Chapter 1

INTRODUCTION

Poverty and food insecurity: a growing urban concern

The year 2008 will go down in history as the year in which the world's urban population outnumbered its rural population for the first time in history. According to the United Nations Population Fund, the world's urban population is expected to double from 3.3 billion in 2007 to 6.4 billion by 2050, and it is predicted that by 2030, 60 per cent of the world's population will live in cities (UNFPA, 2007).

Rapid urbanization in many developing countries, especially those with lower incomes, is taking place at a time when the availability of non-farm jobs is limited. In fact, non-farm productivity in the least developed countries declined 9 per cent from 1980–83 to 2000–03 (UNCTAD, 2006). As a result, the urbanization process is accompanied by a phenomenon referred to as the ‘urbanization of poverty’: rural-to-urban migration combined with limited employment opportunities in cities is leading to a shift in the locus of poverty from rural to urban areas. The percentage of the poor living in cities is expected to increase from 30 per cent in 2000 to 50 per cent by 2035 (UNCHS, 2001).

A recent World Bank and IMF report based on more than 200 surveys conducted in 90 developing countries showed that the growth in urban poverty was 30 per cent higher than that of rural poverty during the 1993–2000 period. This translated into an additional 50 million urban poor in a period of just seven years (IMF, 2007). In most developing countries, more than half of the urban population is below the poverty line. The total number of urban poor (those living on less than US$1 a day) in developing countries is estimated at 1.2 billion (UN, 2008).

Increasing urban poverty goes hand in hand with growing food insecurity and malnutrition in the cities. Urban food insecurity is often overlooked since at aggregate level economic and social conditions in urban areas are much better than those in rural areas. The familiar images of ‘famine’ situations are often from rural areas and rarely depict urban areas. But such
aggregate figures do not account for inequality within the urban population that is generally much greater than within the rural areas (World Bank, 2000). Besides, such data mask the deep food insecurity and hunger issues in urban areas, which remain under-reported problems (FAO, 2004). Unlike in rural areas, problems of food insecurity in urban areas are strongly related to the inadequate purchasing power of the urban poor which limits their access to adequate quantities of nutritious food. Hunger in the cities is chronic but is less visible and attracts much less attention from the media and policy makers. Moreover, the nutritional value of food consumed by the urban poor is often very low (Mutonodzo, 2009).

The urban poor often live in neighbourhoods with poor sanitary conditions, limited access to clean water, high environmental pollution and consequently high and chronic exposure to health hazards. Such unhealthy living conditions aggravate food insecurity. Chronic infections compromise the ability of the human body to make effective use of nutrients from consumed food (including malabsorption and part of the nutrients being used to mitigate toxic effects of environmental contaminants) amplifying the impacts of an already poor diet (Yeudall, 2007).

Although already in 1999 the FAO Committee on Agriculture (COAG), during its 15th meeting, urged the member states to give more attention to urban and peri-urban agriculture – production of food within and close to the urban centres – in order to enhance urban food security, in many countries the growing urban food insecurity and malnutrition problem remained largely unattended and did not yet translate into policy action. Poverty and hunger were still viewed by many as a largely rural problem (Shapouri et al., 2009), although many good examples exist of cities and countries that have developed innovative policies and programmes on urban and peri-urban agriculture. We will see various examples of this later in this book.

The recent food and economic crises have made city and national governments realize that urban food security is a major issue that requires policy intervention. In over 30 major cities food riots broke out due to the sharp increase in food prices and the deteriorating access to food for the urban poor.

As a consequence of these crises the number of people that were undernourished increased by about 170 million people in just one and a half years and the urban poor are among the hardest hit. The 136th Council meeting of the FAO reported ‘World hunger is projected to reach a historic high in 2009, with 1,020 million people going hungry every day (from 850 million in 2007). The urban poor will probably face the most severe problems in coping with the global recession].’ (FAO, 2009).

The urban poor are particularly vulnerable to changes in food prices and variations in income since food makes up a large part of their household expenses (often over 60–70 per cent) and urban consumers are almost exclusively dependent on food purchases. They are the first to lose their jobs. Variations in income or food prices have a significant and direct impact on their
diets (lower food intake, turning to cheaper/less nutritious food) and lead further to reduced expenditure in health care and schooling or the sale of productive assets (FAO, 2008). The most vulnerable groups are the underemployed or unemployed citizens, refugees, the disabled, people dislocated by rural violence and conflict and immigrants escaping from poverty and hunger and especially the children and women within these groups (FAO, 2009).

Inevitably, also the effects of climate change will disproportionally affect the urban poor, since they are often located in the most vulnerable parts of the cities in slum and squatter settlements on steep hillsides or in low lying and poorly drained areas and have the lowest capacity to adapt to such changes (Commission on Climate Change and Development, 2009).

Recent natural disasters and human-induced emergencies (e.g. Iraq, Georgia, Darfur, Democratic Republic of Congo and Afghanistan) have led to large numbers of refugees. Often, a large proportion of these refugees end up living permanently in and around urban areas, even after short periods of displacement, further exacerbating the pressure on urban systems to provide basic services and accelerating processes of massive slum formation, growing urban poverty, rising food insecurity and chronic malnutrition and poor health. Food security is a specific concern to recent refugees in urban areas as they have very limited resources to help them cope (IASC Task Force on Meeting Humanitarian Challenges on Urban Areas, 2009).

These are urgent and pressing challenges that need an equally urgent and adequate response from city and national authorities and international support organizations. Urban policies need to incorporate food security considerations and focus more on building cities that are more resilient to crises.

