



Introduction to urban agriculture¹

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Urban Agriculture

Urban agriculture can be defined as the growing of plants and the raising of animals for food and other uses within and around cities and towns, and related activities such as the production and delivery of inputs, and the processing and marketing of products. Urban Agriculture is located within or on the fringe of a city and comprises of a variety of production systems, ranging from subsistence production and processing at household level to fully commercialised agriculture.

Urban agriculture is generally characterised by closeness to markets, high competition for land, limited space, use of urban resources such as organic solid wastes and wastewater, low degree of farmer organisation, mainly perishable products, high degree of specialisation, to name a few. By supplying perishable products such as vegetables, fresh milk and poultry products, urban agriculture to a large extent complements rural agriculture and increases the efficiency of national food systems.

Having reviewed the related literature, Mougeot (2000) concludes that the most important distinguishing character of urban agriculture is not so much its location - or any other of aforementioned criteria - but the fact that it is an integral part of the urban economic, social and ecological system: urban agriculture uses urban resources (land, labour, urban organic wastes, water), produces for urban citizens, is strongly influenced by urban conditions (policies, competition for land, urban markets and prices) and impacts the urban system (effects on urban food security and poverty, ecological and health impacts).

Growing urban poverty, hunger and lack of formal employment, as well as the special opportunities that a city provides for farmers (including the growing urban demand for food, herbs and plants, proximity to markets and availability of cheap resources such as urban organic wastes and wastewater) have stimulated the development of a

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diversity of agricultural production systems in and around cities, often specialised in perishable products, such as green leafy vegetables, milk, eggs and meat, taking advantage of vacant open spaces in and around cities.

Although some forms of urban and peri-urban agriculture are based on temporary use of vacant lands, urban agriculture as such is a permanent feature of many cities in developing as well as developed countries.

Potentials and Risks of Urban Agriculture

Urban agriculture, as with other urban activities, has both positive and negative social, environmental, and economic impacts and externalities. Externalities are transformations of the physical or social environment caused, in this case, by urban farming beyond the limits of its productive system (Fleury and Ba, 2005). The risks of urban agriculture relate to human health and the environment, if certain associated risks are not taken into account and consequently proper preventive and guiding measures are not implemented. The main potentials and risks of urban agriculture can be summarised as follows:

Urban 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. In urban settings, lack of income translates more directly into lack of food than in rural settings (cash is needed to buy food). The costs of supplying and distributing food from rural areas to urban areas, or importing food for the cities, is rising continuously, and its distribution within the cities is uneven. As a consequence, urban food insecurity will continue to increase (Argenti 2000). In addition to enhanced food security and nutrition of the urban producers themselves (Nugent and Bourgue 2000), urban agriculture produces large amounts of food for other categories of the population. It was estimated that 200 million urban residents produce food for the urban market providing 15 to 20 percent of the world's food (Margaret Armar-Klemesu 2000).

Health

Improved access to fresh food as described above, directly relates to improved health. In most discussions, though, the health risks of urban agriculture are referred to in a negative context. A review of literature (Birley and Lock, 2000, Danso et al. 2003) indicates that, although insight into the potential health risks of urban agriculture is growing, detailed information on the actual health impacts of urban agriculture is still scanty (which pretty much is the case today). However, the health risks associated to urban agriculture should be taken seriously and health impacts assessments and adequate regulatory and preventive measures should be put in place. But the fear of contaminated food and other health risks should not be exaggerated and need to be compared to those of rural agriculture.

The main health risks associated with urban agriculture can be grouped into the following categories:

- Contamination of crops with pathogenic organisms as a result of irrigation with water from polluted streams and insufficiently treated wastewater or the

unhygienic handling of the products during transport, processing and marketing of fresh products;

- Spread of certain human diseases by mosquitoes and scavenging animals attracted by agricultural activities;
- Contamination of crops due to prolonged intensive use of agrochemicals;
- Contamination of soils and products with heavy metals due to traffic emissions and industrial effluents;
- Certain diseases transmitted to humans by keeping livestock in close proximity without proper precautions being taken.

Local economic development

Urban agriculture is an important source of income for a substantial number of urban households. In addition to income from sales of surpluses, farming households save on household expenditure by growing their own food. Since poor people generally spend a substantial part of their income (60 – 80 percent, Mougeot, 2005) on food, the savings can be substantial. Urban agriculture also stimulates the development of micro-enterprises for the production of necessary agricultural inputs (e.g. fodder, compost, and earthworms), the processing, packaging and marketing of products and the rendering of other services (e.g. animal health services, bookkeeping, transportation).

Social inclusion and gender

Urban agriculture may function as an important strategy for poverty alleviation and social integration of disadvantaged groups (such as immigrants, HIV-AIDS affected households, disabled people, female-headed households with children, elderly people without pension, youngsters without a job) by integrating them more strongly into the urban network, providing them with a decent livelihood and preventing social problems (Gonzalez Novo and Murphy 2000). Urban and peri-urban farms may also take on an important role in providing recreational and educational functions to urban citizens or play a role in landscape and biodiversity management.

