

## URBAN AGRICULTURE AND FOOD SECURITY, NUTRITION AND HEALTH

*Margaret Armar-Klimesu*

### 1. Food security: concepts and definitions

The concept of food security has been on the international agenda as far back as 1948, when the Universal Declaration of Human Rights affirmed that “Everyone has the right to a standard of living adequate for the health and well-being of himself and his family, including food....” Article 11 of the International Covenant on Economic, Social and Cultural Rights went further, in 1966, when it affirmed the “right of everyone to be free from hunger”. This right to food is even characterised as a “fundamental right” and is acknowledged as the primary economic right of a human being. This global concern heightened after the 1974 World Food Conference, when diminishing world food supplies and large-scale food shortages triggered responses in the international community that focused on increasing domestic agricultural production and creating international grain reserves. Food security was identified with commercial food prices and physical food availability, rather than with demand and consumption, especially by the poor and vulnerable.

With the realisation that the problem of hunger has more to do with inequalities in distribution and that increased food production was only part of the solution, the concept of food security has shifted from simply being a question of availability of food (at the national or even local level) to the more complex issue of access (at the household or individual level). The current definition, which incorporates issues of adequacy of food, supplies, stability of supplies and secure access to available supplies thus evolved. In 1986 the World Bank further added the dimension of activity level and defined food security as “secure access at all times to sufficient food for a healthy and active life” (World Bank 1986).

At the household and individual level, the concept of adequate food is considered in both quantitative terms (i.e., caloric sufficiency) and, even more so, in qualitative terms (i.e., variety, safety and cultural acceptability). Similarly, household food security depends not only on the availability of an adequate and sustainable supply of food but also on the means employed by households to acquire the needed food.

Stability of household food supplies depends on the ability of a household, even when faced with unpredictable crises, to procure through income, production and/or transfers of adequate food supplies on a continuing basis. The UN ACC/SCN in 1991 came up with a rather more comprehensive technical definition which states: “A household is food secure when it has access to the food needed for a healthy life for all its members (adequate in terms of quality, quantity, safety, and cultural acceptability), and when it is not at undue risk of losing such access” (UN ACC/SCN 1991, 10).<sup>1</sup>

### **1.1 Urbanisation and food security**

Urbanisation is an inevitable consequence of socio-economic development, but in many countries it is proceeding at such a fast rate that it is outpacing the growth of services and employment. In most developing countries, especially those in sub-Saharan Africa, urban poverty has been on the increase with increasing urbanisation for the following reasons:

- rapid population growth;
- economic recession; and
- structural adjustment policies that have reduced government spending and decreased employment opportunities.

Urbanisation also influences all aspects of food production and consumption. Specific aspects of food security applicable to the urban context include (i) the necessity to purchase most of the food needed by the household; and (ii) greater dependence on the market system and on commercially processed food. Wage employment and monetary income are therefore the main prerequisites for achieving food security. However, the majority of urban dwellers, especially those in developing countries, are highly disadvantaged with limited purchasing power, as most are engaged in very low-paying employment in the informal sector.

It is claimed that the world’s resources are adequate to produce enough food for its population for at least the next few decades and that, although food supplies are projected to increase faster than population growth in higher-income developing countries, many lower-income countries with the highest levels of poverty will remain vulnerable to food insecurity. More importantly, the majority of the people who cannot

---

1 United Nations Administrative Co-ordinating Committee/Sub-Committee on Nutrition

meet their nutritional needs will be living in urban areas.

## **1.2 Urban food systems and urban food security**

In terms of access to food, the most significant difference between urban and rural areas is that people in rural areas can often produce their own food, while people in urban areas are more dependent on food purchases. For the urban poor, it is the dominance of the cash economy over access to such a basic need as food that links urban food systems to poverty and vulnerability to food insecurity. With regard to urban food systems, the following are the main factors that determine the urban dwellers' access to food:

- macroeconomic policies;
- employment and cash income;
- markets and food prices;
- urban agriculture.

### ***1.2.i Macroeconomic policies***

Macroeconomic policies can significantly influence urban dwellers' access to food both directly and indirectly. These include the increasing lack of employment opportunities, rural-urban migration, urban expansion, rising land prices and the resultant lack of available land for local production and, most importantly, the price of urban food.