The United Nations High Level Task Force on the Global Food Crisis states (p. 15):

A paradigm shift in design and urban planning is needed that aims at: ... reducing the distance for transporting food by encouraging local food production, where feasible, within city boundaries and especially in immediate surroundings. Without sacrificing core principles to observe public health standards, this includes removing barriers and providing incentives for urban and peri-urban agriculture, as well as improved management of water resources in urban areas (UN, 2008).
Urban agriculture

Urban agriculture is used throughout this book as the term to describe both intra-urban and peri-urban agriculture. It is defined as the growing of plants and the raising of animals within and around cities and related activities (production of inputs, processing, marketing, provision of services to agricultural producers and agro-enterprises).

A wide variety of different types of urban agriculture and all sorts of classifications can be made based on different classification criteria. According to Mougeot (2000) the most important aspects to characterize urban agriculture are the following: who are the main actors involved; where is the activity taking place (location); what kind of products are produced; which technologies are used and at what scale of production; what are the main motives of the people involved; and to what degree is processing and marketing taking place?

Characteristics of urban agriculture

Types of actors involved. A large proportion of the people involved in urban agriculture are the urban poor. Contrary to general belief they are often not the most recent immigrants from rural areas (since the urban producers need time to get access to urban land, water and other productive resources). In many cities, one will often also find lower and mid-level government officials, school teachers and the like involved in agriculture, as well as richer people who are seeking a good investment for their capital. Women constitute an important section of urban producers, since agriculture and related processing and selling activities can often be more easily combined with their other tasks in the household. It is, however, more difficult to combine household responsibilities with urban jobs that require travelling to the town centre, industrial areas or to the houses of the rich.

Locations. Urban agriculture may take place in locations inside the cities (intra-urban) or in the peri-urban areas. The activities may take place on the homestead (on-plot) or on land away from the residence (off-plot), on private land (owned, leased) or on public land (parks, conservation areas, along roads, streams and railways), or semi-public land (schoolyards, grounds of schools and hospitals).
Products. Urban agriculture includes food products from different types of crops (grains, root crops, vegetables, mushrooms, fruits) and animals (such as poultry, rabbits, goats, sheep, cattle, pigs, guinea pigs and fish) as well as non-food products (like aromatic and medicinal herbs, ornamental plants and tree products), or combinations of these. Often the more perishable and relatively high-valued vegetables and animal products and by-products are favoured. Production units in urban agriculture tend in general to be more specialized than rural enterprises, and exchanges take place across production units.

Scale of production and technology used. In the city we may encounter individual or family farms, group or cooperative farms and commercial enterprises at various scales ranging from micro- and small farms (the majority) to medium-sized and some large-scale enterprises. The technological level of the majority of urban agriculture enterprises in developing countries is still rather low. However, the tendency is towards more technically advanced and intensive agriculture and various examples of such can be found in all cities.

Types of economic activities involved. Urban agriculture includes agricultural production activities as well as related processing and marketing activities and delivery of inputs and services delivery (e.g. compost production from organic wastes, animal health services) by specialized micro-enterprises or NGOs. In urban agriculture, production and marketing tend to be more closely interrelated in terms of time and space than for rural agriculture, thanks to greater geographic proximity and quicker resource flow.
Degree of market orientation. In most cities in developing countries an important part of urban agricultural production is for self-consumption, with surpluses being traded. However, the importance of market-oriented urban agriculture, both in volume and economic value, should not be underestimated (as shown in the following section of this chapter). Products are sold at the farm gate, by cart in the same or other neighbourhoods, in local shops, on local (producers’) markets or to intermediaries and supermarkets. Mainly fresh products are sold, but part of the produce is processed for use by farmers themselves, cooked and sold on the streets or processed and packaged for sale to one of the outlets mentioned above.

**Policy relevance of urban agriculture**

Cities are quickly becoming the principal territories for intervention and planning of innovative strategies that aim to eradicate urban hunger and improve livelihoods. Urban agriculture provides a strategy that contributes to enhanced food security and improved nutrition of the urban poor. Further, it contributes to local economic development, poverty alleviation and social inclusion of the urban poor – and women in particular – as well as to the greening of the city, the productive reuse of urban wastes, and reduced vulnerability to climate change. Research findings related to each of these potential contributions of urban agriculture are reviewed in the following sub-sections.

**Food security and nutrition**

The contribution of urban agriculture to food security and healthy nutrition is probably its most
important asset. Food production in the city is in many cases a response of the urban poor to inadequate, unreliable and irregular access to food, and the lack of purchasing power.

Urban agriculture may improve both food intake and the nutritional quality of the food. Locally produced food is fresher, more nutritious and diverse than food products bought in supermarkets or in fast food chains; it also leads to more regular food intake. This is of crucial importance for young children, the elderly or sick household members (e.g. HIV/AIDS and TB patients) and pregnant and lactating women. Involvement in local food production also leads to better mitigation of diseases (better nutrition, home-grown medicinal plants), more physical exercise, less dependency on gifts and food aid and enhanced self-esteem (Maxwell and Armar-Klemesu, 1998; Yeudall, 2007).

