

2.2 Urban Horticulture



Urban horticulture in greenhouses.

(Picture: Henk de Zeeuw)

Urban and periurban horticulture in Africa and Asia: characterisation of the systems and issues of sustainability

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Definitions

Urban and periurban horticulture (UPH) refers to: (i) the production of a range of vegetables, aromatic plants, medicinal plants, flowers, ornamental plants, fruit trees and mushrooms, (ii) grown mainly in intensive production systems with high levels of inputs, (iii) located in the city or at its close periphery where there is competition for access to land between agricultural and other human activities (Moustier, 1999), (iv) the products of which are consumed in the city. This paper will study two aspects of the horticultural sector: marketing and production, essentially of vegetables, based on data from Africa and South-East Asia.

Marketing of urban and periurban horticultural products

Main supply system to the cities

The horticultural urban market is supplied by products from different areas: rural, periurban and urban, which can be located within the national territory or in foreign countries. There is a complementarity between the various origins, which may change over time. The periurban and urban productions account for a very large part of the supply of vegetable urban market, e.g. in the capital city of Hanoi (2.7 millions inhabitants). In this city, 80% of the vegetables are from the Province of Hanoi from a production area covering 7,095 ha, i.e. 118,628 tons (Mai Thi Phuong Anh, 2000). In Brazzaville, 65% of the marketed vegetables come from the urban gardens (Moustier, 1999).

The distribution between the different production areas fluctuates with the vegetable species. Soils, access to water, development of insects and diseases, climatic conditions, yields, costs of production, and most importantly the shelf life of the vegetables influence the location of vegetable production. The latter condition explains why, in most of the urban markets, leafy vegetables are from urban and periurban areas. In Brazzaville, the urban gardens supply 80% of the urban market; in Bangui, 100% ; in Bissau and Antananarivo, 90% (Moustier & David, 1997); in Dar-es-Salaam, 90% (Sabel-Koschella, 1998). Some leafy vegetables are well adapted to a hot and wet season. The very short shelf life of cut flowers such as roses and chrysanthemums also explains the development of this horticultural crop around Hanoi where they are grown in an area of 1,000 ha.

The season also influences the distribution of the supply of the urban market between rural and urban areas. In Bangui, the share of tomatoes from rural areas increases from 40% to 50% in the wet season. In Bissau, the share of tomatoes from urban areas increases from 10% to 20% in the wet season (David, 1992). Urban horticultural areas may also supply the urban market more regularly than rural areas. In Nouakchott, UPH supplies the urban market for nine months each year whereas the rural areas provide vegetables to the city for three months (Margiotta, 1997). Around Hanoi, choysum and leafy mustard are grown all year

round. In Dar-es-Salaam, amaranth is also grown throughout the year. This tendency is increased by the urban and periurban farmers' need to derive a year-round income from various high-value crops. This bias towards UPH may be due to production constraints and access to transportation infrastructure during the rainy seasons or to socio-economic causes. In some countries where flooding areas expand every year, however, it is easier to find available areas to grow vegetable in rural areas (Phnom Penh, Dacca).

Consumer demand

Even where consumption is low, consumer demand is the driving force behind urban and periurban production. In developing countries, consumption of vegetables is generally lower than the FAO recommendation of 75 kg/year/inhabitant (205 g/day/capita). The importance attached to vegetable consumption depends on the population group. Over the period 1994-1998, consumption in Vietnam was higher in urban areas (182 g/capita/day) than in rural areas (122 g/capita/day), but lower than in mountainous areas (196 g/capita/day) (Nguyen Thi Lam, Ha Huy Khoi, 1999). In Bangladesh, the consumption of vegetable was higher in urban areas than in rural areas (Ali, 2000).

Table 1: Monthly per capita consumption of vegetables (kg) in Bangladesh (From Ali, M. (ed.) 2000)

Household	Total vegetables	Leafy vegetables	Potato	Banana, papaya & eggplant	All others vegetable
Urban	6.20	1.42	1.67	0.82	2.29
Rural	5.13	1.08	1.13	0.80	2.12

Urban consumption is related to size of households, incomes and socio-cultural characteristics (Bricas, 1998). In Africa, most frequently consumed vegetables are tomato, onion and leafy vegetables. On the other hand, in Brazzaville for instance, the importance of vegetables varies from one socio-economic group to another.