For many years, urban dwellers have benefited from “cheap food” policies, including widespread subsidies, overvalued exchange rates and trade restrictions that have kept the price of urban food low. It became necessary during the 1980s for many developing countries to adopt structural adjustment policies that were intended to revitalise economic growth and employment, which are the crucial ingredients for food security of the urban poor. In the short term, however, these measures – which called for a reversal of many of the urban-biased policies – only aggravated the food-security problems of the urban poor (Demery & Squire 1996, Sahn et al. 1996).

During the period of economic decline and the subsequent reforms instituted in the 1980s and 1990s in most of sub-Saharan Africa, a wide range of case studies showed that urban food prices rose more than the general cost of living and more than incomes (von Braun et al. 1993). In Kampala, for example, 60% of the minimum wage was sufficient to provide food for a household of four in 1972, but by 1988 the

entire monthly minimum wage purchased enough food to last the same household only about four or five days (Jamal & Weeks 1993). These changes have increased the vulnerability of the urban poor in terms of food security.

### ***1.2.ii Employment and cash income***

Most of the food consumed in cities must be purchased, and poor families can spend as much as 60-80% of their income on food (Tabatabai 1993, Maxwell et al. 1999). The ability to earn a cash income is a significant determinant of urban food security, and perhaps the biggest challenge urban dwellers face is that the majority of them work in sectors where wages are low, working conditions precarious and job tenure insecure. In urban sub-Saharan Africa, employment in sectors that pay regular wages accounts for less than 10% of total employment (Rondinelli & Kasard 1993).

### ***1.2.iii Markets and food prices***

With the urban dweller's dependence on purchases in the market for food, food prices are another important determinant of the urban household's access to food. Food prices depend on a number of factors, the most important being the efficiency of the food marketing and distribution system. Urban food distribution systems are highly diverse but not especially well integrated, leading to higher prices. As the demand for food rises in urban areas, food supply and distribution systems (FSDSs) have to supply the inhabitants of cities with increasing amounts of food often coming from distant production centres. From harvesting until the moment the produce reaches the urban consumer's table, a whole series of interventions (handling, processing, packaging, transport, storing, marketing, etc.) adds to the price at each stage, and to the amount it costs consumers to feed themselves. Food losses between the production and retail stages are estimated to range from 10 to 30% and are caused by a combination of on-farm, transport, distribution and spoilage problems which are greater in urban than rural areas. All these factors will increase the pressure on existing FSDSs and raise supply and distribution costs, in which transport often plays a major role. Surveys of prices in five developing countries showed that city dwellers paid 10-30% more for food than rural dwellers (Newland 1980). This figure is likely to have increased in recent decades.

Expansion of cities, and the tendency of urban planners to follow the complex highly capitalised and energy-consuming supermarket model of food distribution, affect almost all aspects of food retailing in cities. These supermarkets are placed in the more central locations, out of the periphery. This has not only had serious

consequences in terms of infrastructure, transport and storage requirements; it has also resulted in many poor urban neighbourhoods becoming food-retailing deserts, where access to good food shops and markets is rare (Garnett 2000). In the context of the problems posed by urbanisation and structural adjustment, this capitalisation of the conventional food supply system in Third World cities has posed huge problems for the poor. The rising costs of food retailed through these outlets have forced the urban poor to fall back on the informal, petty-commodity or non-conventional sector, which includes the retailing of both fresh and processed produce as well as ready-prepared or street food.

#### ***1.2.iv Urban agriculture***

Over the past couple of decades, urban agriculture has increasingly gained recognition as a viable intervention strategy for the urban poor to earn extra income. It also allows the poor to reduce their reliance on cash income for food by growing their own food on plots inside or outside the city, thus increasing their access to much needed food.

It must, however, be noted that urban agricultural activities, while being an important strategy for self-provisioning, especially for poor households, have not always been a response to household economic crises. The more highly developed commercial urban farming is a major component of the urban food system, supplying urban residents with the more perishable fresh vegetables and animal products and by-products such as poultry, eggs and milk, and providing the diversity needed to ensure dietary quality – an important aspect of food security.