In addition to enhanced food security and nutrition of the urban producers themselves, urban agriculture produces large amounts of food for other categories of the population (Nugent, 2000). It has been estimated that about 15–20 per cent of the world’s food is produced in urban and peri-urban areas (Armar-Klemesu, 2000). The volume of crops and animal products produced in urban and peri-urban agriculture often represents a substantial part of the total urban annual food requirements, e.g. in Nakuru (Kenya) 8 per cent (Foeken, 2006), Dakar (Senegal) 10 per cent (Mbaye and Moustier, 2000), Kampala (Uganda) 40 per cent (International Potato Center, 2007) and Hanoi (Vietnam) 44 per cent (Mubarik et al., 2005). For certain products (especially perishable products like leafy vegetables, poultry, eggs and milk) often 60–90 per cent is produced by urban and peri-urban producers (Table 1.1).

Urban agriculture improves access of the urban poor to fresh and nutritious food not just by making it available at close proximity to cities but also by reducing the costs of food (since
locally-produced food involves fewer intermediaries and less transport, cold storage, processing and packaging). Marketing chains in urban agriculture are normally much shorter and more varied than in rural agriculture, reducing the costs of wholesalers and retailers in the total chain; transport costs are lower, while more products are sold fresh and unpackaged soon after harvest, thus reducing related storage, packaging and cooling costs. Consequently, the price differential between producer and final consumer (which may go up to 1:10 in rural agriculture) is lowered to 1:2 or 1:3 in urban agriculture (Moustier and Danso, 2006).

Intensive horticulture can be practised on small plots, making efficient use of limited water and land resources. Horticultural species, as opposed to other food crops, have a considerable

<table>
<thead>
<tr>
<th>City</th>
<th>Leafy vegetables</th>
<th>All vegetables</th>
<th>Eggs</th>
<th>Poultry</th>
<th>Milk</th>
<th>Pork</th>
<th>Fruit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Havana, Cuba (Gonzalez Novo and Murphy, 2000)</td>
<td>58</td>
<td></td>
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<td></td>
<td>39</td>
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<tr>
<td>La Paz, Bolivia (Kreinecker, 2000)</td>
<td>30</td>
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<tr>
<td>Dakar, Senegal (Mbaye and Moustier, 2000)</td>
<td>70–80</td>
<td>65–70</td>
<td>60</td>
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<tr>
<td>Dar Es Salaam, Tanzania (Jacobi et al., 2000)</td>
<td>90</td>
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<td></td>
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<tr>
<td>Addis Ababa, Ethiopia (Tegegne et al., 2000)</td>
<td>30</td>
<td></td>
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<td>79</td>
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<tr>
<td>Accra, Ghana (Cofie et al., 2003)</td>
<td>90</td>
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<tr>
<td>Ibadan, Nigeria (Olajide-Taiwo et al., 2009)</td>
<td>80</td>
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<td></td>
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<tr>
<td>Brazzaville, Congo (Moustier, 1999)</td>
<td>80</td>
<td></td>
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</tr>
<tr>
<td>Nouakchott, Mauritania (Laurent, 1999)</td>
<td>90</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Antananarivo, Madagascar (Moustier, 1999)</td>
<td>90</td>
<td></td>
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<tr>
<td>Jakarta, Indonesia (Purnomohadi, 2000)</td>
<td>10</td>
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<td>16</td>
</tr>
<tr>
<td>Shanghai, China (Yi-Zhang and Zhangen, 2000)</td>
<td>60</td>
<td>90</td>
<td>50</td>
<td>90–100</td>
<td>50</td>
<td></td>
<td></td>
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<tr>
<td>Hong Kong, China (Smit et al., 1996)</td>
<td>45</td>
<td></td>
<td></td>
<td>68</td>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Singapore (Smit et al., 1996)</td>
<td>25</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Hanoi, Vietnam (GTZ, 2000; Phuong Anh et al., 2004)</td>
<td>80</td>
<td>0–75 seasonal variation</td>
<td>40</td>
<td>50</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vientiane, Laos (Kethongs et al., 2004)</td>
<td>100</td>
<td></td>
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</tbody>
</table>

Source: Compiled by RUAF Foundation
yield potential and can provide up to 50 kg of fresh produce per m² per year depending on the technology applied. In addition, due to their short cycle, horticultural crops provide a quick response to emergency needs for food (several species can be harvested 60–90 days after planting).

Urban agriculture complements rural agriculture and increases the efficiency of the national food supply by:

• providing products that rural agriculture cannot easily supply, such as perishables that require rapid delivery upon harvest (e.g. fresh milk and vegetables) especially where road conditions are poor and cold storage facilities scarce;

• complementing rural production in the dry season and/or when rural areas are poorly accessible during the rainy period and thus also acting as a market stabilizer (Moustier and Danso, 2006);

• substituting for food imports intended for urban consumption and thereby saving on foreign exchange.

**Poverty alleviation and local economic development**

Households involved in urban and peri-urban agriculture are mainly (but not exclusively) the urban poor, each working small pieces of land intensively or keeping small numbers of animals. Smit et al. (1996) estimated that 800 million people worldwide are involved in urban agriculture of which 200 million are full-time farmers. Not only do household farms produce goods through family labour, but numerous other people are employed in the farming, marketing and processing activities. Table 1.2 summarizes data on employment generated in urban agriculture in a number of cities.

Poor households involved in urban and peri-urban agriculture benefit economically from their production activities by:

• saving on food expenditure. Since food is a major part (often 60–70 per cent) of the expenditures of a poor urban household such savings can be substantial and the freed up cash can be used for other livelihood essentials (water, medicines, rent, schooling and clothing). For example, in Windhoek, Namibia, research found that households involved in urban agriculture saved an average of 60 Namibian dollars a month on food expenditure, which is a significant amount (Frayne, 2005);

• sales of surplus crop and livestock production to neighbours and local shopkeepers and to local and city markets, supermarkets, school feeding programmes and hospitals.