Table 2: Most frequently consumed vegetables per socio-economic group in Brazzaville (Congo), ranked by importance (From Moustier, P. (Ed.) 1999)

Socio-economics groups	
Congolese households	Cassava leaves, cherry tomato, pakchoy, roselle, gnetum, dry kidney bean
Non-Congolese African households	Potato, cassava leaves, cherry tomato, dry kidney bean, amaranth, lettuce
Expatriates	Potato, "European-type" vegetables

In Cagayan de Oro, most frequently consumed vegetables are: tomato, eggplant, sweet pepper, common cabbage, papaya and cauliflower (Schnitzler et al., 1999).

Consumers' decisions are based on price, availability of the product on the market, and on the qualitative characteristics of the products. Fluctuating vegetable prices are a recognised characteristic of vegetable markets all over the world.

Traditional habits also have a very strong influence on consumer demand for specific products. In many countries, the main demand for flowers occurs around Mother's Day, Valentine's Day, and the Christmas period. In Vietnam, the Tet celebration is the opportunity to offer two ornamental trees: kumquats bearing mature orange fruits and peach trees in blossom. In urban and periurban areas in Hanoi, specific ornamental fruit-tree specialists have set up this type of production, which takes one year of preparation from buying a young tree.

Organisation in the commodity chain

Farmers have two main options for marketing:

- Direct marketing to consumers: by a family member, in retail markets, or at farm gate
- Marketing to intermediate marketing bodies: wholesalers, assemblers, cooperatives or producers' associations, at the farm gate or in markets. These intermediaries may sell directly to retailers such as supermarkets or to other wholesalers.

Farmers' organisations are often described as an efficient system for producers to obtain favourable prices and income security. Yet there are a number of obstacles to collective marketing, including the risky nature of horticultural production and marketing, the scattered location of plots, and the lack of farmers' information on consumer demand and supply sources.

Information systems

Information at farmer level means access to data on prices on the wholesale and retail markets, on production techniques, new outlets, and favourable periods of time for marketing. Access to information about retail prices is one of the main problems for the urban or periurban farmer. The problem may be less important for urban farmers than for the rural farmer because the distances from the farm to the wholesale or the retail markets are shorter. Moreover, in many cases, such as in Hanoi, a family member goes to the wholesale market everyday, so farmers have access to price trends. The proximity of the city allows farmers to gain better insight into consumer demand, to be receptive to new production options, to compare their performance with farmers located in other areas, and to have access to improved technologies.

On the marketing side, information concerns quantity and quality of the vegetables and final retail price. With regard to urban and periurban commodity chains, it can be said that if the product quantity still seems a large problem due, in most cases, to the lack of farmers' organisations, reactivity to new outlets and to retail prices has great advantages. The trader is a key player in the development of innovations mainly through the confident interrelations that he can establish with the end-consumer and with his suppliers.

Production of urban and periurban horticultural crops

Farming systems and environment

Most of the farming systems in the big cities of developing countries do not require much starting capital. Use of labour, however, is far higher than in cereal crop production. In northern Vietnam, for instance, AVRDC has shown that vegetables require twice as much labour per unit of land (456 days/ha) as rice (223 days/ha). The classification of agricultural

production systems proposed by Moustier is well suited to horticultural systems (Moustier, 2000): (i) subsistence home production, (ii) farm-type commercial production systems, (iii) entrepreneurial production systems, (iv) multicropped 'rurban' production systems. Within each group, different kinds of technical systems are used: roof production, open space in the city, hydroponics, organoponics, high-level input production systems, protected cultivation, standard cultivation. Most of the time, horticultural farming is a full-time job. In some locations, however, it becomes a part-time activity for employees, workers, shopkeepers, craftsman, etc. In Dakar, for instance, such persons are called Sunday farmers. They are urban civil servants or employees of private companies who buy land for producing fruit trees and vegetables. Traditional farmers consider that these newcomers are robbing them of their lands and market opportunities.

Land is one of the main constraints in the horticultural system. The average garden surface area for vegetable farmers is rather low: 700m² in Brazzaville, 1,500 m² in Bangui, 760 to 900 m² in Bissau, 700 m² in Antananarivo, 6,750 m² in periurban areas and 500 m² in intra-urban areas in Dar-es-Salaam, 1,490 m² in Hanoi. The harvest is either used for auto-consumption (mainly in the case of intra-urban subsistence-oriented home gardening) and/or for sale. There are two groups of horticultural farmers: (i) farmers who deal only with horticultural products (medicinal plants, ornamental plants, flowers, vegetables, and fruit trees), and (ii) those who also produce cereals or breed animals. In Hanoi province, for instance, 78% of the cultivated area is covered with rice and maize: most of the horticultural farmers also produce food crops and some animals. Whatever the level of specialisation, horticultural activity faces similar urban conditions: (i) problems of quality of natural resources (water, air, soil, light) and inputs (water, fertilizers) needed for production, (ii) high population density that may limit the use of inputs and the management of horticultural waste products.