A large majority of the world's urban farmers are women (around 65 percent). Promotion of urban agriculture without due attention to gender aspects may lead to a (further) increase in women's burden of work.

Urban environmental management

The disposal of waste has become a serious problem in many cities. Urban agriculture can contribute to solving this problem by turning urban wastes into a productive resource through compost production, vermiculture, and irrigation with wastewater. Urban agriculture and forestry can also positively impact upon the greening of the city, the improvement of the urban micro-climate (wind breaks, dust reduction, shade) and the maintenance of biodiversity as well as the reduction of the ecological footprint of the city by producing fresh foods close to the consumers and thereby reducing energy use for transport, packaging, cooling, etc. Research in the Netherlands has shown that greenery around homes has a positive effect on people's health.

However, urban agriculture could contaminate local water sources if overly high inputs of chemical fertilisers and pesticides are used. The wastewater discharge from intensive poultry farms for instance can be high in micro-organisms and could contaminate drinking water supplies. Inappropriate farming practices may - under

certain situations - lead to reduction of vegetation or siltation of water bodies. Because of the under-valuation of urban agriculture and the stiff competition for land, urban agriculture is often pushed back to the marginal areas within a city such as wetlands and hill-slopes, where it may harm the fragile ecosystems if not properly guided.

Growing Attention for Urban Agriculture

Cuba, Argentina and Brazil (Zero Hunger Campaign) are well known examples of countries where substantial government support is given to the development of urban agriculture. Other countries such as Botswana, Zambia, Benin and China are preparing policies favourable to urban agriculture, often as part of a broader strategy (e.g. Food Security Policy, Poverty Reduction Strategy, Sustainable City Development Policy or Irrigation Policy). An increasing number of city governments have or are formulating policies and programmes on urban agriculture (Rosario in Argentina, Kampala, Dar es Salaam, and Bulawayo in Zimbabwe)

This trend is also reflected in a number of “Declarations on urban agriculture” in which local and national level policy makers have stated their formal commitment to develop policies and programmes on urban agriculture, as was the case of the mayors present at regional meetings in Quito (2000 – see box 1), Dakar (2002), Addis Abeba (2003) and Beijing (2004) and the ministers present in the Regional Ministers Conference on Urban Agriculture in Southern Africa, Harare 2003.

Box 1 Quito Declaration

At an international workshop on Urban Agriculture held in Quito, Ecuador, from 16 to 21 April 2000, “*Urban Agriculture in the Cities in the 21st Century*”, the participating mayors signed the following declaration:

“We affirm our promise to promote Urban Agriculture in our cities, with the objective to design and improve municipal policies and actions on urban agriculture, to strengthen food security, eradicate poverty, improve the environment and human health, and develop participatory governance”.

“We also affirm our decision to produce and disseminate methodological tools, guides and mechanisms that collect regional experiences and inform others about the elaboration and implementation of policies and municipal interventions related to urban and land use planning; re-use of wastewater; access to credit for urban agriculture; transformation and commercialisation”.

Signed by 22 countries in Latin America and the Caribbean.

The growing attention of local and national policy makers and practitioners is also reflected in the growing demand for inspiring examples of successful policies and programmes on urban agriculture as well as for training and (co-) funding of research and action programmes.

This can be attributed to several factors among which are:

- *The fast urbanisation process and the “discovery” that both urban poverty and urban food insecurity are rapidly increasing.* The quick urbanisation process has

created vast problems for urban authorities. Most cities have not been able to create sufficient employment opportunities for its population leading to a rapid development in the so-called informal sector, including urban agriculture.

- *The growing body of research data on urban agriculture and urban food security* providing data on the presence and persistence of urban agriculture in cities in the South and its importance for urban food security and income generation for the urban poor. Since the early nineties, IDRC's Cities Feeding People programme has encouraged action research on urban agriculture. In 2000, the international research organisations belonging to the Consultative Group on International Agricultural Research (CGIAR) included urban agriculture in their research agenda and initiated a group-wide research programme on urban agriculture under the name "Urban Harvest" with activities in many countries. Since then, several national research organisations have been including urban agriculture in their regular programmes (e.g. in Argentina, Kenya, Senegal, and Niger).
- *The growing attention to urban agriculture and urban food security by international organisations* such as FAO, UNDP and UN-Habitat and the growing attention given to such issues at International Summits. In 1996 some 40 international organisations involved in urban agriculture created the International Support Group on Urban Agriculture (SGUA) to establish a joint agenda and to coordinate their activities. UNDP and UN-Habitat have included urban agriculture in the Urban Management Programme (Latin American section) and have been working with municipalities in the region on the integration of urban agriculture into urban policies and planning. Recently this initiative has also been taken up by the African Network of Urban Management Institutions (ANUMI, 2005). FAO has integrated urban agriculture in its agenda and created an interdepartmental working group on urban agriculture and food security (now renamed as PAIA Food for the Cities). The FAO has organised regional consultations, in Stellenbosch, Bangkok and Nairobi (the last one in cooperation with UN-Habitat, IDRC and RUIAF). Special sessions and panels on urban agriculture were organised at the UN Conference on Human Settlements in Istanbul 1996, the WHO Healthy Cities Conferences in Athens 1996 and in Belfast 2002 and at the Habitat World Urban Forum Barcelona 2004, to mention a few.
- *The growing capacities at regional and local levels regarding urban agriculture.* IDRC organised regional training of trainers workshops in Senegal (1999), Quito (2001), Nairobi (2003) and Beirut (2005). Regional networks on urban agriculture have started functioning in Latin America (AGUILA), Francophone Africa (Reseau Francophone Agriculture Urbaine), the Middle East and North Africa (MENA Urban Agriculture Network) and South East Asia (Peri-urban Development in South East Asia - PUDSEA). RUIAF has established regional resource centres on urban agriculture and food security that have been very instrumental in pooling and disseminating the growing body of knowledge on urban agriculture and facilitating networking and capacity development at regional and city levels.

