pain 1985: 34).

Authorities in some intermediate size cities have also innovated. Tanzanian municipalities have experimented with zones for UA in recent years. While breaches to regulatory constraints on public land have led to harassment in Nairobi and Kisumu, councils in Kenyan other cities have been innovative and pro-active, supporting crop irrigation in Isiolo, providing extension services in Kitui, or experimenting with allotments for food crops in Kitale (Lee-Smith and Memon, 1994: 83). 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: 257).

In Daloa, Côte d'Ivoire (population 123 000 in 1988), peri- and intra-urban 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 in 1988 on government-improved and acquired bottomland. A 1989 map shows 55 poultry farms located within and on the edge of the built-up area, with 13 pig farms and 110 fish ponds in the city's immediate vicinity. Della (1991) also surveyed Daloa's intra-urban 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 some major cities the changes in official attitudes have been remarkable. In Harare, Zimbabwe, bylaw enforcement remains among the most stringent observed in East and Southern Africa. Yet, official attitudes towards UA have progressed considerably over the last decade, as shown by Mbiba (1994: 194-

200). Authorities were originally opposed to any off-plot UA and this was reflected in information campaigns prohibiting felling and cropping at all cost. Tree-planting programs, the demarcation and pegging of cultivable areas, and the policing of UA by a municipal security unit in high-density areas were implemented to discourage cultivation. A Greater Harare Illegal Cultivation Committee was later set up by the City Council, the aggressiveness of which began to worry ministerial authorities. Pressed by the Ministry of Local Government and Town Planning, the Harare City Council in the early 1980s finally issued a more accommodating policy: UA could now take place on Council land leased out by the Council to producers in cooperatives. However, the slashing of crops on other public land proceeded, until major confrontations prompted a review, resulting in the suspension, of crop slashing in 1992 and ever since.

A local stakeholders' workshop in Harare in early 1994 (ENDA-ZB, 1994b) further identified critical issues which need to be better documented in order to guide a better management of UA in Harare. In cooperation with the Ministry of Local Government and the Department of Housing and Community Services, ENDA-Zimbabwe conducted a baseline survey of open-space UA in Greater Harare; it now plans to research more specific UA management issues. In 1989 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–Glenview–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. 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 could promote UA in a highly integrated fashion, with multiple benefits to a wide range of population groups and economic sectors.

Thus, in several African countries, 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 recently.

3.4.4 City Farming on Global Agendas of Local Authorities

Not surprisingly, international congresses of city governments are now paying much greater attention to the role of UA in urban development than reported until recently. For instance, the International Union of Local Authorities had panels addressing city farming at their 31st World Congress in Toronto in June 1993. In June 1994, the Global Forum 94 in Manchester convened 50 city delegations from the North and the South; it conducted an Advisory Workshop on Urban Agriculture where delegates representing 25 of the 50 cities invited

acknowledged UA and qualified its impact as positive. Almost all questionnaire respondents at the workshop said there is UA both within and at the edge of their home city; a little more than two thirds said it is done by households, with a third adding that entrepreneurs and institutions are also engaged in UA; only a quarter said UA causes some problems but two thirds said their city benefits from it. A third said UA was regulated in some way in their city, with only about a quarter knowing of any support programs or research underway in their city on UA. In August 1994, in a Declaration on Social Development and Sustainable Human Settlements issued at the International Colloquium of Mayors on Social Development at the U.N. in New York, over 100 mayors from around the world invited the various sectors of society to join them in six categories of actions for the sustainable social development of their cities. The category at the top of the list reads:

> "Reducing urban poverty by providing productive employment for the poor and the jobless in the private and public sectors, promoting urban agriculture and supporting micro-enterprise development through credit and training, particularly the informal sector;" (ICMSD, 1994: 10).

4.0 SIGNIFICANCE OF URBAN AGRICULTURE

Food security is the most important consideration in assessing the significance of UA. This seems to be the strongest argument which politicians and planners in the South invoke to accommodate the rise of farming in their cities. Food security is basically 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: 3). One can readily see why local authorities have begun to seriously revisit earlier, largely colonial attitudes, towards city farming.

4.1 Urban Vulnerability to Food Imports

Urban food supplies, particularly in the Least-Developed 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: 37). In African cities, many imported food products now cost relatively less than local food, at least during part of the year (Vennetier 1988: 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, sees UA as a national food-security issue (Charles Gore, personal communication, Harare, 1 September 1993).

4.2 Food: Basic Luxury for the Urban Poor

For 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; 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 Americans spend 34% of their after-tax income on food (Ethelston, 1992: 16). Food-price surveys of five developing countries showed that city dwellers paid between 10–30% more for their food than rural dwellers (Yeung, 1985: 2).

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: 2, 5). In Bangkok, the lowest-income families spend 60% of their income on food (Sukharomana 1988: 7). In Ecuador, 74% of urban households had insufficient incomes to afford basic food purchases: percentages vary from 62% in Babahoyo to 84% in Tulcán, 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: 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 1993: 273, 277).

In Africa, poor urban Kenyan households have to spend 40–50% on food and cooking fuel alone (Lee-Smith et al. 1987: 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: 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: 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: 55). In Kinshasa, in 1982, food purchases were already absorbing an average 60% of total household spending (Pain 1985: 44); a 1988 study of food consumption showed that in major Zairean cities 67.4% of monthly household expenditure went to food purchases (MacGaffey, 1991: 14). In the early 1980s, a minimum wage fed a Ghanean family for a week with a staple starch. An official in Conakry could only feed his family for three days with his monthly wage. Senior Ugandan civil servants could only buy 1.5 bunches of banana with theirs. An Angolan official would pay six days of his salary for one

chicken. And an average Tanzanian household of six could be fed on formal wages for six days of the month (MacGaffey, 1991: 15-16). Apolo Nsibambi, was writing in 1988 (151): "In Uganda, where the salary of an ordinary wage-earner lasts for two weeks, food alone wipes out the entire salary."

Dar es Salaam illustrates how badly urban wages and their purchasing power can trail behind 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: 26, cited by Sawio 1993: 10).

Food insecurity grows as the share of household budget which must be spent on food rises. The fewer the household's alternatives to buying food, the more it will be food-insecure. If one is a city poor, one's coping strategies are fewer than in rural areas. In the Ecuadorian city of Cuenca, 56.5% of street scavengers interviewed 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 in order to feed their family (Fundación Natura 1993, II).