Industrial activities, wastewater and vehicle traffic increase the levels of heavy metals in the air (lead from the vehicle), in the soil and in the water (cadmium, zinc from chemical and industrial activities). The presence of heavy metals in the environment reaches the plants through the air (roadside dust on the leaves), the underground and surface water, and the soil (deposit of dust and supply by organic and inorganic chemicals). The consequence is an increase of heavy metal content in vegetables for human consumption. In Bangkok, the presence of a permanent fog decreases the light intensity, reducing the photosynthesis activity of the plant. The presence of air pollutants such as sulphur dioxide and fluoride may reduce growth and yield through a reduction in chlorophyll content, and, hence, the inhibition of photosynthesis (Midmore, 1998).

Cropping systems and crop management

The crops

Vegetables usually include between 60 to 100 species. The range of the ornamental crops is larger. Classification may be based on length of cycle, inputs requirements, and risks related to climate and pests. In Central Africa, vegetables are divided into four groups:

- Short-cycle indigenous leafy vegetables (less than one month): amaranth, petersill, local sorrel, etc. that grow with very few disease problems. They are used very commonly, but generated incomes are low due to low prices.
- "Long-cycle" indigenous leafy vegetables (one – two months) with few risks for production and marketing: glossy nightshade, cabbage, chives, Malabar spinach, which provide higher revenues.

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- Short-cycle (less than two months) “temperate origin” vegetables, e.g. lettuce and parsley, with risks at production and marketing levels situated between those of leafy vegetables and long-cycle temperate vegetables.
- Long cycle temperate vegetables (more than two months) such as tomato, carrot, purple eggplant, and cucumber that present some risk in production and marketing. They provide the highest revenues, but also present the highest risks.

Another classification is based on internal characteristics including taste, shape, size, colour, origin and shelf life. Vegetables can be ranked in five groups according to their shelf lives:

- very short (1-2 days): day lily and leafy vegetables, leafy mustard, lettuce, amaranth, choysum, jute, spinach, Malabar spinach, pumpkin leaves, sweet potato leaves, cassava leaves, Ethiopian kale, chinese kale
- short (3-7 days): pakchoi, okra, radish, green pea, asparagus
- medium (1-2 weeks): mushroom, sweet pepper, tomato, watermelon, musk melon, cucumber, yard long bean, squash, broccoli
- medium-long (3-4 weeks): common cabbage, cauliflower, eggplant, Chinese cabbage, chilli pepper
- long (more than 4 weeks): onion, garlic, pumpkin, shallot

Year-round vegetable production system or seasonality

The objective of periurban farmers is to produce horticultural products for as long as possible during the year in order to obtain a regular income. They face a number of constraints, though: (i) adverse climatic conditions such as excess of water, lack of water, high temperature; (ii) lack of technical know-how; (iii) lack of on-farm and public infrastructures; (iv) competition between suppliers. Seasonality in supply of vegetables is observed in all vegetable markets in the world. The development of urban and periurban horticulture may decrease the variation of the markets' supply during the year, because of easier access to new off-season technologies.

For year-round production, crops may be cultivated on the same fields or on different fields throughout the year. If horticultural crops are grown continually on the same fields, the length of the period between crops has to be very short. This favours the permanent presence of pests in the soils and the decrease of soil fertility. One solution is hydroponics, to be described in chapter two of this publication.

Production during hot and wet season

Some vegetable species do not adapt to high temperatures and a rainy season. Lettuce yields are still rather low during this season from June to October in the northern inter-tropical and tropical zone. Many breeding programmes have been conducted since 1950 in tropical areas of Japan, the United States, Europe, and Taiwan. Many new varieties have been successfully obtained for resistance to disease (tomato, eggplant, cucumber, melon, sweet pepper, cabbage, etc.) or for better adaptation to high temperatures (tomato, common cabbage). Still, climatic variables (heat, low irradiance) limit the development of the plant. Tomato yield during the hot and rainy season, for instance, is half of the cool season yield. There are still a number of limits to production in the hot and rainy season, especially in the intensive urban and periurban systems.

To avoid the direct physical damaging effects of the rain, it is recommended that vegetables be grown under plastic shelter houses with good static ventilation to avoid the negative effect of temperature increase due to the plastic cover. Growing tomato, cucumber, and lettuce under shelter protects the plants from heavy rains. In the hot and wet season, high temperature and high humidity are factors favouring the development of plant pathogens such as fungi (anthracnose due to *Collectotrichum spp.*, fruit rots, downy mildew, Southern blight due to *Sclerotium rolfsii*) and bacteria (bacterial wilt due to *Ralstonia solanacearum*, soft rot caused by *Erwinia spp.*). For solanaceous crops (tomato, pepper, eggplant), frequent cropping also leads to the development of bacterial wilt. Three solutions may limit the damaging effect of this disease: long-term rotations with crops that are not sensitive to the bacteria; growing resistant varieties; growing tomato –the most sensitive plant to this disease– grafted on bacterial wilt resistant solanaceous crops.