In addition, poor urban households may benefit from:

• production and sales of processed products (meals, jams, shampoos and other products) on the street, in local restaurants and shops, and other outlets;
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• production and sales of agricultural inputs (e.g. production of compost or animal feed from collected organic waste; irrigation equipment from recycled materials) and provision of services (e.g. transport, animal health care services).

Although the production levels and turnover of individual urban producers in many cases will be small, the high number of urban producers in each city makes their overall contribution to the urban economy highly significant, generating employment for many poor urban households and providing incomes equivalent to or higher than the official minimum wage (Moustier and Danso, 2006).

Table 1.2 Contribution of urban agriculture production to urban employment

<table>
<thead>
<tr>
<th>City</th>
<th>Urban producers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accra, Ghana (Sonou, 2001; Maxwell and Armar-Klemesu, 1998)</td>
<td>13.6% of all households in 16 city areas are involved in farming, among them 700 market farmers (1997)</td>
</tr>
<tr>
<td>Dakar, Senegal (Mbaye and Moustier, 2000)</td>
<td>3,000 family vegetable farms (14,000 jobs) of which 1,250 fully commercial (9,000 jobs); 250 poultry units (1996)</td>
</tr>
<tr>
<td>Dar es Salaam, Tanzania (Sawio, 1993)</td>
<td>15-20% of all families in 2 city areas have a home garden; urban agriculture forms at least 60% of the informal sector and was the second largest urban employer (20%) in 1997</td>
</tr>
<tr>
<td>Kumasi, Ghana (Drechsel et al., 2000; AQ 2006 in Ref Poynter and Fielding, 2000)</td>
<td>1,470 registered farms and 30,000 unregistered farmers; 500 cattle owners; 100 registered poultry farms (+ 200 unregistered)</td>
</tr>
<tr>
<td>Kampala, Uganda (International Potato Center, 2007)</td>
<td>35% of households are engaged in urban agriculture</td>
</tr>
<tr>
<td>Nairobi, Kenya (Foeken and Mwangi, 2000)</td>
<td>150,000 households (30% of population); agriculture provided (in 1993) the highest self-employment earnings among small-scale enterprises</td>
</tr>
<tr>
<td>Cienfuegos, Cuba (Socorro, 2003)</td>
<td>17,000 jobs were generated between 1995 and 2003; 1.17% of city GDP</td>
</tr>
<tr>
<td>Governador Valadares, Brazil (Lovo and Pereira Costa, 2006)</td>
<td>45% of population practices some form of urban agriculture</td>
</tr>
<tr>
<td>Habana, Cuba (Gonzalez and Murphy, 2000)</td>
<td>117,000 direct and 26,000 indirect jobs in urban agriculture</td>
</tr>
<tr>
<td>Lima, Peru (IPC, 2007)</td>
<td>20% of the population of Lurigancho-Chosica District of Lima is involved full-time or part-time in agriculture</td>
</tr>
<tr>
<td>Shanghai, China (Yi-Zhang and Zhangen, 2000)</td>
<td>2.7 million farmers (31.8% of all workers) 2% of city GDP</td>
</tr>
<tr>
<td>Beijing, China (Liu et al., 2003)</td>
<td>Peri-urban agriculture is absorbing high amounts of migrant labour (between 500,000 and 1 million people)</td>
</tr>
<tr>
<td>Manila, Philippines (IPC, 2007)</td>
<td>120,000 low-income households in the Manila region depend economically on local jasmine production (including jasmine farmers, garland makers, garland sellers)</td>
</tr>
</tbody>
</table>

Source: Compiled by RUAF Foundation

Backyard gardening in Cape Town

Credit: Henk de Zeeuw

• production and sales of agricultural inputs (e.g. production of compost or animal feed from collected organic waste; irrigation equipment from recycled materials) and provision of services (e.g. transport, animal health care services).

Although the production levels and turnover of individual urban producers in many cases will be small, the high number of urban producers in each city makes their overall contribution to the urban economy highly significant, generating employment for many poor urban households and providing incomes equivalent to or higher than the official minimum wage (Moustier and Danso, 2006).
Table 1.3 summarizes data from a number of studies regarding net income generated in (mainly peri-urban) irrigated open space vegetable production in a number of African and Asian cities, showing that monthly net farm income figures usually range between US$30 and US$70, but can go up to $200 or more. In the same countries, the minimum monthly wage is in the range $20–40 indicating that urban irrigated vegetable production could indeed be a profitable business compared to other urban jobs and also compared to rural vegetable farming (in Ghana irrigated urban vegetable farmers are earning an average annual income that is two to three times higher than that of rural farmers (Danso et al., 2003).

Danso et al. (2003) provide some data on the profitability of urban livestock in and around Kumasi. Cattle-raising within or close to the city is a highly profitable enterprise but only when the herd size falls within one to five animals. Space requirements, waste disposal and feed availability are major factors to be considered for larger herd sizes. Also, raising animals such as pigs, sheep and goats is profitable. Studies in Nairobi have shown the generation of significant incomes in urban livestock keeping, with pig and poultry farming as profitable ventures that guarantee a quick return on capital (Mireri, 2002).