As a result of such developments, as well as the pressure by local poverty groups, urban farmers and NGOs, many city authorities have acknowledged the potential of urban

agriculture and are collaborating with other local stakeholders in efforts to maximise the benefits of urban agriculture while reducing the associated risks.

Box 2 Urban Agriculture and the Millennium Development Goals

The Millennium Development Goals (MDGs), which are agreed upon by member states of the United Nations, constitute an agenda for reducing poverty and improving livelihoods. They call for a concerted effort to find solutions to hunger, malnutrition and disease by reducing by half the number of people who suffer from hunger between 1990 and 2015. Eight Goals and 18 specific development targets, each with its own set of indicators have been agreed on (See www.unhabitat.org)

Urban agriculture is an important (complementary) strategy to achieve MDG 1 (Eradicate extreme poverty and hunger) as well as MDG 3 (Promote gender equality and empower women), MDG 6 (Combat HIV-AIDS and other diseases) and MDG 7 (Ensure environmental sustainability).

See for an extensive discussion: Mougeot, 2005.

City Dynamics; the context for urban agriculture

Rapid Urbanisation

The number of people around the world who live in and around cities is increasing steadily. The “State of the World Cities” by UN- Habitat (2004) predicts that by 2030, 60 percent of the world’s population will live in cities. The growth of cities is due to the natural growth of the urban population and to migration from the rural areas to the cities, with the former gradually becoming more important than the latter (Drescher and Iaquina, 1999). There is general consensus that urban populations will continue to grow rapidly in most developing countries in the decades to come.

The extent of urbanisation varies by region (UN Habitat, 2004). In Latin America, which is the most urbanised region in the developing world, has more than 75 percent, or 391 million, of its people living in cities and the urban population in the region will approach 539 million, or 81 percent of its projected total population of 665 million, by 2020. With the exception of Brazil, the urbanisation pattern in most countries in the region typically involves one very large city that accounts for much of the country's urban population. In 2005, sub-Saharan Africa's urban areas accounted for 34 percent of the total population of 611 million, which will approach 440 million, or 46 percent of its projected total of 952 million, by the year 2020. Global economic processes have stalled in sub-Saharan Africa, while the urban population is quickly growing, causing severe consequences for the livelihoods of people in urban areas. In Asia and the Pacific urban areas today account for 35percent of the total population of 3,515 million, and is expected to grow to 1,970 million or 46percent in the next 15 years. An increasing number of the region's poor live in urban areas.

Increasing urban poverty and food insecurity

Many cities cannot cope with such massive population growth. City authorities around the world face enormous challenges in creating sufficient employment, in providing basic services such as drinking water, sanitation, basic health services and education, in planning and maintaining of green spaces, in managing urban wastes and waste water and in decentralisation and creation of efficient local autonomy.

The increase in urban poverty is accompanying the urbanisation process and poverty is concentrating gradually in the urban areas (“urbanization of poverty”, Baud, 2000). A massive 40percent of the population of Mexico City, for instance, and a third of Sao Paulo's population is at or below the poverty line. According to UN-HABITAT, slum populations in urban areas of developing countries were estimated at 870 million in 2001 and are expected to increase by an average of 29 million per year up to 2020.

Growing urban poverty goes hand in hand with growing food insecurity and malnutrition in the urban areas. Both in the South and in the North, especially in the bigger cities, the urban poor find it increasingly difficult to access food. Food composes a substantial part of urban household expenditures (60-80percent for poor households) and the lack of cash income translates more directly into food shortages and malnutrition (Mougeot, 2005) in the city context.

This indicates that cities are quickly becoming the principal territories for intervention and planning of strategies that aim to eradicate hunger and poverty and improve livelihoods, requiring innovative ways to stimulate local economic development in combination with enhancing food security and nutrition. Urban agriculture is one such strategy.