On the other hand, periurban production may have to face the problem of lack of water in particular conditions, for instance in Accra. There, the main production occurs during the rainy season and at the beginning of the dry season with the associated risk of disease development.

The development of permanent vegetable crops on a restricted location increases the risk of insect pest development. The absence of adequate rotations leads to problems in controlling pest development. This is one of the causes of the excessive use of pesticides.

Use of pesticides

Chemical pesticides have played an important role in yield increases for more than fifty years. Periurban horticulture has increased this phenomenon due to easy access to the products (via national and international companies, retailers, and wholesalers), technical information, high value of the crops, and the effectiveness of the chemicals. There are three major risks, however: (i) the health risk for consumer, (ii) the risk of polluting the environment (mainly water sources), and (iii) the user risk. Surveys have been conducted regularly on the use of chemicals, their rate of application and the period between the last application and the harvest for marketing.

In Hanoi, low-cost pesticides (organophosphates, pyrethroids, carbamates) with high toxicity (classes I and II) are very commonly used, with little information provided about how to use them. Application rates are much higher than the recommended rates (table 3) for most of the insecticides used. This and the high spraying frequency are the causes of high pesticide residues in the marketed vegetables.

Table 3. Pesticide application rates on Cruciferae (kg a.i./ha/time) in Thanh Tri and Tu Liem districts (1995) (From, *Tran Khac Thi 1999*)

Pesticides	Tu Liem	Thanh Tri	Recommended rate
Wofatox 50 EC (methyl parathion)	1.25	1.50	0.50
Monitor 70 SC (methamidophos)	1.05	1.80	0.70
Dipterex 90 WP (trichlorfon)	1.50	0.50	0.90
Sherpa 25 EC (cypermethrin)	0.20	0.20	0.12

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Sumicidin 20 EC (fenvalerate)	0.20	0.20	0.12
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Pesticide presence in the city's surface water and wastewater for crop irrigation constitutes a high risk for urban and periurban horticulture, even though this presence is not due solely to urban and periurban horticulture. In Bangkok, a survey has shown residues of organochlorine and organophosphate in the irrigating water (Eiumnoh.& Parkpian, 1998).

Fertilizer management

Two main groups are distinguished: organic fertilizers and chemical (or inorganic) fertilizers. Intensive production of vegetables and ornamental flowers has always made heavy use of organic fertilizers. The quantity used varies from a few tons/ha to fifty or even a hundred tons per year. The organic fertilizers provide most of the micronutrients and improve the structure of the soil. Organic fertilizers have various origins: manure from livestock or poultry; compost from vegetable waste; waste from urban activities: sewage sludge, night soil, household waste, etc. For many centuries, periurban and urban agriculture have managed and recycled the urban waste products (Fleury & Moustier, 1999). These practices cause some risks to the environment: pollution of soils with heavy metals from sewage sludge, pollution of water with nitrates due to huge quantities of organic manure; but also to the health of the consumer (see below). In South-east Asia, use of fresh night soil is a common practice even though it disseminates human pathogens.

The disadvantage of these solid organic sources for vegetable production is that they release nutrients (especially nitrogen) slowly. Liquid fertilizers act faster. This is why these liquid organic fertilizers are often used on the short-cycle leafy vegetables such as amaranth, choysum, and mustard. Often, research has been on combining organic fertilizers and inorganic ones to enhance their efficacy (AVRDC, 2000). In Hanoi, liquid organic fertilizer, such as pig urine, is used to supply nitrogen during crop growth. AVRDC is working on producing an organic liquid fertilizer that does not endanger consumer health.

Inorganic fertilizers are easier to use, especially as regards providing the right dose in relation to plant uptake. The risks concern application and contamination of soils and water by nitrates and phosphates. Also, they might be the source of heavy metals. In Thailand, it has been shown that ammonium phosphate can bring cadmium, zinc, chrome into the environment in excessive quantity¹⁴.

Irrigation

Water is essential to the growth of the plants. Water requirements are related to climatic conditions and the plant species. In most of the capital cities of developing countries, located in tropical and subtropical areas, quantities required vary from 0.1 to 1 l / m²/day in very dry and hot areas. For a crop of 30 days, the quantity of water needed by a leafy vegetable during the dry season will be around 15 l/m².