In African cities, to eat only one meal a day is becoming commonplace, and this undoubtedly affects people's nutritional health (Vennetier 1988: 222). Even when doing so, if one is poor, one will tend to pay relatively more than do higher income consumers for the food one buys. More likely than not, one will be forced into inefficient shopping practices: smaller, more frequent purchases from various and distant sources, more cash spent on transportation, more losses from bad storage, and so forth. Vennetier (1988: 222) considers the micro-retailing of food as increasing food prices in African cities, the higher prices being charged to those who are less able to pay.

The nutritional energy requirements of urban dwellers are generally greater than that of rural dwellers, regardless of differences in income or expenditures. Furthermore, 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, intra-urban 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 shown in Manaus, Brazil (Amorozo and Shrimpton 1984, cited by von Braun et al. 1993: 18).

Available findings are collapsing the myth of urban privilege over rural neglect. In some countries, malnutrition is as prevalent in large cities as it is in rural areas; rates of 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 for many countries. Schilter (1991: 11) and staff of the United Nations Children's Fund (UNICEF) (Francis Kamondo, personal communication, August 1993; Bjorn Ljungqvist, personal communication, August 1993) believe that malnutrition in Nairobi, Lomé, and Kampala is 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: 13, 23).

4.3 The Rise of Urban Agriculture: How Many Do It?

As a result, urban food production has become a complex, thriving industry. More and more people in cities in the South are trying to grow some of the food they need. 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: 3). Estimates are 25% in urban USA and 65% for Moscow in 1991 (Smit and Ratta, 1992).

In Peru, more than 50% of households are reported to raise guinea pigs at home (Charbonneau, 1988: 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% raised small livestock for self-consumption (hens, rabbits, pigs, lambs, and ducks), with the number of self-consumers tending to increase. Animal husbandry is the main source of animal protein for households, with the low-income group representing as much as 68.1% of all animal 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: 226–229).

4.4 African City Farming: Tapping Underused Human and Land Resources

In Africa, cities for which data are available show a growth in the proportion of households practising some form of UA; a few such cities also report a growth in the area under UA. In Lusaka in mid-1980s, a survey of 250 low-income households in five compounds of urban Lusaka found that 45% of them cultivated food within or on the fringe of the city (Sanyal, 1984: 198). Rakodi's (1988) study showed percentages varying between 25 and 56%, reaching 73-80% in some areas (Lee-Smith and Memon, 1994: 74). A 1991 dry-season survey on vegetable supply in urban townships of Lusaka found that nearly 50% of respondents practised vegetable gardening. An FAO-funded household garden survey in 1992-3 found that 42.6% of 648 interviewees within Lusaka Town practised gardening

(Drescher, 1994:7). While rainy season urban plots covered an average 300 m^2 in the late 1970s (Jaeger and Hickabay, 1980, as per Drescher, 1994: 8), the FAO 1992-3 survey showed that this average area had grown to 423 m^2, ranging from 231 to 666 m^2 in six different sectors of Lusaka (Drescher, 1994: 8). In Harare, an interpretation aerial photographs of open-space cultivation by ENDA-Zimbabwe (1994) reveals that this type of cultivation has grown by 92.6% in almost four years, from 4 882 ha in 1990 to 9 288 ha in 1994(ENDA-ZB, 1994: 12).

In Maseru, Lesotho (110 000 in 1986), a survey of 4 280 plots showed that 55% had some form of UA ongoing; in low-income areas, horticulture abounded where soils permitted, with small livestock being preferred on more rocky soils; dairy and poultry husbandry were fairly common in higher-income districts (Greenhow, 1994: 2).

In Addis Ababa, a 1983 survey indicated that 17% of 1 352 households surveyed produced their own vegetables (Hormann and Shawel, 1985, as per Egziabher, 1994: 88). 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: 126, cited by Sawio, 1993: 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 sample of 1 576 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 one senior UNICEF officer, clearly more of the food sold by street-food vendors in Nairobi (spinach in particular) comes from urban home gardens than was the case years ago (Francis Kamondo, personal communication, 24 August 1993).

In the early 1980s, UNICEF/KCC estimated that a quarter of low-income households farmed, but, in the early 1990s, the Makerere Institute of Social Research study found that 36% of the households surveyed within a 5-km radius from downtown, and 30% of all households citywide, were engaged in some form of agriculture (Maxwell and Zziwa, 1992; Maxwell, 1994: 49). In Kisangani (Zaire), 33% of 426 households responded that they practise UA (Streiffeler 1991: 268, cited by Sawio 1993: 103).

Also, in many studies used here, large percentages of the nonfarming households said they would farm if they had access to land to do so. In 1992-3 nearly 40% of the respondents of the survey in Lusaka Town resorted to gathering of wild fruits and vegetables to supplement their food intake or income; that percentage rose to 80% in peri-urban and rural areas outside Lusaka Town (Drescher, 1994: 4).

4.5 Urban Agriculture Shouldering Cities' Food Self-Reliance

Clearly, UA is already contributing considerably to the food self-reliance of 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. No one expects UA to satisfy most of the urban demand for cereals and tubers; these products can be easily stored and transported, with limited losses, from rural areas. What is striking and must be recognised is that UA, with little support, already supplies significant share of cities' food needs. In the USA, the Department of Agriculture statistics show that one third of the country's agricultural output comes from urban/metropolitan areas (Ratta and Smit, 1993: 26; Smit and Nasr, 1992: 142).

In Asia, Singapore is relatively self-sufficient in pork, poultry, and eggs, and grows 25% of all vegetables its population consumes (Yeung, 1985: 22). In the early 1980s, on 10% of its total area, Hong Kong was producing 15% of the pork, 45% of the fresh vegetables, and 68% of live chickens it consumed (Wade, 1981, cited by Yeung, 1985: 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: 12). Within their municipal boundaries, six large Chinese cities grew 85% of their vegetables requirements (Skinner, 1981: 215–280, cited by Yeung 1985: 8–9), with relatively small waste and waste-water problems and budgets (Smit and Nasr 1992). Karachi produced 50% of its fresh vegetables (Smit, 1980, cited by Yeung, 1985: 9). Metro Calcutta's 4 500 ha of fish-stocked wetlands produced 10% or more of its daily fish consumption (Panjwani 1985: 35). In Kathmandu, 30% of the fruit and vegetable needs are met by household food production alone (Wade, 1987: 4). Some Latin American metropolises grow 30% of the vegetables they consume (Heimlich, 1989, cited by Sawio, 1993: 116).