Urban sprawl

Rapid urbanisation leads to a continuous extension of the city into the rural suburbs, bringing large areas under the direct influence of the urban centres. Around cities there are dynamic and expanding zones of interaction between urban and rural areas. This peri-urban interface (Brook and Dávila, 2000) is characterised by rapid land use changes and changing livelihoods. The traditional local agricultural and land distribution system is disrupted by urban newcomers seeking to buy land (for speculation, for mining of loam, sand and stones, for infrastructure development, for construction, for more urbanised types of agriculture) leading to an increase of land prices. In response, some of the traditional farmers are giving up farming, selling their land and switching to other income earning activities; in other households the males (mainly) are engaging in urban jobs while the females take main responsibility for the farming operations; yet another part of the (now) peri-urban farmers are starting to intensify their farming systems and to adapt to the new more urban conditions (change of crops, market orientation, use of new technologies such as production under covers, direct marketing, use of urban organic wastes or wastewater etc.). The interdependence between urban and surrounding rural areas creates the need for integrated development approaches (Purushothaman and Brook, 2004), which calls for rethinking domains of interest, institutional change and innovative planning approaches.

City renewal

Cities are in a constant process of building and decay. Existing open spaces get built up, and the formal or informal temporary users of such areas are removed (as is regularly happening to many urban farmers who are forced to find an alternative location or give up farming). Meanwhile, degenerated residential, office or industrial areas are demolished, creating new open spaces that may stay vacant for a long time until a new purpose and the corresponding investments are found. New roads and power lines continue to be constructed, creating new vacant open spaces as

reservations for these structures. Often such newly created open spaces are gradually occupied by urban producers (informally or through temporary leases). Urban agriculture can therefore be characterised as a form of “shifting cultivation” - although it is a permanent element of the urban system, its locations within the city may vary over time.

Other city dynamics

Other city dynamics that directly influence the development of urban agriculture, and how and where it is practised, are urban traffic and industry (negatively influencing the quality of soils and irrigation water), new demands from urban citizens (need for recreational spaces, new products), changes in urban zoning and related norms and regulations, changes in the urban labour market etc.

These city dynamics take place in a world which is opening up and becoming more global, but at the same time is seeking a more local focus, decentralisation and maintenance of local socio-cultural identity (Baud, 2000). Both tendencies influence urban agriculture; globalisation leads to new products entering the market, more information available in general, and changing consumer preferences and thus leading to increased buying in super markets; the local focus trend leads to preferences for locally-grown fresh foods and direct producer-consumer linkages (see for instance chapter 6 in this volume).

Development of Urban Agriculture in Response to Urban Dynamics

Urban agriculture has always been part of city life. It has never ceased to exist, but it has adapted to changing situations. Urban citizens develop many different strategies to improve their livelihoods and urban agriculture is one of them. Urban agriculture is responding in three main ways to these urban dynamics (van Veenhuizen, 2006 forthcoming).

The first is the response of the urban poor and unemployed to urban poverty and food insecurity/malnutrition. Sometimes this is due to a temporary crisis situation such as a natural disaster (Mitch in Honduras, drought in Bolivia), a temporary economic crisis (Russia after the transition to capitalism), a war (East-Congo) or an epidemic (Malawi). However, many of these urban poverty and hunger problems have become structural and current trends show that urban agriculture will have a longer term role as a social security net for poor and disadvantaged urban households.

The second is as a response of the urban poor as well as people from other social classes to the opportunities and relative advantages that the urban environment provides for agricultural producers: direct access to urban consumers and markets, availability of cheap inputs such as urban organic wastes and wastewater, closeness to institutions that provide market information, credit and technical advice, new urban demands etc.

The third adaptation of urban agriculture is a direct response of urban farmers to conducive urban policies and programmes, stimulating and enabling urban agriculture to fulfil certain functions required for sustainable city development: local economic development and food supply as well as recycling of wastes, urban greening, maintaining open green buffer zones, provision of recreational services, mitigation of HIV-AIDS, social inclusion of disadvantaged groups etc.

It is no surprise then, that agriculture within cities can have many different functions. Some of the functions of agriculture can be valued in monetary terms while with others this is hardly possible (aesthetical or sentimental values). The sustainability of urban agriculture is related to this multi-functionality. Urban agriculture adapts and develops along with the city according to the wishes of stakeholders who represent these diverse functions. Therefore, new forms of governance, institutions, and policies need to be crafted through processes that seek synergies and involve multiple stakeholders (van de Berg and van Veenhuizen, 2005).

Policy Making and Action Planning on Urban Agriculture

When local authorities come to understand the role urban farmers can play in various urban policy areas rather than just prohibit or (temporarily) tolerate urban agriculture, they will seek to formulate policies that facilitate and regulate urban agriculture so as to maximise the benefits of urban agriculture whilst preventing or reducing the associated risks.

Urban agriculture has a significant share in the food supply of many cities in the world, supplying especially perishable products such as vegetables, fresh milk and poultry products, but important differences are found between urban and rural agriculture. This has important consequences for the design of policies and support programmes.

Policy dimensions of Urban Agriculture

Dubbeling (2005) and Cabannes (2004) describe three main policy dimensions of urban agriculture that may help to focus and differentiate policies regarding urban agriculture (see also figure 1).