## **2. Urban agriculture and food and nutrition security**

### **2.1 Urban agriculture and food security**

The scale of urban food production is generally underestimated. According to the most widely accepted estimate, about 200 million urban dwellers now participate in urban farming, providing 800 million people with at least some of their food (Nelson 1996). Conservative estimates suggest that, in 1993, between 15 and 20% of the world's food was produced in urban areas. Although numbers are difficult to come by, it is further estimated that as much as 40% of the population in African cities and up to 50% in Latin America are involved in urban agriculture (Mougeot 1994). Urban

agricultural output ranges from staple crops like maize, cassava, plantain and vegetables, including local varieties of tomatoes, peppers, leafy vegetables and the more exotic lettuce, cucumbers, cauliflowers and carrots, to livestock such as cattle, goats, poultry and small ruminants.

Urban agriculture contributes, in no small measure, to the food security of many major cities, both as an important component of the urban food system and as a means for vulnerable groups to minimise their food-insecurity problems. City case studies indicate a considerable degree of self-sufficiency in fresh vegetable and poultry production as well as other animal byproducts. Using a productivity level of 10.7 t/ha, London is estimated to produce around 232,000 t of fruit and vegetables (Garnett 2000). Sofia's daily sales of produce at its open markets are estimated at about 1000 t (Yoveva et al. 2000). Dakar produces 60% of its vegetable consumption, whilst poultry production amounts to 65-70% of the national demand (Mbaye & Moustier 2000). In Accra, 90% of the city's fresh vegetable consumption is from production within the city (CENCOSAD 1994). In Dar es Salaam, more than 90% of leafy vegetables coming to the markets have their origin in the open spaces and home gardens (Stevenson et al. 1996).

In terms of meeting household food needs, urban agriculture in Harare is estimated to provide families engaged in the activity with staple food for up to four months in a year (Mbiba 1993). Figures for Accra range from between one and eight months (Zakariah et al. 1998). Kampala residents living within a 5 km radius of the city centre produced about 20% of the staple foods consumed within that same area (Maxwell 1994).

Studies that have undertaken actual measurements of the impact of urban agriculture on food security generally support the hypothesis that urban agriculture does improve the food security of vulnerable households. Mwangi (1995) compares farming and non-farming households in low-income neighbourhoods in Nairobi and notes that, while mean consumption is well below estimated requirements in all cases, farming households are better off in terms of both energy and protein consumption, and that farmers participating in an organised urban agriculture support program are significantly better off in both categories. The farming households produce 20-25% of their food requirements and are significantly less dependent on gifts and transfers. Sawio (1993) reports that nearly 50% of 260 Dar es Salaam residents indicated that urban agriculture provided 20-30% or more of their household's food supply. In

Kampala, 55% of 150 producers obtained 40% or more and 32% obtained 60% or more of their household food needs from their own urban garden (Maxwell & Zziwa 1992). In Harare, a disaggregated profile of self-produced food consumption and its variation by income indicated that 60% of food consumed by a quarter of the low-income group was self-produced (Bowyer-Bower & Drakakis-Smith 1996).

Clearly, urban agriculture makes a vital contribution to the food self-reliance of many major cities. As reiterated by Mougeot (1994), food self-reliance is not self-sufficiency, but it can go a long way towards reducing the food insecurity of vulnerable groups. Urban agriculture cannot be expected to satisfy the urban demand for staple crops like cereals and tubers, which can easily be stored and transported with limited losses from rural areas. What must be recognised and appreciated is that urban agriculture, with limited support, already supplies a significant share of food, especially the more easily perishable vegetables and poultry products, to many cities.

Fresh vegetables, for instance, make up an important component of diversified diets, improving dietary quality. They can also be one of the most expensive items in the urban consumers' food basket, given the costs incurred in their marketing, in terms of transportation from producing areas and the sheer quantities that perish during transportation. The marketing channel is an important factor in the cost of food, and the location and extent of local food production may shorten the path of distribution from producer to consumer. Cost-benefit analyses of market vegetable crops in Lomé and Bissau have shown that net incomes are higher where there are fewer middlemen (Schilter 1991, cited in Mougeot 1998). Vegetable wholesalers in a major distribution market in Accra, when interviewed, stated categorically that they preferred buying their produce from local producers (personal observation).