In Africa, a single cooperative in Addis Ababa (in 1983) supplied 6% of cabbage, 14% of beetroots, 17% of carrots, and 63% of the Swiss chard consumed in the city (Egziabher, 1994: 98). In Kampala about 20% of the staple foods consumed within the 5 km radius of the city centre were produced within that same area, the percentage probably being higher in the other less built-up municipal areas. Statistics indicate that Kampala produces 70% of all poultry products it consumes (Maxwell, 1994: 49). Some cities even manage to export to other centres — Singapore exports eggs, chickens, and orchids, Shanghai exports grains and vegetables (Yeung, 1985: 14, 22); chicken broilers are exported from Bangkok to Tokyo, and fresh fruits from Abidjan to Paris (DGIP/UNDP 1992: 4).

International development policies nurturing rural–urban dichotomies have been starving cities. Beyond industrialisation programs which, in the 1960s, disregarded the rural areas on one hand, and the 1970s and 1980s saw

agricultural programs which ignored urbanisation, more balanced development approaches are now needed. Urban agriculture provides us good reasons for better exploiting rural–urban linkages; fittingly, a recent book on the urban–rural interface in Africa dedicated a full section to UA (Baker and Pedersen, 1992). The comparative advantages which rural and urban areas must be exploited to meet large cities' growing needs for affordable and reliable supplies of sufficient and nutritious food. In the process, a number of related economic, social, gender, environmental and political issues can be addressed more comprehensively.

4.6 City Farming's Benefits to Urban Households

There are more signs that UA contributes to producers' well-being. It enables them to satisfy part of their needs in food. It provides them with ready access to nutritious food which improves their health status. It enables them to save cash and earn income which then can be spent on other necessities.

4.6.1 Contribution to Food Intake

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. Self-produced food accounted for as much as 18% of total household consumption in East Jakarta (Yeung, 1985). However, percentages are much higher in African cities, as urban farmers produce mostly or largely for household consumption, 77% in urban Kenya for example (Lee-Smith and Memon, 1994). In Nairobi, over 50% used the entire amount harvested to feed their families or dependents. In Pointe Noire, 26% of households or 33% of the population self-supplied all or part of its needs for cassava (Vennetier, 1961: 71–72). In Dar es Salaam, nearly 50 % of 260 intra-urban producers reported that UA contributed 20–30% or more of the household's food supply (Sawio. 1993: 309). 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: 49–50). The poorest households in Lusaka were estimated to self-produce about one third of all the food they consumed (Sanyal, 1986, as per Rogerson, 1993: 38). In Kenya 40% of the 1 576 urban farmers interviewed in the six Kenyan cities said they would starve if stopped from farming (Lee-Smith and Memon, 1994: 80). 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, 1994).

4.6.2 Nutritional Impact

The impact of UA on households' nutritional status is still under-researched but the few data available are encouraging and more are being collected.

According to a 1981 UNICEF survey of households with children aged 5 or under in 13 low-income districts of Kampala, partial reliance on intra-urban food production largely explained why supplementary feeding aid could be discontinued. This had taken place despite dramatic economic decline during the Amin regime and a war with Tanzania: 24% of households were engaged in farming within the city. The Save the Children Fund (SCF) reports similar findings in its 1987 study of one division in Kampala. (Maxwell, 1993a).

The findings of SCF are also supported by the initial results of a 1993 survey by a team of the Makerere Institute of Social Research (MISR). The MISR findings impressed the Kampala City Council's Public Health Office. The 1993 survey 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. Areas surveyed coincide with some covered by the World Bank-funded First Urban Project in Kampala. Differences between the nonfarming and farming groups on wasting — a shorter-term effect of malnutrition — have been observed, although they were not statistically significant (Maxwell, 1993a).

Such results suggest that the poorer a household is, the more the women may be inclined to do some 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% (up to as much as 33.1% in one area) of 250 children sampled were 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 women (Mutiso, 1993).

Conventional strategies for urban food security need to be reassessed in view of UA's potential role: an extensive 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). As documented earlier, this is roughly what (largely unassisted) urban farming seems to be achieving already. UA does this at a much lower cost, probably with more benefits to consumers themselves and, by extension, to the general urban economy.

4.6.3 Cash Savings

In Dar es Salaam, 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: 32). 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, 1994). In Maseru, Lesotho, a detailed survey of 428 plots revealed that, in the late 1980s, 69%, 51% and 32% of low, medium and high-income vegetable producers (respectively) were trying to save money through growing vegetables at home; about 66% of the high-cost, and 29% of the low-cost, district households claimed to sell some of their produce regularly (Greenhow, 1994: 2).

4.6.4 Income Generation

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: 15). In Dar es Salaam, incomes obtained from UA are larger than regular salaries for 67% of respondents (Sawio, 1993: 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, 1994). In Nairobi, 47% of the urban farmers had no visible means of support other than their urban *shamba* plots (Freeman, 1991:135).

4.7 The Booming Business of Urban Animal Husbandry

Tanzania's Ministry of Agriculture and Livestock Development keeps statistics on UA. Annual reports of the Livestock Office of Dar es Salaam's City Council show that livestock numbers grew steadily between 1985 and 1989; chickens from 510 789 to 793 441, pigs from 8 601 to 15 658, goats from 2 617 to 6 218, and dairy cattle from 4 200 to 8 517 (Mosha 1991: 84). According to local observers, official data give a conservative picture of reality. Similarly, while it was initially reported that there is little livestock rearing in Harare (Mbiba, 1994: 191) the ENDA ground survey (1994: 15, 17, 22), which targetted major medium- and low-density sectors under off-plot cultivation, revealed that 1 059 of 2 700 (39%) interviewees in those areas (66.7% and 76.6% of whom practised on and off-plot cultivation, respectively) raised 27 776 heads of livestock, largely chickens (57% of growers and 84% of all animals). They also kept rabbits, pigeons, ducks, turkeys and peacocks. Nearly 90% of livestock producers live in high-density districts (most dairy husbandry is carried out on large residential plots excluded from the survey).

Ownership of urban cattle is mostly afforded by upper-income UA practitioners. Individuals are known to raise dairy cattle on their urban residential

compounds in Addis Ababa, Harare and Dar es Salaam, in addition to other livestock (Egziabher, 1994: 87; ENDA-ZB, 1994; Sawio, 1993). In Addis Ababa, the Livestock and Fishery Corporation in the Ministry of State Farms runs dairy, sheep, and poultry farms in the city (Egziabher, 1994: 87). On Harare's outskirts, the City Council irrigates pastures with treated waste-waters for grazing cattle which are then slaughtered and sold in urban outlets.