Different techniques are used for irrigation. Water is supplied through overhead irrigation by tanks, sprinklers or perforated pipes from wells, ponds, or the sewer. Drip or trickle irrigation has been promoted for twenty years now. This technique saves water by 10 to 20% compared with overhead irrigation, but requires clean water in order to avoid blocking the emitters. The full-fledged system includes filters, pumps and a pressure regulator that low

income vegetable growers cannot afford. The advantage of this technique is that water is not in contact with fruits and leaves. It will not, however, avoid contamination of soil and roots of vegetables with biological pathogens. Underground irrigation provides water to the plant by capillarity. Such an underground system can limit the transmission of pathogens to the vegetables thanks to the filtrating effect of the soil. But installation (flat soil) and operation (control of the flows to the plants) are rather difficult and tend to be inaccurate.

Quality of the production

Studies have shown that production in urban and periurban areas does not produce lower quality vegetables than in rural areas¹³. In the context of increasing consumer awareness, it is worthwhile, all the same, paying attention to major elements of the quality of the vegetables: nitrates, biological pathogens, heavy metals and pesticide residues.

Nitrates

Nitrates can cause health problems to very young babies and pregnant women. They are also an indicator of good or bad agricultural practices. Nitrates also cause eutrophication of water in combination with phosphorus. In Europe, there is standard for lettuce (see table 4). FAO and a Russian recommendation also provide extensive standards. In urban and periurban systems, nitrates stem from fertilizers and from irrigation water. Some quick tests, such as Nitracheck®, appear to help farmers in nitrogen management. In Germany, the “KNS system” based on Nmin measurement is commonly used in field vegetable production. Still, these methods need to be validated for the specific urban and periurban leafy vegetables. Moreover, with the objective of developing the use of organic matter obtained from urban waste products in mind, it appears that specific tools must be developed that take into account the problem of the irregular and slow release of nitrogen.

Table 4. Standards for nitrates in lettuce (CE 194/97)

Lettuce type	Nitrates content limit (mg/kg)
Greenhouse lettuce October – March	4,500 ppm
Greenhouse lettuce April – September	3,500 ppm
Open field lettuce	2,500 ppm

Biological contaminants

Biological contaminants are introduced through organic fertilizers, irrigation water and handling and storing of products. Tap water and wastewater are used for irrigating crops and for cleaning vegetables. In Accra, the common micro-organisms isolated from vegetable samples include *Escherichia coli*, *Pseudomonas spp.*, *Salmonella arizonae* on white radish, green pepper, lettuce, and carrot. Helminths and protozoans have also been identified on vegetables collected on fields and markets (Sonou, 2001). In a recent study in Vietnam, 39 samples of choysum (*Brassica campestris spp. parachinensis*) from fields have not shown any presence of Salmonella, E. coli and Shigella, but have revealed the presence of some Ascaris eggs in four cases (10%). These Ascaris eggs probably originate from top dressing applications of liquid organic fertilizer (pig urine). Similar results have been obtained in various studies in Dakar (Ndeye Fatou Diop Gueye & Mouss Sy, 2001).

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Regulations exist at production level on the quality of the water and organic fertilizers used. Also, there are standards for the quality of vegetables. According to FAO, water for irrigating vegetables should contain less than 1 egg per litre for intestinal nematodes and less than 1,000 / 100ml of coliform bacteria. For flowers and ornamental crops, less strict regulations have to be set up. In Vietnam, the maximum levels in fresh vegetables are: coliforms 10/1g and Salmonella 0/1g, but for *E. coli*, *Staphylococcus aureus* and *Clostridium perfringens*, control is done according to a guide of Good Agricultural Practices.

The main problem will be the implementation of the regulations. Numerous projects have been set up, implemented and completed with some success about composting organic matter, deep wells, waste stabilisation ponds and treatment batches. The adoption of safer technologies will have to include mechanisms for certification and the creation of small and medium enterprises specialised in these activities.

Heavy metals residues

In Hanoi, sampling at 25 locations near industrial factories (battery factory, chemical industry), revealed an excess of lead and cadmium on choysum, lettuce, kangkong at two locations (Tran Khac Thi, 1999). In other capital cities of developing countries such as Dar-es-Salaam, it appears, however, that the negative impact due to the urban polluting environment is not as important given the lack of industrial activities (Giza Muster, 1997). Table 5 gives the maximum level for a number of heavy metals. The rate of absorption of heavy metals by vegetables seems linked to the levels present in the soil. Lead is taken up by the plant roots and is then transported to the leaves. Lead from traffic fumes in the air settles on the leaves. It can be washed away by watering the leaves, especially when the leaf surface is waxy (cruciferous plants, Alliums). Cadmium can be taken up by plants through roots and leaves. For these two very poisonous heavy metals with no biological functions, controlling their presence in plants must be done by respecting the soil standards. The location of vegetable production with regard to roads and polluting industry, should be looked at carefully. Bio-remediation of the soil by plants, and installation of mycorrhizae that limit heavy metal uptake are long-term projects that might help solving the management of heavy metals in the future.