Food growing in cities can and does help improve the quality of people's diets by providing fresh fruits and vegetables, particularly to people in the low-income bracket. The Cagayan de Oro study (Potutan et al. 2000) shows that urban farmers generally eat more vegetables than non-urban farmers of the same wealth class and also more than consumers from a higher wealth-class (who consume more meat). Urban dwellers in most cities in the developing countries have a high dependency on ready-prepared meals, popularly referred to as "street food". Vending of street food has become an important component of the urban food supply system. Local food production can be an important source of supply of fresh vegetables for street food preparation. Contrary to the traditional food consumption pattern of the Ghanaian, which frowns on the

consumption of raw vegetables, fresh salad preparations have increasingly become an integral component of rice-based street food sold in Accra (personal observation). This is a clear departure from the popularly held view that fresh vegetable consumption is the reserve of expatriates and the rich (CENCOSAD 1994).

Being mindful of the fact that food security encompasses quality and not only quantity, local food production is an important component of food security and must be seen as complementary rather than competitive to other urban food supply systems.

## **2.2 Effect of urban agriculture on the nutritional status of vulnerable groups**

Whilst it can easily be inferred that better access to food and greater dietary diversity will improve the nutritional status of vulnerable groups, very few studies in African cities have attempted to rigorously test the link between urban agriculture and nutrition by comparing the nutritional status (assessed by the height-for-age, weight-for-age and weight-for-height indicators) of children aged under five, from farming and non-farming households.

Ogden (1993) reported various indicators of pre-schooler nutritional status in her study of urban food security in Kigali, and noted that urban agriculture was positively associated with nutritional status in some income groups, and under some conditions of maternal employment. In Nairobi, Mwangi (1995) reported few differences in mean nutritional status (expressed as a percentage of the expected mean). Children from non-farming households were somewhat more likely to be moderately malnourished.

Maxwell, Levin and Csete (1998) report the linkages of urban agriculture and malnutrition in Kampala. When controlling for socio-economic status and other individual and household characteristics, they found that urban agriculture is positively and significantly associated with higher nutritional status in children, particularly in terms of height-for-age, and that there is a significantly lower proportion of moderately to severely malnourished children in households where someone (almost always the mother or primary care-giver) is farming. They suggest that the impact on nutritional status is a result of both higher and more stable access to food on account of virtually year-round availability of staple foods from urban production, and the ability of mothers who farm to provide more direct childcare than women engaged in other economic activities.



With the exception of the Kampala study, these studies generally do not provide conclusive evidence of a positive impact of urban agriculture on nutritional status of children. Several reasons could account for this. Most of the studies based their conclusions on differences in height-for-age (indicator for stunting), which is a measure of long-term chronic undernutrition and a reflection of poverty. More importantly, food intake is only one determinant of nutritional status of children - others being the quality of care provided and the incidence of disease (UNICEF 1990). Without adequate knowledge of the role of these other factors, caution must be exercised in the interpretation of these results.

### **2.3 Innovative approaches to enhance local food production and improve food distribution systems**

Limited access to productive resources in terms of access to land, security of tenure, availability of water and other inputs are major constraints to local food production. Provision of technical support to farmers through extension services is necessary for the enhancement of local food production. Extension workers can play a very useful role as a link between farmers and other service providers or projects. They can act as important channels to disseminate information to farmers on training and more sustainable, bio-intensive farming methods that can enhance local food production. Such methods include hydroponics, use of organic pesticides and composting with organic waste.

Hydroponics, for instance, is gaining popularity as a solution to the problem of access to land for urban farming. Urban farmers in Mexico, Lima and central Santo Domingo are using the most unconventional of spaces, such as balconies and rooftops, for food production. “Organoponics” is a production technique applied by state-owned gardens which involves raised container beds with a high ratio of compost to soil and intensive planting of vegetable crops. This method is particularly useful for vacant lots that have been paved over with concrete or where the soil is extremely poor or hard to plough.

Composting of organic waste from harvested produce of farms, markets and urban households to enhance soil fertility is not only gaining popularity but is also being recognised and strongly advocated as a viable alternative to dealing with the problem of municipal waste disposal. The use of organic pesticides such as the neem tree (*Azadirachta indica*), as is currently being tried in Accra, is another innovative way of producing safer crops in a non-polluting way.