Milk vending can be a lucrative undertaking for urban dairy producers. In Dar es Salaam in August 1993, one cow, yielding an average of 10 litres of milk daily, if this were all sold at 200 TZS/litres, 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, compared to the minimum monthly salary which was set at 7 000 TZS. Anyone wishing to cash-purchase a cow has to disburse an average of 150 000 TZS (Camillus Sawio, personal communication, August 1993): cows can be acquired through various means other than cash purchase. In 1988/89, there were 8 517 dairy cows in the Dar es Salaam City region. If, in August 1993, there were at least as many dairy cows producing an average 10 litres/day in Dar es Salaam, these were worth the equivalent of 2.2 million USD. They generated a net overall annual income equivalent to 6.75 million USD (during the 10-month lactation period). Assuming that only half of the milk was sold, the equivalent to 3.38 million USD per year would go into the pockets of urban cow owners.

Furthermore, assuming that 75% of the estimated 23 000 heads of cattle in Nairobi in 1985 were dairy cows, the annual retail value of milk produced in the city of Nairobi was at least 13 million USD (based on the above figures for Tanzania); this was probably only part of the local milk-market picture as, according to Lee-Smith and Lamba (1991:38), in 1985, the city of Nairobi was home to an estimated 26 000 goats. Some of these goats may produce milk which is used for household consumption. It should be noted that the cost of living in Nairobi was probably higher than in Dar es Salaam.

Because urban dairy production is lucrative, it attracts reinvestments which make it competitive within cities. In 1993, the District Veterinary Office of Kampala counted 1 751 heads of cattle in the city ; while the numbers of indigenous breeds have declined in recent years, the zero-grazing of exotic and cross-bred dairy cattle has been rising and is actively promoted by NGOs (NEIC, 1994 draft).

The smaller the animal, the more affordable it is to a wide range of people and the more easily it can make use of limited spaces in the urban fabric. In Kampala, at least 105 private homes and three institutions were raising over 1 100 pigs altogether (87 and 13% of the total number of pigs respectively). The

central-city division boasted the second largest concentration (30%) of all animals reported, largely piglets sold for sale and slaughter. As in Dar es Salaam, poultry is thriving, having grown by 60% up between 1991 and mid-1993, when it totalled 156 000 animals (NEIC, 1994 draft: 79-81)

As with food crops, urban livestock can sustain sizeable markets for inputs and outputs, from feedstocks to slaughterhouses. In Kampala, the growth of poultry is in turn boosting the sales of hatcheries and chicken feed outlets (NEIC, 1994 draft: 81). In the mid-1980s, within the city limits of Maseru, Lesotho, seven egg producers owned 75 000 birds; a marketing agency supplied the city with 90 000 dozens of eggs per month. An expanding poultry industry had over thirty large-scale poultry producers, a broiler unit and a slaughter unit with a capacity of 2 500 birds/day; the national pig-breeding herd was found within the town, with a capacity to produce 2 500 weaners per year (Greenhow, 1994: 3). Maseru's dairy plant in the mid-1980s processed 3 000 litres of milk a day from 94 urban producers, contributing to about 40% of the town's overall milk production (Greenhow, 1994: 3).

Small-scale urban farming's annual production in crops and livestock may be worth tens of millions of dollars (US). In metropolitan Rio de Janeiro, 172 ha are cultivated on lease in 1983, under electrical transmission lines, resulting in the addition of garden produce worth 10 million USD to the local market (La Rovere 1986, p. 32). In Kenya, the Mazingira Institute's six-town survey 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. In Nairobi, upper-income farmers keep heads of cattle while lower-income practitioners raise chickens, rabbits, sheep, goats. The value of animals eaten by producing households in urban Kenya was estimated at 1.5 million USD annually in 1985, with another 2.4 million USD worth lost in livestock deaths (Lee-Smith and Memon, 1994: 78). In Maseru, the annual value of UA was estimated at 6.7 million maloti or South African rands (Physical Planning Division and Institute of Land Use Planning, 1987: 27, as per Mbiba, 1994: 192).

Although research on UA seems to have focused more on food crops than on animal husbandry, the available data reveal that livestock keeping is particularly amenable to farming in small urban spaces and where soils are less fertile or water scarce (even space-scarce Cairo in the early 1980s had at least 80 000 households home-raising animals (Reed 1984, cited by Khouri-Dagher 1987: 41)). It can combine with plant cultivation to give a highly productive farming system (Siau and Yurjevic, 1993). It is less visible and less easily surveyed, thus often more widespread and profitable than generally reported. Some forms are less affordable to low-income farmers and most forms are subject to more controls than plant cultivation in general.

4.8 The Spatial Distribution 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 indicate.

Urban agriculture claimed the largest land use within the city boundaries of Waterloo, Canada, in 1981 (Dorney, 1990, cited by Sawio, 1993: 121). In Sheffield, England, nature gardens and allotments together cover 22% of the inner city area and City Council is encouraging the "green" redevelopment of a much larger central area (Carr and Lane, 1993: 10). There are still 28 000 ha being cropped in three delegations of the Federal District of Mexico; the Tlahuac delegation supplies one third of the eggs/milk produced in the district, while Tlalpan is ranked first in terms of acreage under oats, fodder and fresh maize (Brena, 1993: 149). Some 60% of Greater Bangkok was officially under UA in the 1980s (DGIP/UNDP, 1993: 4). A little more than half of the municipal area of Kampala is used for agriculture (Maxwell, 1994: 48). In Bamako, 1 550 ha available for UA are fertilized solely with domestic wastes (Diallo and Coulibaly, 1988: 30). Five cooperatives produced vegetables on 274 ha in Addis Ababa (Egziabher, 1994).

Reported areas often exclude forms of UA in hidden household spaces (individually small but collectively considerable). There is probably more UA in any city than meets the eye of conventional aerial 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. When surveys are carried out in the dry season, rainfed crops are probably omitted.

4.8.1 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, land which cannot be built upon and voluntarily undeveloped, idle public lands and water bodies, and household spaces); Freeman's (1991: 132) 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).