Table 5. Maximum levels of heavy-metal content in vegetables (from FAO/WHO 1993)

Element	Arsenic	Lead	Mercury	Copper	Cadmium	Zinc	Boron	Antimony
Content mg/kg	0.2	0.5-1.0	0.005	5.0	0.02	10.0	1.8	200

Pesticide residues

Pesticide residues above the maximum residue limit, have been observed several times in markets^{12, 13, 18}. In Hanoi survey in 1998 of common cabbages collected on the retail market showed high residues of methamidophos on cabbage, 2 out of 20 samples exceeding the maximum residue limit¹⁷. More recently, 1 out of 8 samples taken on choysum at harvesting time showed excessive residues of cypermethrin. This in spite of the fact that regulations were already in place for the use of pesticides and in spite of existing recommendations for health safety. The application of pesticides to crops also endangers workers if protective measures are not taken. This is mainly the case for low-income farmers who cannot afford to buy proper clothing and equipment or are not aware of the importance of doing so.

Awareness of risks due to excessive use of chemical pesticides exists at all levels, ranging from farmers, consumers, and public authorities to agro-chemical companies. The urban and periurban horticulture sector is more sensitive to this problem due to the proximity of consumer and farmer. At this moment, penalties are normally not high enough to drastically reduce the over-use of pesticides. More negotiation between all players in the commodity chain might be one solution. In any case, there will be a cost, implying that the consumer must be ready to pay more for having a better quality product and a safer environment. The development of new technology such as integrated pest management and biological control can help in reducing pesticide use.

Conclusions: gaps and research topics

Characteristics of the vegetable commodity chains in urban and periurban areas

The main characteristics of one of the agriculture commodity chains, the vegetable are summarised in the following table⁴.

Table 6. Opportunities and constraints of urban and periurban horticulture (*From Moustier and David, 1997*)

	Production	Marketing
Opportunities	<p>Inputs and know-how flows</p> <p>Access to inputs</p> <p>Access to urban waste products</p> <p>Diversity of know-how due to human migrations</p> <p>Diversity of sources of incomes and capital</p> <p>Access to technical support</p>	<p>Market proximity</p> <p>Low costs of transportation</p> <p>Access to marketing information</p> <p>Confidence relations</p>
Constraints	<p>Risks at the production level</p> <p>Precarious access to land</p> <p>Lack of institutional recognition</p> <p>Pollution of air, water and soil</p> <p>Theft and straying</p> <p>Pressure on the land fertility</p> <p>Phytosanitary pressure</p>	<p><u>Risks at the marketing level</u></p> <p>High elasticity of the demand (temperate vegetables)</p> <p>Health risks</p> <p>Scattered firms</p>

Sustainability of urban and periurban horticultural systems

Two main hypotheses could be formulated:

- The urban and periurban horticulture sector is not profitable compared to other human activities and needs for urban infrastructure.
- The city would like to maintain urban and periurban horticultural activity in and around the city in order to benefit from its different advantages: links with nature, waste product recycling, job opportunities, greening of cities.

The sustainability of these systems must be of a different kind. In the first hypothesis, it will be related to the direct productive role of the commodity chain to provide horticultural products to the city; in the second one, the productive roles will be supplemented by more qualitative functions about city environment.

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In the first case, the horticulture activity will follow the expansion of the city. This is a phenomenon that has been observed for centuries. Research should be more focused on the agricultural problems of horticulture: improving productivity but, at the same time, reducing the negative impacts on the environment (less pesticides, less waste products, recycling urban waste products), organisation of farmers, an innovative sector in terms of products, technologies with a quick and efficient response to consumer demands.

In the second case, more efforts will be directed towards environmental aspects, employment opportunities for a part of the urban population, greening of the city, technology for small-space horticulture, diversification of horticulture towards leisure. In this case, horticulture needs the support of policy makers for securing access to land and natural resources - water, air and light - in the city environment.

In these two hypotheses, two problems remain essential: (i) the response of the horticulture industry to quality demand by consumers, and (ii) the relationship between horticulture and the urban environment.