Most poor families rarely have sufficient space for profitable urban animal husbandry within their homesteads. However, many urban producers keep smaller herds/flocks or only smaller

<table>
<thead>
<tr>
<th>City</th>
<th>Typical net monthly income in US$ per farm</th>
<th>Net income per capita in this country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accra, Ghana</td>
<td>40–57</td>
<td>27</td>
</tr>
<tr>
<td>Bamako, Mali</td>
<td>10–300</td>
<td>24</td>
</tr>
<tr>
<td>Bangui, Central African Republic</td>
<td>n.d–320</td>
<td>22</td>
</tr>
<tr>
<td>Banjul, Gambia</td>
<td>30–n.d.</td>
<td>26</td>
</tr>
<tr>
<td>Bissau, Guinea Bissau</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>Brazzaville, Congo</td>
<td>80–270</td>
<td>53</td>
</tr>
<tr>
<td>Cotonou, Benin</td>
<td>50–110</td>
<td>36</td>
</tr>
<tr>
<td>Dakar, Senegal</td>
<td>40–250</td>
<td>46</td>
</tr>
<tr>
<td>Dar es Salaam, Tanzania</td>
<td>60</td>
<td>24</td>
</tr>
<tr>
<td>Kumasi, Ghana (Eriksen-Hamel and Danso, 2009)</td>
<td>35–160</td>
<td>27</td>
</tr>
<tr>
<td>Lagos, Nigeria (Ezedinma and Chukuezi, 1999)</td>
<td>53–120</td>
<td>27</td>
</tr>
<tr>
<td>Lomé, Togo</td>
<td>30–300</td>
<td>26</td>
</tr>
<tr>
<td>Nairobi, Kenya</td>
<td>10–163</td>
<td>33</td>
</tr>
<tr>
<td>Niamey, Niger</td>
<td>40</td>
<td>17</td>
</tr>
<tr>
<td>Ouagadougou, Burkina Faso</td>
<td>15–90</td>
<td>25</td>
</tr>
<tr>
<td>Yaoundé, Cameroon</td>
<td>34–67</td>
<td>53</td>
</tr>
<tr>
<td>Ho Chi Minh City, Vietnam (Jansen et al., 1996)</td>
<td>40–125</td>
<td></td>
</tr>
<tr>
<td>Jakarta, Indonesia (Purnomohadi, 2000)</td>
<td>30–50</td>
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</tbody>
</table>

Source: for data on West and East African countries: Drechsel et al, 2006
animals (e.g. guinea pig, rabbit, guinea fowl and poultry) with low space and input requirements and still generate a good income. For example, in Addis Ababa (Ethiopia), profits above average are earned with very low capital input by backyard owners of inner city dairy units of even the smallest scale, a large part of which is managed by women (Tegegne et al., 2000).

A sizeable proportion of urban middle- and high-income families do have adequate land for commercial livestock keeping. The high start-up capital requirements of livestock keeping means that the majority of urban livestock producers (especially of cattle and of larger herds/flocks) maintain their livestock enterprises as secondary to other ventures, for example, trading or salaried employment, from which the capital is derived.

Ornamental plant and/or flower production is another profitable urban agricultural activity that can achieve annual benefits of US$400 up to $4700 (Nigeria) or $5000 (Lomé) if sufficient cash is available for labour and the purchase of seeds and seedlings (Kessler, 2002; Ezedinma and Chukuezi, 1999).

Recent work by FAO analysed the importance of urban agriculture for the urban poor from a comparative international perspective, making use of a Rural Income-Generating Activities (RIGA) database, which brought together comparable, nationally-representative household survey data for 15 developing and transition countries (FAO, RIGA website). The results show that the share of income from agriculture by poor urban households is highest in Nigeria with over 50 per cent of the income of the urban poorest quintile derived from agriculture, while this is around 20 per cent or somewhat higher in the other three African countries in the sample. Outside Africa the numbers are much lower (Zezza and Tasciotti, 2008).

Recent studies show that urban horticulture and urban livestock-raising have much higher growth rates than rural agriculture and are even comparable to or higher than in some other urban sectors. According to the World Bank (2007), intensive peri-urban horticultural and livestock rearing are extremely fast growing sectors that employ many workers and produce high value-added products that yield reasonable incomes and returns.

Urban agriculture has a comparative advantage over rural farming due to its proximity to urban consumers and lower transport and cooling costs, which is particularly important for perishable products (green vegetables, milk, eggs, etc.) and in places where roads and other infrastructure facilities such as refrigeration are poor.

Urban agriculture, to a large extent, makes productive use of land that is not fit for construction (flood or earthquake-prone areas, land under power lines and in buffer zones) and adds value to land that might not otherwise have an economic output. It can generate income from temporarily idle land through urban and peri-urban infill, and is compatible with public parks and open space planning. Urban agriculture can also compete with alternative land uses. However, questions are sometimes raised regarding the sustainability of urban agriculture in
the context of a dynamic urban market with high competition for land, soaring land prices and largely uncontrolled urban growth, if it is not protected by municipal laws and programmes and combined with other functions like recreation, water management, urban greening, lowering urban temperature and adaptation to climate change (see Chapter 2).

**Social inclusion**

Alongside the economic and employment aspects, urban agriculture can play a role in the social inclusion of marginalized groups (the aged without a pension, unemployed youth, persons with disabilities, those afflicted by HIV-AIDS, refugees, female-headed households, etc.) by providing them an opportunity to feed their families and raise an income, while enhancing self-management and entrepreneurial capacities.

Several examples exist of municipalities or NGOs that have initiated urban agriculture projects focusing on disadvantaged groups, with the aim to integrate them more strongly into the urban network and to provide them with a decent livelihood. The participants in such projects feel enriched by the possibility of working constructively, building their community, working together and, in addition, producing food and other products for consumption and for sale. Providing marginalized groups with a decent livelihood prevents social problems (Gonzalez Novo and Murphy, 2000).