It should come as no surprise that UA responds to competition for land, as do many other urban land uses. As urbanisation 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 single-storey residences, extensive institutional uses, warehousing and industrial compounds, transportation terminals, and ground-level parking facilities. The kind of urban agriculture which remains in central locations tends to labour- or capital-intensive.

Dar es Salaam illustrates this trend. In a sector of 26 km^2 in central Dar es Salaam, UA initially used a vast amount of open public space; in the 1970s, the urban fabric became denser in this sector and by 1981-2, UA had lost ground in terms of total area; at the same time that it had expanded in cultivated valley land, paddy plots, and vacant land under power lines. Still, a substantial amount of open land remained available within this urbanized sector. The pattern of UA had become more dispersed in the sector by 1991-2, with ground surveys revealing that 64% of gardens were less than 101 m^2 and 25% under 51 m^2; more than 80% of the farmers worked other urban plots at 11–20 km from their houses. Also, households now made more intensive use of their homestead space, with 74% saying they raised livestock; most of the cattle were stall-fed (Sawio, 1993: 137–156). UA therefore does not obstruct more competitive land development; instead, it tends to exploit small, inaccessible, unserviced, hazardous, or vacant areas.

UA is typically opportunistic but that is not due to 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 out of climate, site, and other locational constraints and assets in the urban fabric. In Kampala for instance, cocoyams are grown in bottomlands because they tolerate flooding during the rains and thrive on swampland during the drier months (Maxwell, 1994: 54).

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: 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; special crops, animals (poultry, cattle, and micro-livestock), agroforestry and production of multi-purpose wood, and others (snail-raising, ornamental fish, silkworms, worm larvae, horses, pets, and medicinal and culinary herbs).

Product and technical diversity enables UA to colonise an broad range of niches in the urban ecosystem. This is best revealed by local surveys. For instance, in three different socio-economic 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, and some 11 major conventional

land uses and 22 sub-land uses identified on 1:12 500 air photographs (Sawio, 1993: 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 plot. Over 60 kinds of vegetables were found to be grown by Hong Kong farmers (Yeung, 1985: 20). Tricaud (1988: 11, 33–34) identified some 74 species in Freetown and Ibadan gardens between short-cycle, annual-cycle, and semi-perennial crops; they include 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, fencing and decorative plants.

UA can be a 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).

4.9 Urban Agriculture is Not Only the Poor's Business

Because UA is complex, it is clearly far from being merely a poor person's subsistence, an informal or illegal undertaking. Surveys in middle- and upper-class districts actually unveil a very different picture. The UNDP survey, for example, identified seven categories of urban farmers, with types of production ranging from low-income survival to agribusiness; food producers may be middle-income home gardeners, low-, middle-, and high-income entrepreneurs, and may organize themselves into farmers' associations and cooperatives. An empirical classification for Kampala also ranges from food-security to market-oriented households (Maxwell, 1993b). Another typology based on the nature of production clearly indicates that some types of food production require more inputs than others (Sawio, 1993).

For instance, according to the Sokoine University's survey of 1 800 farmers in six Tanzanian cities, 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 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) 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: 221, 228).

UA can take on the form of a large enterprise: in Bangkok, a single large firm contracts to about 10 000 producers of chickens and runs hatcheries and dressing plants; it controls major shares of the national and export 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 within Santiago, Chile (DGIP/UNDP 1992: 23).

4.10 Urban Agriculture is Not for the Neophyte

Because of the resources needed to engage in urban agriculture, even for small scale producers, UA is not primarily the accidental or temporary business of recent migrants from rural areas (Drakakis-Smith, 1992: 5). Back in 1958, in the small town of Pointe Noire, Vennetier (1961: 72) had found that the largest fields were in hands of people who had been living for 5–20 years in that city. More than 60% of Lusaka's urban farmers had resided there for more than 5 years before starting their plot gardens; nearly 45% had not farmed for the first 10 years of residence (Sanyal, 1986: 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 (Freeman, 1991:137). Tricaud's (1988: 8) survey of 100 gardeners in Freetown and Ibadan, Sawio's study (1993) in Dar es Salaam and others show similar findings. Most urban farmers have part or full-time jobs. Even in small Pointe Noire, only 17 out of 266 interviewed farming heads of household could be described as jobless; the rest were nonskilled manual workers, construction workers, and mechanics (Vennetier, 1961: 72). In Addis Ababa, most urban crop producers in Egziabher's sample initially worked in the informal sector. They then became agricultural leaseholders and workers prior to squatting on public land and setting up this cooperative (Egziabher, 1994: 92).

5.0 CONCLUSION

Urban farming as a basic urban function is nothing new; in fact this activity seems to be as ancient as cities themselves. At the dawn of the 21st century, Asia is leading the "South's way" in this sector, with highly organised and competitive systems for the production and marketing of urban agriculture. Since the late 1970s, the literature has been unveiling the growing incidence of UA 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 which recognise, tolerate, manage and/or promote the activity.

Paramount to justifying and encouraging this change of attitude is the mounting evidence on UA's contribution to urban food security. That urban food

supplies in developing countries can no longer be taken for granted and there is ample evidence from cities world-wide that food is turning into a basic luxury for the urban poor. These findings are collapsing the myth of urban privilege over rural neglect, at least as far as food security is concerned. Urban food production has grown into a complex and thriving industry, in terms of practising households; it supplies many nutritious food items to urban markets. There is a growing body of data on the benefits accruing to practising households, in terms of food supply, of child nutritional status and general health, and of cash savings and income. The unfolding evidence should gradually lead the development assistance organisations and local authorities to incorporate UA into more sustainable and cost-effective food security strategies.

From 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 indicate. UA is virtually ubiquitous because it is remarkably adaptive and mobile. UA is typically opportunistic because practitioners have evolved and adapted remarkable know-how to select and locate land, produce, process and market plants, trees and livestock within the urban context. What urban farmers have achieved and what they dare to pursue, despite minimal support, in the very heart of our metropolises is a resounding tribute to human ingenuity.

Perhaps some of the more startling revelations of studies are 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 recent migrants from rural areas. Above all, UA in the South generally replicates on a massive scale the efforts of increasingly urban-based people to meet their basic need for food that is affordable and in adequate quantity. Without this food, there can be no sustainable city, economy, or government.

REFERENCES

Adams, R. M. (1994) "The Origin of Cities." Scientific American (special issue): 12-19.

Addyman, P. V. (1994) "Eburacum, Jorvik, York." Scientific American (special issue): 108-118.

Anton, D. (1993) Thirsty Cities: Urban Environments and Water Supply in Latin America. International Development Research Centre, Ottawa, Canada.