A first, the *social* policy dimension refers mainly (but not exclusively) to *subsistence oriented* types of urban agriculture that form part of the livelihood strategies of (especially) the urban poor and that are mainly focused on producing food and medicinal plants for home consumption. In addition, the expenses of the family on food and medicines are reduced and minor cash income is generated from sales of surpluses. These households need additional income from other sources than agriculture to survive. Examples include home gardening, community gardening, institutional gardens at schools and hospitals, and open field farming at micro scale with low levels of investment. These systems show little direct profitability but have important social impacts such as social inclusion, poverty alleviation, community development, HIV-AIDS mitigation etc.

The *economic* policy dimension is more related to *market oriented* types of urban agriculture. Activities are undertaken (mainly) by small-scale family-based enterprises and (some) larger scale entrepreneurial farms run by private investors or producer associations. The activities not only refer to food production (e.g. irrigated vegetable production, stall-fed dairy production) but also to non-food products (medicinal and aromatic herbs, flowers, ornamental plants). These commercial farms are embedded in a chain of small-scale and larger enterprises involved in inputs delivery (e.g. compost, fodder), processing and marketing.

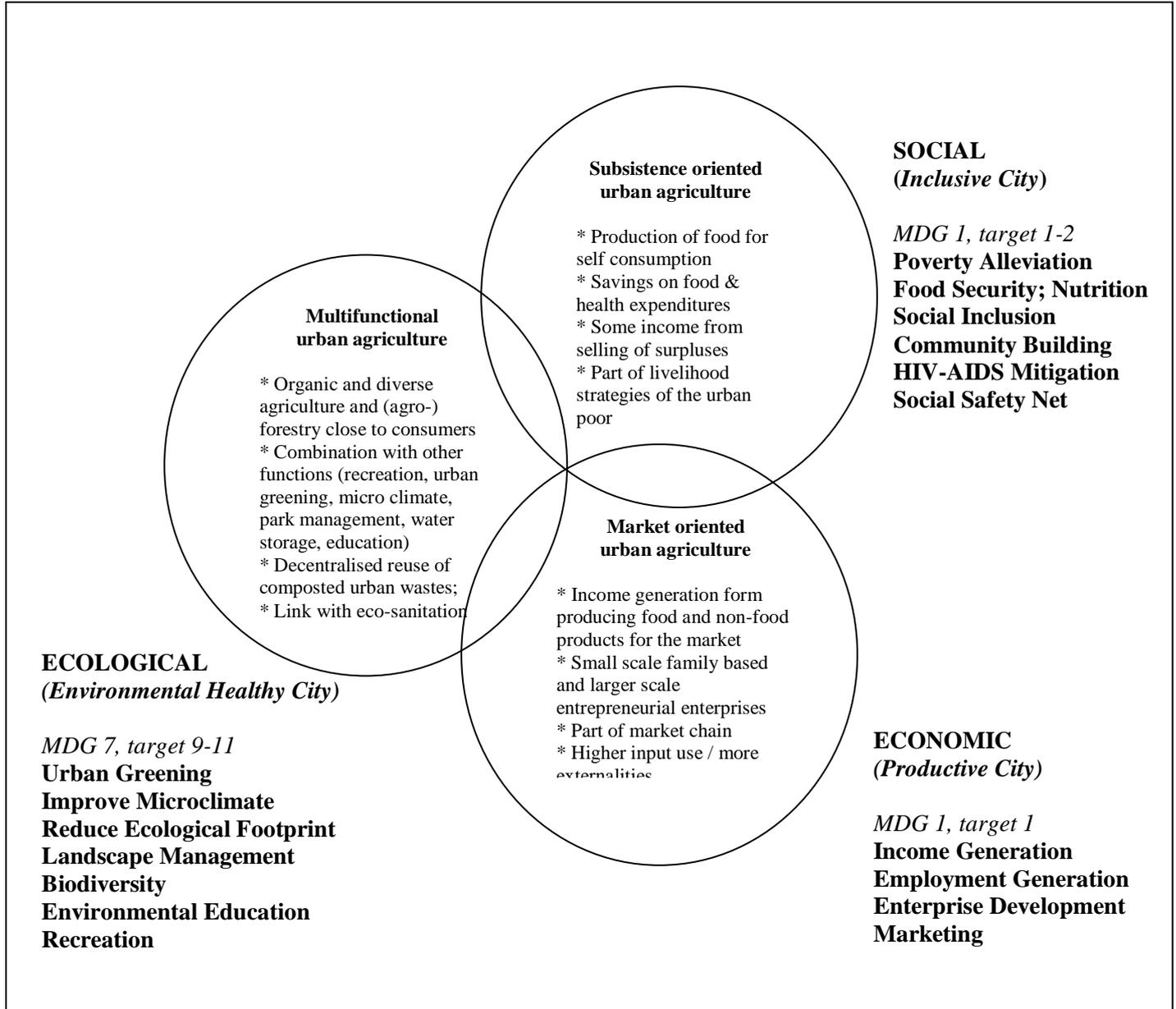
These types of urban agriculture have more economic impact and higher profitability, but their externalities for the city and urban populations, especially those of the intensive larger scale enterprises, tend to be higher (e.g. risk of contamination of soils and water due to intensive use of agro chemicals, health risks due to use of contaminated water for irrigation and risks of zoonosis).