In terms of food distribution, Community Supported Agriculture is an innovative system of direct linkage between urban producers and consumers. The idea is that a group of consumers pays a fixed price to the producer in exchange for a weekly vegetable box or the right to harvest a certain amount of produce. Developing a relationship with the farmer, the consumers can express their production wishes and are often prepared to pay a bit more. At times, they also pay in advance (before the growing season), so that the producer does not need to borrow money to make investments. The producers are secured of their sale and the risks are shared between producers and consumers (in case the harvest is less, each consumer receives less). Good examples are given by WSAA<sup>2</sup> (1996). In Accra, the city authorities are putting measures in place for the establishment of Saturday markets purposely to enable urban vegetable farmers to sell directly to consumers.

### **3. Urban agriculture and health**

#### **3.1 Health risks related to urban agriculture**

Health issues in urban agriculture are mainly related to pollution, both chemical and biological, of food prior to harvesting and possible contamination during marketing and distribution. Human and environmental health risks of inappropriate urban agricultural practices arise from the following:

- inappropriate handling of agrochemicals by producers;
- crop selection or location without due regard to the ambient pollution in the air, soil or water;
- livestock production;
- application of unsorted or insufficiently treated solid and liquid organic wastes to vulnerable crops; and
- poor handling during marketing and distribution.

Food products are one form of human ingestion of toxic products. The WHO Surveillance Programme for Control of Food-borne Infections and Intoxications in Europe has reported a dramatic increase in food-borne diseases over the last ten years.

Indiscriminate use of agrochemicals such as fertilisers, insecticides, pesticides and

---

2 World Sustainable Agriculture Association

herbicides may significantly increase agricultural yield, but the residues from them can also have negative impacts on the environment and on human health. Along with potentially toxic levels of chemical farm inputs used in agricultural production, crops grown on polluted soils and in the vicinity of rail, roads and industrial areas can be contaminated with heavy metals (mostly lead), pesticides, sulphur and nitrate. These toxicants affect the nervous, digestive and circulatory systems, particularly threatening the health of young children. Lead is probably most dangerous for children, as it interferes with their vitamin D production and mental development. Fundamental factors determining the presence of these metals and toxicants in agricultural produce are the distance of the production area from the source of pollution and the duration of exposure to the toxicants. Also the type of crop grown determines the potential contamination. In general, leafy vegetables and crops with a longer growing period are the most sensitive. Several surveys on quality of soils and vegetable production show that large areas are polluted in Sofia, Bulgaria. More than half of 34 soil samples taken from farmland and backyards in “Novi Iskar” in Sofia had lead concentrations in excess of 1.5 times and up to 14 times the limits allowed.

Livestock production in cities can also be a potential source of health problems. Livestock is an important carrier of parasites, bacteria and viruses that are dangerous to human health. For example, cattle, sheep, goats, pigs and horses are important reservoirs for *Cryptosporidium* parasites, excreting them in their faeces. Known routes of transmission are animal-to-person, consumption of animal produce and faecal contamination of the environment, particularly by fertilisation of crops with sewage sludge or wastewater irrigation.

Foods most often involved in disease outbreaks are raw or insufficiently cooked meat, milk, poultry and eggs (salmonella).

One of the main beneficial impacts of urban agriculture is the potential to recycle urban waste products. Organic waste, such as waste from harvested agricultural produce and animal manure, is popularly used as compost. While this is certainly a favourable practice, attention must be given to health risks from the handling and application of manure from vector-carrying animals. Use of composted domestic waste also poses health risks if the trash has not been sorted properly. There is also the danger of polluting the soil if the compost is used on land for vegetable production. The use of untreated wastewater for irrigation purposes is a cause for considerable concern. In the developing world, some 90% of all sewage is discharged, along with the faecal

coliform bacteria that cause intestinal diseases, directly into rivers, lakes, streams and coastal waters (Nelson 1996).

In most cities in the developing world, these water bodies may be the only source of irrigation. In Nairobi, the majority of plots farmed are located along the Nairobi River, which is heavily contaminated with both industrial and human waste (Foeken & Mwangi 2000). Vegetables are grown along the banks of Accra's streams and drains that carry much of the wastewater in the city. These waterways are heavily polluted, with both human and industrial waste. Because alternatives are lacking, wastewater from these drains and streams is used to irrigate vegetables. Studies carried out in Accra showed a high incidence of faecal pollution and microbial contamination along the banks of streams and drains used for watering vegetables (Amuzu & Leitmann 1992). In related studies on food contamination, lettuce was found to contain the highest levels of contamination of all vegetables examined in Accra (Akpedonu 1997, Abdul-Raouf et al. 1993). This is not an altogether surprising finding, as lettuce is a low-growing crop, the edible parts of which are likely to be directly contaminated if irrigated with dirty water.