A majority of the world’s urban producers are women (around 65 per cent). Urban agriculture may provide some advantages over other jobs and income-earning opportunities such as the low capital needed to start farming, lower food expenditures, the possibility of combining this activity with caring for children, less travelling (and related costs in money and time) to the city centre or better-off neighbourhoods for an informal job as housekeeper or other low-paid job.

In more developed cities, urban agriculture may be undertaken for the physical and/or psychological relaxation it provides, rather than for food production per se. Also, urban and peri-urban farms may take on an important role in providing recreational opportunities for citizens (recreational routes, food buying and meals on the farm, visiting facilities) or having educational functions (such as bringing youth in contact with animals and teaching ecology).
Urban waste management

Productive reuse of solid organic wastes. Urban agriculture is part of the urban ecological system and can play an important role in urban environmental management. A growing city will produce increasing organic wastes. For most cities the disposal of wastes has become a serious problem. Urban agriculture can help to solve such problems by turning urban wastes into a productive resource.

In many cities, local or municipal initiatives exist to collect household wastes and organic refuse from vegetable markets and agro-industries in order to produce compost or animal feed. Quality compost is an important input that can fetch a good price, and allows an urban farmer to use less chemical fertilizers (and by so doing also preventing problems related to the contamination of groundwater with residues of agrochemicals). The composted organic solid wastes generated by a city contain large amounts of nutrients (nitrogen, phosphorus, potassium and others) that can be used for soil improvement and fertilization. Drechsel et al., (2007) calculated that the nutrient value of the uncollected solid waste in Kumasi would be sufficient to pay the service costs of solid waste management for the whole city (US$180,000 per month). Moreover, about 80 per cent of this amount is spent on waste collection and transportation to disposal sites, which could be drastically reduced through composting for the additional benefit of the farming community. In addition, compost-making initiatives create employment and provide income for the urban poor. Diverting solid organic waste from landfill sites by composting is also one of the simplest ways to prevent emissions of methane (a greenhouse gas) and to reduce the pollution of groundwater due to leachates from the landfill. Recovering methane from landfills has proven to be only partially successful because up to 60 per cent of the methane generated escapes through leakage. And it is clearly much better to prevent organic waste coming into landfills.

Fresh waste from vegetable markets, restaurants and hotels, as well as food processing industries, is regularly used as a source of feed for urban livestock (Allison et al., 1998). Organic wastes are also used as a source of energy, either by incineration in an electricity-producing plant, by capturing methane from composting sites for biogas or by making briquettes for household use.

Productive reuse of wastewater. As competition for water in densely populated zones intensifies, producers close to cities increasingly make use of wastewater for irrigation in agriculture and
aquaculture (either treated wastewater, wastewater diluted in rivers or other water bodies and untreated wastewater). Wastewater provides the poor urban and peri-urban producer with a regular supply of irrigation water as well as nutrients (replacing expensive industrial fertilizers). A study by IWMI of 53 cities in the developing world revealed that in four out of every five cities surveyed wastewater is used in urban and peri-urban agriculture on approximately 0.4 million ha, involving a farmer population of 1.1 million with 4.5 million family dependants. The total number of farmers worldwide irrigating their plots with treated, partially treated or untreated wastewater is estimated at 200 million farming on at least 20 million ha (Raschid-Sally and Jayakody, n.d.).

The World Health Organization (WHO) expects that ‘urban agriculture, with urban wastewater as a common resource, will play a more important role in supplying food for the cities’. They indicate that a city of 1 million people can produce enough wastewater to irrigate approximately 1500–3500 ha land in a semi-arid country (WHO, 2006).

It seems obvious to view wastewater as a major source of irrigation water supply in urban and peri-urban horticulture, agro-forestry and aquaculture, while taking into account the WHO guidelines (WHO, 2006) to reduce associated health risks. (See IWMI, 2007 for a clear and practical overview). Benefits of using wastewater include:

• Productive (safe) use of wastewater in urban agriculture will help to reduce the demand for freshwater supply and mitigate the stress on water resources.
• Local reuse of wastewater will reduce the discharge of wastewater into rivers, canals and other surface water sources and thus diminish water pollution.
• Reuse of wastewater will reduce the need for artificial fertilizers and the energy used to produce them, and lower the depletion of certain minerals (e.g. phosphorus) by making productive use of the nutrients in the wastewater. Wastewater, excreta and urban organic waste are an accessible source of plant nutrients, such as phosphorus, nitrogen and potassium. The amount of nutrients in urban wastewater is substantial (but can vary considerably: 16–62 kg total nitrogen, 4–24 kg phosphorus, 2–69 kg potassium, 18–208 kg calcium, 9–110 kg magnesium, and 27–182 kg sodium per 1,000 m³) and its economic value is sizeable (Manzoor et al, 2007). It should be noted that the world’s resources of readily available phosphorus are limited and will run out in 25 years (Rosemarin, 2004).