Archibald, C. (1993) "City of Toronto Support for Urban Food Production: Creating a Garden City". Proposal from the City of Toronto Interdepartmental Technical Working Group on Urban Food Production, revised 9NOV93. City Hall, Toronto, Canada.

Bagachwa, M.S.D. (1990) "The nature and magnitude of the second economy in Tanzania." Tanzania Economic Trends 2/4: 25-33.

Baker, J. and P.O. Pedersen, eds. (1992) The Rural-Urban Interface in Africa: Expansion and Adaptation. Scandinavian Institute of African Studies, Uppsala, Sweden. Seminar Proceedings No. 27.

Binns, T. (1994) Tropical Africa. Routledge, London, UK.

Brena Valle, G. (1993) La Gran Ciudad: Un retrato aéreo de la Ciudad de Mexico y sus alrededores, Revimundo, Mexico City, Mexico.

Butland, C.A. (1976) People of the Sun: the Civilizations of Pre-Columbian America. Praeger Publishers Inc., New York, USA.

Canaval, B. (1992) La ciudad y sus chinampas. Universidad Autonoma Metropolitana - Unidad Xochimilco, Mexico City, Mexico.

Carr, S. and A. Lane (1993) Practical Conservation: Urban Habitats. The Open University, London, UK.

Cereceda, L.E. and M. Cifuentes (1992) "La subsistencia de los grupos pobres en Chile." In Trabajo informal y pobreza urbana en América Latina, pp. 241-305. Edited by F. Bélisle. International Development Research Centre, Ottawa, Canada.

Charbonneau, R. (1988) "Le cobaye de la fiesta." Le CRDI Explore, 1988 (July): 7-8.

Coe, M., D. Snow and E. Benson (1986) An Atlas of Ancient America. Equinox, Oxford, UK.

Cosgrove, Sean (1994a) "Une Histoire des Deux Villes: Comparing Canadian Community Gardening programs in Montreal and Toronto." Paper presented to Joint ACGA/AHTA Conference, Chicago, 24 August 1994, 6 p. (Mimeo.)

Cosgrove, Sean (1994b) "Une histoire des Deux Villes: Comparing Canadian Community Gardening programs in Montreal and Toronto." For IDRC Panel on Cities Feeding People, Habitat 94 (IFHP-CIP), Edmonton, 20 September 1994, 12 p. (Mimeo.)

Courtlandt, C. with A. Kocybala (1990) A Guide to the Archaeological Sites of Israel, Egypt and North Africa. Facts on File, New York, USA.

Coy, Martin (1994) "Cuiaba (Mato Grosso): Crescimento urbano, limites e potencialidades para um desenvolvimento sustentavel na cidade periférica." Paper presented to Symposium "What future for the Amazon Region?", 48th International Congress of Americanists, Stockholm/Uppsala, 4-9 July 1994.

Della, A.A. (1991) "Dynamique de l'espace péri-urbain de Daloa: étude géographique." Institut de géographie tropicale, Faculté des lettres, arts et sciences humaines, Université nationale de Côte d'Ivoire, Abidjan, Ivory Coast. Doctoral thesis. (Mimeo.)

DGIP/UNDP (Division of Global and Interregional Programmes, United Nations Development Programme) (1992) "Urban agriculture in Latin America, Africa and Asia." DGIP/UNDP, New York, USA. (Mimeo.)

DGIP/UNDP (1993) "Urban Agriculture: Neglected Resource for Food, Jobs and Sustainable Cities." Draft manuscript. DGIP/UNDP, New York, USA. (Mimeo.)

Diallo, S. (1993) "L'agriculture urbaine en Afrique de l'Ouest: revue et perspectives de la recherche." In Urban Environment Management: Developing a Global Research Agenda, vol. 1, pp. 127-135. Edited by Luc J.A. Mougeot and Denis Massé. International Development Research Centre, Ottawa, Canada.

Diallo, S. and Y. Coulibaly (1988) Les déchets urbains en lieu démuni à Bamako. Food-Energy Nexus Programme, United Nations University, Tokyo, Japan.

Drakakis-Smith, D. (1990) "Food for thought or thought about food: urban food distribution systems in the Third World." In Cities and Development in the Third World, pp. 100-120. Edited by R.B. Potter and A.T. Salam. Mansell, London, UK.

Drakakis-Smith, D. (1992) "Food production and under-nutrition in Third World cities." Hunger Notes 18/2: 5-6.

Drescher, A. W. (1994) "Urban Agriculture in the Seasonal Tropics of Central Southern Africa - A Case Study of Lusaka - Zambia."

DSM/ARDHI (Dar es Salaam City Council/Centre for Housing Studies) (1992) Environmental Profile of the Metropolitan Area. DSM, Dar es Salaam, Tanzania. (Mimeo.)

Egziabher, Axumite G. (1994) "Urban Farming, Cooperatives, and the Urban Poor in Addis Ababa." In Cities Feeding People: an Examination of Urban Agriculture in East Africa, pp. 85-104. Pyar Ali Memon et al. IDRC Books, Ottawa.

ENDA-ZB (1994a) "Urban Agriculture in Harare." Draft final technical report on IDRC Project 93-0024. Environment & Development Activities, ENDA-Zimbabwe, Harare, Zimbabwe.

ENDA-ZB (1994b) "Proceedings of Workshop on Urban Agriculture Experiences in Harare: Presentation of Preliminary Results and Way Forward." Environment Resource Management Division, ENDA-Zimbabwe, Harare, Zimbabwe. (Mimeo.)

Ethelson, S. (1992) "Food costs in cities." Hunger Notes 18/2: 16-17.

Finquelievich, S. (1986) Food and Energy in Latin America: Provisioning the Urban Poor. Food-Energy Nexus Programme, United Nations University, Tokyo, Japan.

Freeman, Donald B. (1991) A City of Farmers: Informal Urban Agriculture in the Open Spaces of Nairobi, Kenya. McGill-Queen's University Press, Montreal and Kingston, Canada.

Fundacion Natura (1993) "Project for the management of solid waste in Ecuador. Executive summary, volumes ii to iv - final technical report to IDRC Project 90-0048." Fundacion Natura, Quito.

Ganapathy, R.S. (1983) "Development of urban agriculture in India: public policy options." Paper presented at the Urban Agriculture Seminar, Singapore, July 1983. International Development Research Centre, Ottawa, Canada.