However, the fear of contaminated urban grown food, whilst legitimate, should not be exaggerated. For example, tests carried out by the Russian State Committee on Standards showing almost identical results to those of Cornell University in New York: crops grown on rooftops in urban areas contained up to ten times less contaminants than produce bought at local markets or grown on suburban plots. The potential risks from eating urban-grown food should be balanced against those of eating foods grown in rural areas. These, unless grown ecologically, are likely to have been treated with an array of chemicals. These chemicals are used not only in producing fruits and vegetables, but also in producing meat and dairy products.

### **3.2 Innovative and effective approaches to manage health risks of urban agriculture**

Potential negative health effects of urban food consumption can be minimised by adopting least-risk farming strategies. Improvement of least-risk farming with low-cost measures requires awareness and willingness on the part of the entrepreneurs as well as supportive government and sector organisations. As both conditions seem to be absent in most countries, this calls for research into the needs of the urban farmers and

entrepreneurs, the testing of technical improvements, the development of training material on environmental and health effects, and advocacy involving government, sector organisations and international organisations like the Food & Agriculture Organisation (FAO), United Nations Development Programme (UNDP) and the World Health Organisation (WHO).

Least-risk farming strategies may include:

- crop choice: For example, the metal absorption ratio in plant parts is (fruits + seeds): (leaves + roots) = 1:10, showing that fruits and seeds are ten times safer to grow and consume than leaves and roots. Celery, parsley, leek, lettuce, spinach, carrots, beets and radishes are not advisable to cultivate on heavily polluted soils, on account of their high uptake of heavy metals and nitrate. Gourds, onions, garlic and fruit trees and shrubs offer lower risks. In severely polluted areas, growing non-edible plants, flowers and products for industrial use should be considered. However, the return on such crops may be lower and the markets less well understood and trusted (Polish Ecological Club, Gliwice Circle 1993);
- use of cash crops or bio-remediation (using plants that take up toxic waste): The Henry Doubleday Research Association (United Kingdom) publishes a list of hedging species which can take up pollutants in the soil and act as barriers to airborne pollution. In Germany, good results are obtained with the use of reed species that take up a large amount of heavy metals from polluted soils and waters. The reeds are later used in construction/building;
- location of production: Lead concentrations in food items vary greatly depending on location (distance to road and railways), emission sources (air pollution through traffic can contaminate leafy vegetables) and processing methods (leaf contamination can be rather easily removed through washing or scraping of produce). Vegetables grown in industrial and mining areas or close to roads suffer from a higher atmospheric deposition of lead particles. Mengel and Kirkby (1987) mention that the lead concentration in vegetables grown next to streets is 5-20 times higher within a distance of 50 m from the roads. On the other hand, Smit et al. (1996) suggest that a distance of 7.5 m minimises this effect; and
- other possibilities involve adoption of farming techniques that prevent contact with contaminated soil altogether by growing crops in containers or raised beds with growing media or by using hydroponics, or preventing or reducing heavy metal

uptake by maintaining the pH level of the soil above 7.5 (by adding basic organic matter or lime) .

Technologies needed to effectively deal with the problems of using recycled urban organic waste and wastewater do exist and should be promoted to enable the adoption of safer agricultural practices. Such technologies include the biological treatment of wastewater for irrigation purposes. Minimising the use of pesticides and other agrochemicals will go a long way in managing the health risks associated with the use of such chemicals. An innovative approach using the neem tree to control insect and pest infestation is being tried among vegetable farmers in Accra (personal communication).

Raising animals in proximity to or in the midst of homes and workplaces can cause a variety of health problems through transmittance of epidemic diseases or contamination of water sources (animal manure). Preventive measures are related to clean animal housing, adoption of hygienic measures (feed, manure handling, cleaning and disinfection) and, when appropriate, vaccination. More importantly, regulations and monitoring are vital to ensure appropriate animal husbandry practices in urban areas.

#### **4. Implications for urban policies and programmes**

The main constraints to the development of urban agriculture have been identified, and possible interventions to address them have been proposed by de Zeeuw (1998). The constraints include:

- prohibitive urban policies and regulation;
- limited access to productive resources and insecure land tenure;
- lack of support services; and
- lack of organisation among urban farmers.