However, wastewater use is still not clearly incorporated into national or local policy in most countries. The fear of health impacts, increasing focus on water supply instead of managing the demand for water and, occasionally, cultural factors influence the lack of clear policies in support of safe water reuse. The common point of view of researchers, decision-makers, and service providers is that the use of untreated wastewater is unacceptable and that important benefits can be obtained only when the water is appropriately treated. This approach has resulted in a marginalization of poor farmers who use low quality water since the alternative of using ‘appropriately treated water’ is in many cases an illusion.
Treatment of wastewater in centralized treatment plants is prohibitively expensive for many cities in developing countries. A further disadvantage is that conventional treatment methods remove the nutrients in wastewater, thus reducing the economic benefits to its users. The last two decades have seen a strong move towards alternative decentralized and low-cost treatment of wastewater that allows reuse of wastewater and nutrients or even includes aquaculture or agriculture as part of the wastewater treatment process. Stabilization ponds are used extensively in mid-income countries, especially in the Middle East. Other technologies have and are being developed that allow decentralized and low-cost treatment – and reuse of wastewater and nutrients – close to the source (e.g. cluster approach, constructed wetlands, up-flow anaerobic sludge reactors - see UNEP, 1997 for an overview). However, very low-income countries cannot be expected to provide wastewater treatment facilities of appropriate quality to even a small percentage of the population in the foreseeable future. The adoption of an integrated and productive approach to water development and the use of alternative decentralized wastewater treatment technologies needs to be strongly supported with a view to enhancing coverage while enabling productive reuse.

Further, the use of wastewater does not need to be restricted to fully treated wastewater. Where only partial or no wastewater treatment is available, the health risks of productive reuse of wastewater can be reduced through complementary health risk reduction measures as explained in the new WHO guidelines for safe use of excreta and wastewater (WHO, 2006). The new guidelines assist decision-makers in planning how to achieve the required levels of pathogen reduction by choosing and combining a number of different health risk reduction measures and entry points for action along the ‘farm to fork’ pathway, depending on what is feasible locally. The new WHO guidelines should be extensively applied as this allows for incremental and adaptive change (in contrast to the earlier strict water quality thresholds). This is a cost-effective and realistic approach for reducing health and environmental risks in low-income countries (see IWMI Policy Water Briefing no. 17 for a good overview of this low cost risk reduction strategy and recommended measures; IWMI, 2007).

Adaptation to climate change

Urban agriculture is receiving increasing recognition as an important strategy for climate change adaptation (taking steps to minimize the predicted impacts of climate change) and (to a lesser extent) mitigation (reduction of greenhouse gas emissions).

The Conference ‘Urban challenges and Poverty Reduction in African, Caribbean and Pacific Countries’ organized by UN Habitat with EU and ACP countries, 8–10 June 2009 in Nairobi, identified urban agriculture, including agro-forestry, as having a high potential for climate change adaptation (UN Habitat, 2009). The Asian Cities Climate Change Resilience Network (ACCCRN) earmarked urban agriculture as an important strategy to building resilient cities (defined as cities that are able to respond to, resist and recover from changing climatic conditions) (Rumbaitis del Rio, 2009).
Urban agriculture helps cities to adapt to climate change and become more resilient by:

1. Reducing energy use and greenhouse gas emissions by producing fresh food close to the city (less energy used in transport, cooling, storage, processing and packaging thus lowering the ecological footprint), and enabling synergic and cyclical processes between urban domestic and industrial sectors and agriculture (e.g. use of excess heat, cooling water or CO₂ from industry in greenhouses). Urban food production also contributes to reduction of the ecological food(t)print of the city (the energy and water needed to produce and transport the food consumed by a city).

2. Maintaining green open spaces and enhancing vegetation cover in the city with important adaptive (and some mitigation) benefits:
   - reduction of the heat island effect by providing shade and enhanced evapotranspiration (and thus more cooling, less smog);
   - fewer floods and reduced impacts of high rainfall by storage of excess water, increased water interception and infiltration in green open spaces. Urban agriculture also keeps flood zones free from construction and reduces rapid storm water runoff and floods downstream and facilitates more replenishment of groundwater;
   - improvement of water quality by natural cleaning in low lying agricultural areas (e.g. natural or constructed wetlands, aquaculture in maturation ponds etc.);
   - capturing CO₂ and dust (and thus contributing to mitigating the global warming effect of the city) through urban (agro-)forestry;
   - preventing landslides by agro-forestry on steep slopes (and preventing building on such sites).

3. Reducing the vulnerability of the most vulnerable urban groups and strengthening community-based adaptive management by:
   - diversifying urban food sources, enhancing access of the urban poor to nutritious food, reducing the dependency on imported foods and making the city less vulnerable to periods of low food supply from rural areas due to floods, droughts or other natural or man-made disasters;
   - diversifying income opportunities of the urban poor and functioning as a safety net in times of economic crisis;
   - being a source of innovation and learning about new strategies/technologies for high land and water-efficient food production.

Municipal policy making and action planning on urban agriculture

An increasing number of national and city governments have policies and programmes on urban agriculture, or are in the process of formulating these. The growing attention of local and national policy makers and practitioners is also reflected in the growing demand (e.g. to the RUAF
partners) for inspiring examples of successful policies and programmes on urban agriculture as well as for training and (co-)funding of research and action programmes.

**Main policy perspectives on urban agriculture**

It is useful to distinguish between three main policy perspectives (social, economic and ecological), which are helpful in designing alternative policy scenarios for the development of sustainable urban agriculture. These perspectives are related to the vision of municipal governments regarding the role they expect urban agriculture to play and the kind of contributions they expect urban agriculture to make to the realization of certain policy goals, namely, to make the city more food-secure and socially inclusive, to reduce poverty and enhance local economic development, or to make the city environmentally more sustainable. Figure 1.1 summarizes the three policy perspectives on urban agriculture (Cabannes, 2006).