Greenhow, T. (1994) "Urban Agriculture: Can Planners Make a Difference?" For IDRC Panel on Cities Feeding People, Habitat 94 (IFHP-CIP), Edmonton, 20 September 1994.

Grey-Johnson, C. (1992) "The African Informal Sector at the Crossroads: Emerging Policy Options." Africa Development XVII/1: 65-91.

Haas, A. (1993) Gardens of Mexico. Rizzoli, New York, USA.

Hammond, Norman (1994) "The Emergence of Maya Civilization." Scientific American (special issue): 128-137.

Honghai, D. (1992) "Urban Agriculture as Urban Food Supply and Environmental Protection SubSystems in China." Paper presented to International Workshop "Planning for Sustainable Urban Development: Cities and Natural Resource Systems in Developing Countries" (University of Wales, University of Birmingham, University College London, International Institute for Environment and Development), Cardiff, 13-17 July 1992. (Mimeo.)

House, W., G. Ikiara and D. McCormick (1993) "Urban Self-Employment in Kenya: Panacea or Viable Strategy?" World Development 21/7: 1205-1223.

ICMSD (International Colloquium of Mayors on Social Development) (1994). "Mayor's Declaration on Social Development and Sustainable Human Settlements", New York, August 1994. (Mimeo.)

Jellicoe, G. (1989) The Landscape of Civilisation. Garden Art Press, Northiam, UK.

Khouri-Dagher, N. (1987) Food and Energy in Cairo: Provisioning the Poor. Food-Energy Nexus Programme, United Nations University, Tokyo, Japan.

Lado, C. (1990) "Informal Urban Agriculture in Nairobi Kenya" Land Use Policy 7/3: 257-266.

Lee-Smith, D. and P.A. Memon (1994) "Urban Agriculture in Kenya." In Cities Feeding People: an Examination of Urban Agriculture in East Africa, pp. 67-84. P. A. Memon et al. International Development Research Centre, Ottawa.

Lee-Smith, D. and D. Lamba (1991) "The Potential of Urban Farming in Africa." Ecodecision (December): 37-40.

Lee-Smith, D., M. Manundu, D. Lamba, P. Kuria Gathuru (1987) "Urban Food Production and the Cooking Fuel Situation in Urban Kenya - National Report: Results of a 1985 National Survey." Mazingira Institute, Nairobi, Kenya.

Leon, R., C. de la Vega, A. Franqueville and M. Aguirre (1992) El consumo alimentario en Bolivia. Centro de Estudios de la Realidad Economica y Social, Cochabamba, Bolivia.

MacGaffey, Janet (1991) The Real Economy of Zaire: The Contribution of Smuggling & Other Unofficial Activities to National Wealth. James Currey, London, UK.

Marshall, Peter (1992) Nature's Web: An Exploration of Ecological Thinking. Simon & Schuster, London, UK.

Maxwell, D.G. (1994) "The Household Logic of Urban Farming in Kampala." In Cities Feeding People: an Examination of Urban Agriculture in East Africa, pp. 47-66. Pyar Ali Memon et al. International Development Research Centre, Ottawa, Canada.

Maxwell, D.G. (1993a) "The impact of urban farming in Kampala on household food security and nutritional status." Paper presented to First Crop Science Conference on Eastern and Southern Africa, Symposium on Women and Agriculture, Kampala, Uganda, 14-18 June 1993. (Mimeo.)

Maxwell, D.G. (1993b) "Land access and household logic: urban farming." Makerere Institute of Social Research, Kampala, Uganda. (Mimeo.)

Maxwell, D.G.and S. Zziwa (1992) Urban Agriculture in Africa: the Case of Kampala, Uganda. African Centre for Technology Studies. Nairobi, Kenya.

Mbiba, Beacon (1994) "Institutional responses to uncontrolled urban cultivation in Harare: prohibitive or accommodative?" Environment and Urbanization 6/1 (April): 188-202.

McCann, A.M. (1994) "The Roman Port of Cosa." Scientific American (special issue): 92-99.

Ming, S. and G. Profous (1993) "Urban forestry in Beijing." Unasylva 44/173: 13-18.

Mitlin, Diana and David Satterthwaite (1994) "Cities and sustainable development." Background paper prepared for Global Forum '94, Manchester, June 1994. Human Settlements Programme, International Institute for Environment and Development, London, UK (Mimeo.)

Millon René (1994) "Teotihuacan." Scientific American (special issue): 138-148.

Mlozi, Malongo, R.S. (199?) "Inequitable Agricultural Extension Services in the Urban Context: The Case of Tanzania." In Education in Urban Areas: Cross-National Dimensions, pp. 105-128. Edited by N.P. Stromquist. Praeger, Westport, USA and London, UK.

Mosha, A.C. (1991) "Urban farming practices in Tanzania." Review of Rural and Urban Planning in South and East Africa 1: 83-92.

Mutiso, R. (1993) "Food security, nutrition and health: Kenya case study - the Nairobi nutrition project." United Nations Children's Fund, Nairobi, Kenya. (Mimeo.)

Mvena, Z.S.K. (1986) "Urban agriculture in Tanzania: research proposal." International Development Research Centre, Ottawa, Canada.

NEIC (National Environmental Information Centre) (1994) "District Environment Profile: Kampala." Draft. NEIC, Kampala, Uganda.

Nsibambi, Apolo (1988) "Solving Uganda's food problem." In Uganda Now: Between Decay & Development, pp. 135-157. Edited by H. Bernt Hansen and M. Twaddl. James Currey, London, UK.

Pain, M. (1985) "Kinshasa: symbole d'une Afrique urbaine." Cahiers d'Outre-Mer 38/149: 25-51.

Panjwani, N. (1985) Citizen organisations and food energy alternatives in Indian cities. Food-Energy Nexus Programme, United Nations University, Tokyo, Japan.

PCC (Population Crisis Committee) (1990) "Cities: life in the world's 100 largest metropolitan areas." PCC, Washington, DC, USA.

Prudencio, J. (1994) "Institutional Assessment for Research Initiative on Urban Agriculture (Latin America & Caribbean)". Draft consultancy reports. La Paz, Bolivia. (Mimeo.)

Rakodi, C. (1988) "Urban agriculture: research questions and Zambian evidence." Journal of Modern African Studies 26/3: 495-515.

Ratta, A. and J. Smit (1993) "Urban Agriculture: It's About Much More than Food." WHY Magazine (Summer): 26-28.