The *ecological* policy dimension refers to types of urban agriculture that have a *multi-functional* character: besides provision of food and generating income they play a role in environmental management and provide other services demanded by urban

citizens: decentralised composting and reuse of organic wastes and wastewater (including nutrients), urban greening and improvement of the urban climate (shade, O₂, dust reduction), landscape management (parks, buffer zones, flood or earthquake prone or ecologically valuable zones that should be kept free from construction), provision of opportunities for leisure and recreational activities, water storage etc. In order to allow such a combination of functions, multi-functional agriculture will have to adopt agro-ecological production methods, link up with eco-sanitation and decentralised sustainable waste management, as well as with parks, nature and recreation planning and management.

The analysis of the actual urban farming systems and the discussion of alternative policy measures could be directly linked with one or more of the above mentioned policy areas, depending upon the actual situation in the city and the existing policy priorities. A local government concerned about the growing food insecurity or the exclusion of certain categories of the population will probably focus on the “social” dimension of urban agriculture. Another city - mainly interested in local economic development- will focus on the “economic” dimension of urban agriculture or seek to stimulate subsistence farmers to move into the market sector. Local authorities mainly concerned about the poor urban living climate, the growing waste management problems, or the negative environmental and health effects of market-oriented urban agriculture, may concentrate on the ‘environmental’ dimension of urban agriculture, or promote a shift from high-input commercial agricultural production towards sustainable and multi-functional agriculture.

Figure 1 Policy dimensions and main types of urban farming



Based on Cabannes and Dubbeling (2005)

Multi-Actor Policy Development and Action Planning

Due to the cross cutting and multi-functional nature of urban agriculture, policy development and action planning on urban agriculture should involve various sectors and disciplines: agriculture, health, waste management, community development, parks and nature management, among others.

Moreover, urban farmers, and the CBOs and NGOs supporting them, have to 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 recognised and incorporated in urban planning approaches such as the multi-actor planning methodologies adopted by Local Agenda 21 and the Sustainable Cities Programme.

Box 3 Multi-stakeholder Policy making and Action planning on Urban Agriculture

Multi-stakeholder planning processes on urban agriculture have been, amongst others, applied by Urban Management Programmes in Quito-Ecuador, Rosario-Argentina and Dar Es Salaam-Tanzania. Similar approaches have been used in promoting sustainable food systems through Food Policy Councils (Toronto, Chicago and Vancouver-Canada). The Multi-stakeholder Policy making and Action Planning (MPAP) approach that is used by the RUAF partners in the Cities Farming for the Future programme is described in chapter 2 of this volume (see also www.ruaf.org).

In most cases a platform on urban agriculture or urban food policy is established, involving all direct and indirect stakeholders in urban food production and consumption, assisted by one or more working groups. This multi-stakeholder forum functions as a platform for dialogue and consensus building among the various stakeholders regarding the following: problem definition, agenda setting and identification of priorities; making choices among alternative strategies and policy instruments available; coordination of the drafting of action plans and participatory budgeting; coordination of the implementation and the results obtained; drawing lessons and adjustment of strategies.

Strategies for the Development of Safe and Sustainable Urban Agriculture

Although urban agriculture takes place under varying socio-political conditions and policy regimes urban policy makers and support institutions can substantially contribute to the development of safe and sustainable urban agriculture by:

- Creating a conducive policy environment and formal acceptance of urban agriculture as an urban land use;
- Enhancing access to vacant open urban spaces and the security of agricultural land use;
- Enhancing the productivity and economic viability of urban agriculture by improving access of urban farmers to training, technical advice, and credit;

- Supporting the establishment and strengthening of urban farmer organisations;
- Taking measures that prevent/reduce health and environmental risks associated with urban agriculture (farmer training on health risks and related management practices, zonification, quality control of irrigation water and products).

Creation of an enabling policy environment

Formal acceptance of urban agriculture as an urban land use and integration into urban development and land use plans is a crucial step towards effective regulation and facilitation of the development of urban agriculture. Existing policies and by-laws regarding urban agriculture will have to be reviewed in order to identify and remove unsubstantiated legal restrictions and to integrate more adequate measures to effectively stimulate and regulate the development of sustainable urban agriculture.

A second important step is the creation of an institutional home for urban agriculture. Conventionally, sector policies have been defined under the assumption that agriculture refers to the rural sphere and will be attended to by institutions other than the urban ones, whilst most agricultural organisations don't operate in the urban sphere (Tacoli, 2001). As a consequence, urban agriculture is receiving little policy and planning attention and development support.