The **social perspective** is mainly (but not exclusively) associated with subsistence-oriented types of urban agriculture that form part of the livelihood strategies of urban low income households with a focus on producing food and medicinal plants for home consumption. Examples include home gardening, community gardening, institutional gardens at schools and hospitals, and open field farming at the microscale with low levels of investment. These activities do not generate a major cash surplus but provide for food or medicinal plants, thus reducing the food and health expenses of the family. Since food is such a substantial part of the expenditures of a poor urban household (and can be between 50 and 70 per cent of their budget), such savings can be substantial and the freed cash can be used for other livelihood essentials (such as water, rent, schooling and clothing). This contribution to food security and nutrition is one of the important benefits of
these types of urban agriculture, coupled with other important social impacts such as social inclusion, poverty alleviation, community development, and HIV/AIDS mitigation.

The **economic perspective** focuses on income generation and employment creation, and on market-oriented producers that not only or mainly produce for self-subsistence but also or primarily for the market. In this case the rationale for urban agriculture is its capacity to generate local economic development through enterprise development in local agricultural production, processing and marketing. Market-oriented urban agriculture may constitute the primary or be a complementary source of income for urban residents. Activities usually involve small-scale family-based enterprises and sometimes, larger scale entrepreneurial farms run by private investors or producer associations. The activities not only include food production (such as irrigated vegetable production and stall-fed dairy production) but also non-food production (such as medicinal and aromatic herbs, flowers and ornamental plants). Commercial urban agriculture also includes enterprises involved in the delivery of inputs (like the collection and composting of urban wastes, seed and fodder supply, production of organic pesticides, fabrication of tools, delivery of water, buying and transport of chemical fertilizers),
the provision of services (such as transport, animal health care services), and the processing
and marketing of primary or processed products (including marmalades, shampoos and other
products) on the street, in local restaurants and shops, or at producers’ markets.

Market-oriented types of urban agriculture have a more pronounced economic impact and
higher profitability, but their externalities for the city and urban populations, especially those
of the intensive larger scale enterprises, tend to be higher especially through risk of water
and soil contamination due to intensive use of agrochemicals, health risks from use of con-
taminated water for irrigation and risks of animal–human disease transfers (zoonosis).

The ecological perspective mainly focuses on the role of urban agriculture in urban environ-
mental management. Besides provision of food and generating income, urban agriculture plays
a role in environmental management through nutrient recycling via decentralized composting
and reuse of organic wastes and wastewater. Urban agriculture can also provide other functions
(in addition to food and income) such as: provision of recreational services; reduction of the
city temperature; capturing CO₂ and dust; keeping buffer zones and flood plains free from
construction; storm water storage and flood prevention; ecological education of youth; and
care for people with a handicap. In order to enable such a combination of functions, urban
agriculture will have to adopt agro-ecological production methods, link up with eco-sanitation
and decentralized sustainable waste management systems and also become an integral part
of the planning and management of parks, nature reserves and recreational services.

The three policy perspectives on urban agriculture suggest different scenarios for the devel-
opment of urban agriculture and will lead to a different set of policy measures. For example,
when the focus is mainly on the social perspective the policy will mainly support home-,
community- and school-gardening and groups of disadvantaged citizens will be assisted by
providing access to municipal land, and will receive basic training in group work skills and
in food growing and providing basic materials (such as seeds and equipment) in exchange.
However, when the emphasis shifts to the economic perspective, more market-oriented
producers will be supported with, for example, technical assistance, credit, strengthening
producer groups and small-scale enterprises, infrastructure development and market chain
development.

However, it should be stressed that the three perspectives certainly are not mutually exclusive
and, in practice, most policies on urban agriculture will be based on a specific mix of the
three perspectives, giving different emphasis to a certain perspective in certain locations
and with certain categories of the population and another perspective in other parts of the
city territory and with other actors.

Multi-stakeholder approach to policy development and action planning

Due to the cross-cutting and multifunctional nature of urban agriculture, policy development
and action planning on urban agriculture should involve various sectors and disciplines,
including: agriculture; urban land use planning; health; waste management; social housing and slum upgrading; and park and nature management.

Moreover, urban producers, and the CBOs and NGOs supporting them, should be involved in the planning process. According to Allen (2001) the most important aspect of strategic urban planning is related to the participation of the urban poor themselves in the analysis of the situation, in the definition of priorities and in action planning and implementation. Such consultative processes will make the outcomes of policy development and action planning not only robust and comprehensive, but also accepted and sustainable. Increasingly, this is being recognized and incorporated in urban planning approaches such as the multi-actor planning methodologies adopted by Local Agenda 21 and the Sustainable Cities Programme.

In Chapters 2 to 4, the partners in the RUAF Foundation present the experiences they gained during the last five years in the ‘Cities Farming for the Future’ programme regarding multi-stakeholder policy formulation and action planning (MPAP) on urban agriculture in over 20 cities in 17 countries (see also www.ruaf.org).

Chapter 2 focuses on the MPAP approach: the principles and main working procedures of the approach are explained and the main experiences gained regarding each of the phases in the strategic planning process are presented.

In Chapter 3 seven city cases are briefly presented to further illustrate the practical application of the MPAP approach and the results achieved to date.

In Chapter 4 an overview is provided of a range of policy measures and development strategies regarding urban agriculture that have been applied with success in a number of cities as ‘food for thought’ for policy makers and practitioners in other cities.

Finally, a number of resources on urban agriculture and multi-stakeholder planning are provided.

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