Redclift, M. (1987) Sustainable Development: Exploring the Contradictions. Routledge, London, UK, and New York, USA.

Reynolds, L., D. Myhre, P. McMichael, V. Carro-Figueroa, F. Buttel (1993) "The New Internationalization of Agriculture: A Reformulation." World Development 21/7: 1101-1121.

Reynolds, S. (1984) Kingdoms and Communities in Western Europe 900-1300. Clarendon Press, Oxford, UK.

Rodenbeck, M. (1991) Egypt from the Air. Thames and Hudson, Editions Didier Millet.
Time-Life Books, eds. (19??) Sumer: Cities of Eden. Time-Life Books, Alexandria, Virginia, USA.

Rogerson, C.M. (1993) "Urban agriculture in South Africa: Policy issues from the international experience." Development Southern Africa 10/1 (February):33-44.

Sanyal, B. (1986) Urban Cultivation in East Africa: People's Response to Urban Poverty. Food-Energy Nexus Programme, United Nations University, Tokyo, Japan.

Sanyal, B. (1985) "Urban agriculture: who cultivates and why?" Food and Nutrition Bulletin 7/3: 15-24.

Sanyal, B. (1984) "Urban agriculture: a strategy of survival in Zambia." University of California at Los Angeles, CA, USA. PhD dissertation.

Sawio, C.J. (1993) "Feeding the urban masses? Towards an understanding of the dynamics of urban agriculture and land use change in Dar es Salaam, Tanzania." Graduate School of Geography, Clark University, Worcester, MA, USA. PhD thesis.

Siau G., Gustavo and Andrés Yurjevic (1993) "La Agricultura Urbana, una alternativa productiva para combatir la pobreza en sectores marginales." Agroecologia y Desarrollo 5/6 (December): 42-51.

Smit, J. and J. Nasr (1992) "Urban agriculture for sustainable cities: using wastes and idle land and water bodies as resources." Environment and Urbanization 4/2: 141-152.

Smit, J. and Ratta, A. (1992) "Urban agriculture: a tool to reduce urban hunger and poverty." Hunger Notes 18/2: 7-12.

Sukharomana, S. (1988) Access to food and energy in Thailand. Food-Energy Nexus Programme, United Nations University, Tokyo, Japan.

Tricaud, P.M. (1988) Urban Agriculture in Ibadan and Freetown. Food-Energy Nexus Programme. United Nations University, Tokyo, Japan.

Tripp, A.M. (1989) "Informal economy, labor and the state in Tanzania." Paper presented to Midwest Political Science Association (MPSA) Annual Meeting, Chicago, IL, 13-15 April 1989. (Mimeo.)

Vennetier, P. (1988) "Urbanisation, production agricole et autosuffisance alimentaire: réflexions sur le cas africain." Cahiers d'Outre-Mer 41/163: 209-226.

Vennetier, P. (1961) "La vie agricole urbaine à Pointe Noire." Cahiers d'Outre-Mer, 14/53: 60-84.

von Braun, J., J. McComb, B.K. Fred-Mensah, R. Pandya-Lorch (1993) Urban Food Insecurity and Malnutrition in Developing Countries. International Food Policy Research Institute. Washington, DC, USA.

Wade, I. (1987) Food Self-Reliance in Third World Cities. Food-Energy Nexus Programme. United Nations University, Tokyo, Japan.

Wagenaar, M. (1992) "From hidden hand to public intervention. Land use and zoning strategies in the liberal and post-liberal city (1875-1914)." In Economic Policy in Europe since the late Middle Ages; The Visible Hand and the Fortune of Cities, pp. 165-176. Edited by H. Diederiks, P. Hohenberg and M. Wagenaar. Leicester University Press, Leicester.

Warren, P.M. (1994) "Minoan Palaces." Scientific American (special issue): 46-57.

Watts, D.J. and C.M. Watts (1994) "A Roman Apartment Complex." Scientific American (special issue): 86-91.

Yanin, V.L. (1994) "The Archaeology of Novgorod." Scientific American (special issue): 120-127.

Yeung, Y. M. (1985) Urban Agriculture in Asia. Food-Energy Nexus Programme, United Nations University, Tokyo, Japan.

The original version of the preceding paper was presented at:

Habitat 94: New Frontiers in Housing & Planning
Canadian Institute of Planners & International Federation for Housing & Planning

Cities Feeding People: Urban Agriculture and City Planning
in the North & the South
Session D1, Edmonton Convention Centre
September 20, 1994, 15:30 - 17:00
Edmonton, Alberta, Canada

This panel discussed and compared the recent evolution of food production within and on the edge of cities in the North and the South, its current significance (land use, practitioners, consumers, share of urban food supply, market value). It presented recent changes in official recognition, regulation and promotion of urban agriculture. The panel addressed important challenges for urban agriculture which the city planning community can assist in overcoming to render our cities more sustainable. The session included a 10-minute introduction, four 15-minute presentations, and a 20-minute question and answer period.

"Urban Food Production: A Survey of Evolution, Official Support and Significance (with special reference to Africa)"*
Chairperson: Luc J.A. Mougeot, Senior Program Officer, International Development Research Centre (IDRC), Ottawa, Ontario, Canada (fax: 613-567-7749).

"Promoting Urban Agriculture: A Strategy Framework for Planners in North America, Europe and Asia"*
Speaker: Paul Sommers, Tropical Horticulture Consultant, and Jac Smit, President, The Urban Agriculture Network, Washington, D.C. USA (fax: 202-986-6732).

"Urban Agriculture and The Sustainable Dar-es-Salaam Project, Tanzania"*
Speaker: Camillus Sawio, UNCHS-IDRC Research Project Coordinator, Department of Geography, University of Dar-es-Salaam, Tanzania (fax: 255-51-43038/46718).

"Une Histoire des Deux Villes: Comparing Canadian Community Gardening Programs in Montreal and Toronto"*
Speaker: Sean Cosgrove, Design Consultant, Toronto Food Policy Council, and Board Member of American Community Gardening Association, Toronto, Canada (fax: 416-393-1357).

"Urban Agriculture: Can Planners Make a Difference?"*
Speaker: Timothy Greenhow, Urban/Regional Planner, SWEDEPLAN - International Divisional of Sweden's National Board of Housing, Building and Planning, Stockholm, Sweden (fax: 46-8-644-4689).

* Opinions expressed in the papers do not necessarily represent the views of the institutions to which their authors are affiliated.