Municipal authorities can play a key role in filling this gap, for instance by selecting a leading institute in the field of urban agriculture with an urban agriculture office or department, and by establishing an interdepartmental committee on urban food production and consumption. Also important is stimulating the dialogue and co-operation among the direct and indirect stakeholders in urban agriculture. This can be done by setting up a multi-actor platform and working group on urban agriculture that organises the joint analysis of the presence, role, problems and development perspectives of urban agriculture in the city and coordinates the process of interactive formulation of policies and the planning and implementation of action programmes by the various actors.

Enhancing access to vacant land

Land is a very important resource for urban agriculture, and its availability, accessibility and suitability are of particular concern to urban farmers. Contrary to the common belief even in highly urbanised areas surprisingly high amounts of vacant land can be found that could be used for agriculture on a temporary or permanent basis. City governments may facilitate access of urban farmers to available urban open spaces in various ways. Box 1.5 provides examples of measures taken by various cities in the South to enhance access of poor urban farmers to land (see also the proceedings of the RUAF-Habitat E-conference "Optimising Agricultural Land Use in the City, 2003 at www.ruaf.org).

Box 5 Facilitating Access to Land for urban agriculture

- a. Making an inventory of the available vacant open land in the city (through participatory methods and GIS) and analysing its suitability for use in agriculture (as in Cienfuegos, Cuba; Piura, Peru; Dar es Salaam, Tanzania).
- b. Creating a Municipal Agricultural Land Bank which brings those in need of agricultural land in contact with landowners in need of temporary or permanent users (as in Rosario, Argentina).

- c. Stimulating owners of open vacant land (including institutional owners) to give this land on medium-term lease to organised farmer groups, by providing a tax reduction to land owners that do so (as in Rosario, Argentina) or by levying municipal taxes on land laying idle.
- d. Formulating a City Ordinance that regulates the (temporary) use of vacant land in the city (as in Cagayan de Oro, the Philippines)
- e. Providing of vacant municipal land to organised groups of urban farmers (as in Cagayan de Oro, Lima, Peru)
- f. Taking measures to improve the suitability of available tracts of land, e.g. by removing debris or providing access to irrigation water
- g. Demarcating zones for urban agriculture as a form of permanent land use and integrating these into city land use planning (as in e.g. Dar es Salaam, Tanzania; Kathmandu, Nepal). Such zones normally are more sustainable if located in areas that are not well suited for construction or where construction is not desirable, as on flood plains, under power lines, in parks or in nature conservation areas. Effective guidelines are developed with active farmer participation regarding the management practices to be adopted by urban agriculture in the various locations (e.g. the consultative workshops held in Rosario, Argentina and Kampala, Uganda).
- h. Providing assistance to reallocate urban farmers, especially urban farmers who poorly located and therefore may have serious health and/or environmental risks due to these locations.
- i. Including space for individual or community gardens in new public housing projects and slum upgrading schemes.

Enhancing the productivity and economic viability of urban agriculture

The productivity and economic viability of the various urban farming systems can be substantially enhanced. Agricultural research and extension organisations and other support organisations (i.e. credit institutions) have - until recently - given relatively little attention to agriculture in the urban environment. And where it has happened, most attention has been focused on the larger scale, more capital intensive and fully commercial farmers, especially peri-urban irrigated vegetable production, poultry and dairy production and aquaculture. Consequently, the potential for improvement of the efficiency in urban farming, which tends to be highly dynamic, but normally restrained due to urban farmers' limited access to training and extension services, is vast.

Governmental organisations and the private sector should be stimulated to provide training, technical advice and extension services to urban farmers, with a strong emphasis on ecological farming practices, proper management of health risks, farm development (e.g. intensification and diversification), enterprise management and marketing. Cost-sharing systems (farmers, municipality, sectoral organisations, private enterprise) will be needed to ensure sustainability of the extension system.

Most urban farmers are poorly organised, and if so not in a formal way, and thus lack channels and power to voice their needs. This limits the representation of their interests in urban policymaking and planning at the various levels and hampers their participation in development programmes. Well functioning farmer organisations can negotiate access to land, adequate tenure arrangements and access to credit. Such organisations may also take up roles in farmer training and extension, infrastructure

development, processing and marketing; and control / certification of the quality of the products marketed. More research is needed to identify existing farmer organisations and informal networks of (various types of) urban farmers, and to analyse their problems and needs and effective ways to further develop these organisations. Municipalities may also stimulate Universities, NGO's and CBO's present in the City to actively support farmer organisation and capacity development and their linkages with other urban farmer groups, private enterprises, consumer organisations and support organisations.

Adapted research and technology development activities jointly with urban farmers would have to be undertaken to solve current problems and to realise existing potential (see chapter 10). Urban agriculture is performed under specific conditions that require technologies different to those used in the rural context. Such specific conditions include among others: limited availability of space and the high price of urban land, proximity to large numbers of people (and thus a need for safe production methods), use of urban resources (organic waste and wastewater), and possibilities for direct producer-consumer contacts. Most available agricultural technologies need adaptation for use in these conditions whilst new technologies have to be developed to respond to specific urban needs (e.g. non-soil production technologies for use on roofs and in cellars; development of safe and economic practices for reuse of wastewater). Municipalities and other local stakeholders could voice research and technology development needs of their urban farmers to research institutes and national governments. Also more coordination between research institutes, agricultural extension organisations, NGOs and groups of urban farmers could be promoted.