Ellis and Sumberg (1998) have reviewed the literature and categorised policy recommendations into two: those located within the framework of municipal planning, focusing on issues relating to land access and security of tenure; and those more related to sectoral agricultural policy. The latter category focuses on recognition of urban agriculture as farming systems, and especially emphasising access to farm inputs and services that could raise productivity and output.

The analysis from the city case studies provides practical experience and evidence that virtually all the enumerated constraints are not insurmountable and can be effectively tackled. As cautioned by Nugent and cited by Nelson (1996), “urban agriculture, while potentially viable and productive, may not be a panacea to solve the most severe problems of food security in cities and is at best a survival technique for the urban poor”. There is general agreement that urban and periurban food production has a role to play in contributing to the welfare of some urban dwellers. More importantly, governments in many cities and towns in developing countries are beginning to recognise that local food production may be an important component of urban food systems and food security.

Generally, the nature and success of any intervention aimed at developing urban agriculture in any city will, to a large extent, depend on the awareness and, above all, the political will of personalities holding various positions in the city administration.

## **References**

- Abdul-Raouf UM, Beucht LR & Ammar MS. 1993. Survival and growth of *E. coli* on salad vegetables. *Applied Environmental Microbiology* 59 (7): 1999-2006.
- Accra Study Team. 1998. Final report of the Accra Urban Food and Nutrition Study: report to WHO. Washington: International Food Policy Research Institute (IFPRI) (mimeo).
- Akpedonu P. 1997. Microbiology of street foods from a high density community in Accra. Legon: Noguchi Memorial Institute for Medical Research (mimeo).
- Amuzu AT & Leitmann P. 1992. Environmental profile of Accra case study. Prepared for the Urban Management and Environmental Component of the UNDP/World Bank/UNCHS Urban Management Programme.
- Armar-Klemesu M, Akpedonu P, Egbi G & Maxwell D. 1998. Food contamination in urban agriculture: vegetable production using waste water. In: Armar-Klemesu M & Maxwell D (eds), *Urban agriculture in the Greater Accra Metropolitan Area: report to IDRC*. Legon: NMIMR.
- Baker J & Pedersen PO. 1992. *The rural-urban interface in Africa: expansion and adaptation*. Uppsala: Scandinavian Institute of African Studies.
- Bowyer-Bower T & Drakakis-Smith D. 1996. *The needs of the urban poor versus environmental conservation: conflict in urban agriculture*. London: Research Report, ODA Project R5946.
- Braun J von, McComb J, Fred-Mensah B & Pandya-Lorch R. 1993. *Urban food insecurity and malnutrition in developing countries: trends, policies, and research implications*. Washington DC: IFPRI.
- Bryceson DF. 1996. Deagrarianisation and rural employment in sub-Saharan Africa: a sectoral perspective. *World Development* 24 (1): 97-111.



- CENCOSAD. 1994. Urban market gardens in Accra. Accra: Center for Community Studies, Action and Development, and Mega Cities Project.
- Demery L & Squire L. 1996. World Bank Research Observer (February).
- Egziabher A, Memon PA, Mougeot L, Lee-Smith D, Maxwell D & Sawio C. 1994. Cities feeding people: an examination of urban agriculture in East Africa. Ottawa: IDRC.
- Foeken D & Mwangi A. 2000. Increasing food security through urban farming in Nairobi.
- Garnett T. 1999. Urban agriculture in London: rethinking our food economy.
- Jamal V & Weeks J. 1993. Africa misunderstood. London: Macmillan.
- Jacobi P, Amend J & Kiango S. 1999. Urban Vegetable Promotion Project. Dar es Salaam: Ministry of Agriculture and Co-operatives / GTZ.
- Lee-Smith D, Manundu M, Lamba D & Gathuru K. 1987. Urban food production and the cooking fuel situation in urban Kenya. Nairobi: Mazingira Institute.
- Maxwell D & Zziwa S. 1993. Urban agriculture in Kampala: indigenous adaptive response to the economic crisis. *Ecology of Food and Nutrition* 29: 91-109.
- Maxwell D. 1995. Alternative food security strategy: a household analysis of urban agriculture in Kampala. *World Development* 23 (10): 1669-1681.
- Maxwell D, Armar-Klemesu M & Levin C. 1998a. The impact of urban agriculture on food security and nutrition. In: Armar-Klemesu M and Maxwell D (eds), *Urban agriculture in the Greater Accra Metropolitan Area: report to IDRC*. Legon: NMIMR.
- Maxwell D, Levin C & Csete J. 1998b. Does urban agriculture help to prevent malnutrition? evidence from Kampala. FCND Discussion Paper 43. Washington DC: IFPRI.