Periurban and urban vegetable production supply to the urban market

Technical guides on paper or on CD-ROM are now available for horticulture production in most of the cities of the world. Even in the case of small-scale and new growers, it is now possible to find technical packages for the more common vegetables. The commodity chain appears to be better understood all the time, especially in urban and periurban areas. On the other hand, there are fewer skills available for improving the functioning of the commodity chains and dealing with small farmers. NGOs with extensive know-how in vegetables, international agencies and national institutions specialised in vegetables commodity chain can respond to this demand.

In economics, further research activities need to be developed:

- The place of urban and periurban horticulture in the whole horticulture sector in a context of globalisation and agricultural trade liberalisation; what are the comparative advantages of proximity to the market?
- The diversity of the origin of the growers leads to a great diversity of horticultural products; how to link this potential to consumer demand? Analysis of consumer preferences and identification of new possible products.
- Market information and organisation. Market information systems (prices, flows) and concertation between market stakeholders (farmers, traders) are two tools that allow better fine-tuning of supply and demand. The negotiation activities between the different players of the commodity chains will be enhanced through meetings, newsletters, and daily price information.

At the production level, decision making-tools for better management of the crop, the cropping systems, the farming systems need to be established for the specific small size urban and periurban horticultural sector.

Management of horticultural product quality

Most countries have already set up standards for improving the quality of vegetables, mainly based on the improvement of farmers' practices as has been done in Vietnam (Decision 1208 KHCN/QD, July 15, 1996 Ministry of Agricultural and Rural Development; temporary regulation, April 9, 1999 by Ministry of Agriculture and Rural Development). Still, it is in many cases very difficult to set up good control mechanisms and to enforce the regulations. These problems increase in urban and periurban areas where there is easy access to the inputs. In addition, cropping areas are small, easily leading to input overdoses, coupled with the need of farmers to obtain high yields.

The first step will be to follow the existing standards. This requires certification and control mechanisms. To be effective these should be the result of inter-professional negotiations with the support of public authorities.

Some technical obstacles must be cleared for the control methods: basic analytical laboratories and quick on-field tests. New standards must be set for little known vegetables, such as African and Asian leafy vegetables. Also, new technology must be developed in order to reduce pesticide use: alternative technology to pesticide use, biological control, resistant cultivars and crop management.

Horticulture: benefit or cost for the urban environment ?

Horticulture can improve the urban environment: combustion-free zones, green spaces full of flowers, removal of carbon dioxide (on a very small scale), recycling of solid waste, recycling of liquid urban waste products. At the moment, urban planners are slowly accepting the benefits of urban horticulture¹³. The direct effect on the urban environment adds to the reduction of the problems caused by transportation of the different horticultural products in rural areas to urban markets.

The main objective of horticulture will be to reduce pollution to the environment and to limit the uptake of natural resources, especially water. Standards are available for the main risks of environmental pollution. Techniques that may be developed for reducing levels of nitrate, pesticides and heavy metals must be based on decision-making tools that integrate all components of the urban-horticulture system: economic costs, sustainability of the horticultural farming system, regulation systems, costs of control. In the same way, the use of wastewater and water saving techniques such as drip irrigation and mulching must be validated in the context of urban and periurban horticulture.

Acknowledgements

I would like to thank Dr Paule Moustier for her help and assistance in searching for documents and reviewing this article.

References

- Ali, M (Ed.)** 2000. Dynamics of vegetable production, distribution and consumption in Asia. Asian Vegetable Research and Development Center. AVRDC publication no. 00-498, 470 p.
- AVRDC.** 2000. AVRDC Report 1999. Asian Vegetable Research and Development Center, Shanhua, Tainan, Taiwan, vii +152 pp (47-48)