Other important areas of intervention to enhance the productivity and economic viability of urban agriculture include:

- Enhancing access to inputs (e.g. urban organic wastes and irrigation water) and facilitating decentralised production of such resources (e.g. establishment of low-cost facilities for sorting of organic wastes and production of compost, animal feed or biogas; implementation of pilot projects with decentralised collection and treatment of household wastewater with a view on its re-use in local agricultural production); technical and financial support (eg tax reductions) for enterprises producing ecologically-friendly inputs such as natural fertilisers, bio-pesticides, soil amendments, open pollinated seeds etc..
- Enhancing the access of urban farmers to credit facilities.
- Facilitating (direct-) marketing by urban farmers: access to existing city markets, creation of farmers' markets, linking farmer and consumer organisations, use of urban farmers in supplying food for school feeding, HIV-AIDS and other food distribution programmes, and support to the creation of local infrastructure for small-scale food preservation and storage facilities (i.e., canning, bottling, pickling, drying, smoking).

Box 5 Localised Food Systems

Migration in Europe and North America saw its peak in the early part of the last century, leading to large cities where currently on average 75 percent of the total population seek to make a living. Many of these cities face problems of international migration or impoverishment due to industries being re-located to countries where labour is cheap. This opens new demands and changing roles for urban agriculture. In many of these cities a

counter trend of localising a part of the agricultural and food production is appearing, after a decades-old path of industrialisation and globalisation. This locally based food production or “civic agriculture” (Lyson, 2004) is characterised by its multi-functionality and community linkages. The food system operates within and is influenced by the urban social, economic and natural environment. The food system can be visualised at household, community and city level and relates production, processing and marketing of food produced in urban agriculture with food stemming from other channels (rural areas, imports) and their linkages and relative contributions to the health and nutrition of the population and their contributions to the local economy and environment. In this way strategies for the development of (certain types of) urban agriculture can be focused to the strengthening of the urban food systems, complementing other components of the urban food system.

Measures to reduce the health and environmental risks associated with urban agriculture

Rather than restricting urban agriculture out of fear - often unspecified – of health and environmental risks associated with urban agriculture, cities could instead design a series of accompanying measures to reduce these risks. The most important measure is to create mechanisms of close cooperation between agriculture, health and environment/waste management departments to assess actual health and environmental risks associated with urban agriculture and to design effective preventive/mitigating strategies for which the participation of all these sectors is required.

The following measures appear regularly as part of such strategies:

- Zonification and development of adequate norms and regulations: zones where certain types of urban agriculture are allowed (under certain management conditions) and others are excluded are defined, taking into account the population density and the ecological sensitivity of the area concerned.
- Promotion of waste water treatment at source and separation of industrial and municipal wastewater streams to reduce risks of contamination with heavy metals.
- Farmer education on the management of health risks: proper choice of crops and irrigation methods, hygiene, and management of animal wastes.
- Promotion of ecological farming methods to reduce risks related to intensive use of agrochemicals.
- Consumer education regarding washing of crops and heating of milk and meat products.

Cities Farming for the Future

A growing number of cities are designing policies and programmes on urban agriculture, applying multi-stakeholder planning approaches to identify effective ways to integrate urban agriculture into urban sector policies and urban land use planning and to facilitate the development of safe and sustainable urban agriculture. These aim at fostering the multiple functions of urban agriculture. There is a need however to explore the relationship between multi-functionality and sustainability of urban agriculture.

This involves the analysis of both positive and negative environmental functions as well as their compound effect. Areas for further research and development include: land tenure, legislation and urban land use planning; gender; methodologies in working with stakeholders, such as action research with urban farmers or with

planners to include agriculture in environmental planning, as a part of green belts, city parks and open spaces; development of new institutions or institutional arrangements such as urban and peri-urban markets and support to (commercial and subsistence) horticulture, aquaculture and livestock systems.

Facilitating such research and development requires the creation of adequate institutional frameworks that give urban agriculture an institutional home and ensure the active participation of direct and indirect stakeholders in the formulation and implementation of urban agriculture policies and action programmes.

When accepted and facilitated, urban agriculture will be sustainable, maintaining its dynamism and flexibility, adapting to changing urban conditions and demands, intensifying its productivity and diversifying its functions for the city, whilst reducing associated health and environmental risks and by doing so gaining more social and political acceptability. In certain parts of a city, the existing forms of urban agriculture may fade away or change its form and functions drastically, while new forms of urban agriculture may develop in other parts of that same city.

On the longer term, urban agriculture will be sustainable especially if its potential for multi-functional land use is recognised and fully developed. The sustainability of urban agriculture is strongly related to its contributions to the development of a sustainable city: an inclusive, food-secure, productive and environmentally-healthy city.

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