- Maxwell D, Larbi WO, Lamptey G, Zakariah S & Armar-Klemesu M. 1998c. Farming in the shadow of the city: changes in land rights and livelihoods in peri-urban Accra. In: Armar-Klemesu M & Maxwell D (eds), Urban agriculture in the Greater Accra Metropolitan Area: report to IDRC. Legon: NMIMR.
- Mbaye A & Moustier P. 2000. Market-oriented urban agricultural production in Dakar.
- Mougeot L. 1994. Urban food production: evolution, official support and significance. Cities Feeding People Series Report 8. Ottawa: IDRC.
- Mougeot L. 1998. Farming inside and around cities. *Urban Age* (winter): 18-21.
- Mvena ZSK, Lupanga IJ & Mlozi MRS. 1991. Urban agriculture in Tanzania: a study of six towns. Morogoro: Sokoine University of Agriculture.
- Mwangi AM. 1995. The role of urban agriculture for food security in low income areas in Nairobi. Leiden: African Studies Centre.
- Mwangi AM & Foeken D. 1996. Urban agriculture, food security and nutrition in low income areas in Nairobi. *African Urban Quarterly* 11 (2/3):170-179.
- Newland IK. 1980. City limits: emerging constraints on urban growth. *World Watch Paper* 3. Washington DC: World Watch Institute.
- Nelson T. 1996. Closing the nutrient loop. *World Watch* (November/December).
- Ogden C. 1993. Urban malnutrition: maternal activities and child nutrition in Kigali, Rwanda. Unpublished PhD thesis, Cornell University.
- Potutan GE, Schnitzler WH, Amado JM, Janubas LG & Holmer RJ. 2000. Urban agriculture in Cagayan de Oro: a favourable response of city government and NGOs.
- Sahn D, Dorosh P & Younger S. 1996. Exchange rates, fiscal and agricultural policies in Africa: does adjustment hurt the poor? *World Development* 24 (4): 719-747.

- Sanyal B. 1985. Urban agriculture: who cultivates and why? *Food and Nutrition Bulletin* 7 (3): 15-24.
- Sawio C. 1993. Feeding the urban masses? Towards an understanding of the dynamics of urban agriculture in Dar es Salaam, Tanzania. Unpublished PhD thesis, Clark University.
- Smit J, Nasr J & Rattu A. 1996. Urban agriculture: a neglected resource for food, jobs and sustainable cities. New York: UNDP
- Stevenson C, Xavery P & Wendeline A. 1996. Market production of fruits and vegetables in the peri-urban area of Dar es Salaam, Tanzania. Dar es Salaam: Urban Vegetable Production Project (unpublished).
- Tabatabai H. 1993. Poverty and food consumption in urban Zaire. Cornell Food and Nutrition Policy Program Working Paper 46. Ithaca: Cornell Food and Nutrition Policy Program.
- United Nations Development Programme. 1996. Urban agriculture: food, jobs and sustainable cities. New York: UNDP.
- UNICEF. 1995. Strategy for improved nutrition of children and women in developing countries. UNICEF Policy Review Paper. New York: UNICEF.
- WSSA (World Sustainable Agriculture Association). 1996. For all generations: making world agriculture more sustainable. WSSA.
- Yoveva A, Gocheva B, Voykova G, Borrisov B & Spassov A. 2000. Sofia: urban agriculture in an economy in transition.
- Zakariah S, Lamptey GM & Maxwell D. 1998. Urban agriculture in Accra: a descriptive analysis. In: Armar-Klemesu M & Maxwell D (eds), *Urban agriculture in the Greater Accra Metropolitan Area: report to IDRC*. Legon: NMIMR.
- Zeeuw H de. 1998. The promotion of urban agriculture: what cities can do. Paper presented at the International Healthy Cities Conference, 20-30 June 1998, Athens.