Urban Horticulture

- Bricas, Nicolas.** 1998. Cadre conceptuel et méthodologique pour l'analyse de la consommation alimentaire urbaine en Afrique. Montpellier, France, série Urbanisation, alimentation des filières vivrières, n°1, 48 pp.
- David, O.** 1992. Diagnostic de l'approvisionnement de Bangui. Mémoire de stage de l'ESAT, CNEARC / AFVP/ CIRAD, 162 pp.
- Eiumnoh, A. & Parkpian, P.** 1998. Impact of periurban vegetable production on soils and water: a case of Bangkok plain, Thailand. Paper presented at the « Periurban Vegetable production in the Asia-pacific region for the 21st century », 29 September-1 October 1998, Kasetsart University, Bangkok, Thailand, 24 pp.
- Fleury, A. & Moustier, P.** 1999. L'agriculture périurbaine, infrastructure de la ville durable. Cahiers Agricultures, 8: 281-7
- Giza Muster.** 1997. Environmental problems of urban agriculture. A case study of Dar-es-Salam, Tanzania. Urban Vegetable Promotion Project, Dar-es-Salam, Tanzania
- Margiotta, M.** 1997. Développement de la production maraîchère dans les périmètres urbains et péri-urbains de Nouakchott. République Islamique de Mauritanie, Ministère du Développement Rural et de l'Environnement, rapport FAO.
- Mai Thi Phuong Anh.** 2000. Current status and prospective planning upon agricultural development in Hanoi. Paper presented during the CG Strategic Initiative of Urban and Periurban Agriculture workshop, Hanoi 5-9 June 2000, 7 pp.
- Midmore, D.J.** 1998. Importance of periurban vegetables to Asian cities. Paper presented at the « Periurban Vegetable production in the Asia-pacific region for the 21st century », 29 September-1 October 1998, Kasetsart University, Bangkok, Thailand, 14 pp
- Moustier, P.** 2000. Urban and periurban agriculture in West and Central Africa: an overview. Provisional paper (30/10/00) for SIUPA stakeholder meeting and strategic workshop, Sub-Saharan region, 1-4 November 2000, Nairobi, Kenya
- Moustier, P.** 1999. Définitions et contours de l'agriculture périurbaine en Afrique subsaharienne. In: P. Moustier, A. Mbaye, H. de Bon, H. Guérin, J. Pagès (eds), Agriculture périurbaine en Afrique subsaharienne, CIRAD, Colloques, pp. 17-29.
- Moustier, P. (ed.)** 1999. Filières maraîchères à Brazzaville. Quantification et observatoire pour l'action. CIRAD et AGRISUD-AGRICONGO, Montpellier, France, 157 pp.
- Moustier, P. & David, O.** 1997. Etude de cas de la dynamique du maraîchage périurbain en Afrique sub-saharienne. Document FAO N-DT/02/96, projet: <<Approvisionnement et distribution alimentaires des villes d'Afrique francophone>>, FAO, Rome, Italie, 36 p.
- Ndeye Fatou Diop Gueye and Mouss Sy** 2001. The use of wastewater for Urban Agriculture. Urban Agriculture Magazine, 1, 3, March 2001, 30-2
- Nguyen Thi Lam, Ha Huy Khoi.** 1999. Daily nutrient requirements and vegetable consumption by Vietnamese people. In: National workshop on Safe and year-round vegetable production in periurban areas, RIFAV, CIRAD, Hanoi, December 15-16, 1999, 65-74.
- Sabel-Koschella, U., Jacobi, P. and Amend, J.** 1998. Urban leafy vegetable production in Dar-es-Salam. Urban Vegetable Promotion Project, GTZ, Ministry of Agriculture and Co-operatives, Dar-es-Salam, tanzanie, 9 pp
- Schnitzler, W.H., Potutan, G.E., Arnado, J.M., Janubas, L.G. and Holmer, R. J.** 1999. City harvests: the case of Cagayan de Oro. Urban and periurban small and medium-sized enterprise development for sustainable vegetable production and marketing systems, European Commission (No IC18-CT97-0184), Institute for Vegetable Science, TU Munchen-Weihenstephan, Freising, Germany and Xavier University College of Agriculture, Cagayan de Oro, Philippines, 43 p.
- Sonou, M.** 2001. Periurban Irrigated Agriculture and Health Risks in Ghana. Urban Agriculture Magazine, 1, 3, March 2001, 33-4
- Tran Khac Thi.** 1999. Study on some environmental factors and solutions of safe vegetable development. In: National workshop on Safe and year-round vegetable production in periurban areas, RIFAV, CIRAD, Hanoi, December 15-16, 1999, 33-46

Abalimi Bezekhaya & the Cape Flats tree project: newsletter to our friends. Abalimi Bezekhaya (The People's Garden Centre), Private Bag X12, Observatory 7935, South Africa

community development horticulture
South Africa; home gardening; community initiatives

Urban Horticulture

A small newsletter in the true sense of the word, giving news flashes and articles on homegardening and how it helps in completing people's diets. There is also room for a notice board in its columns. Lots of pictures. (WB)

Ableman, Michael (1999). On good land: the autobiography of an urban farm.

Urban Agriculture Notes <http://www.cityfarmer.org/autourbanfarm.html>. 4 p.

Supplier: City Farmer, Canada's Office of Urban Agriculture

horticulture community development

community gardens; community-supported agriculture; United States

A summary of the book 'On Good Land' about the Centre for Urban Agriculture at Fairview Gardens, California. The Gardens marketing systems are described as well as the other activities on the farm. (NB)

Agbayani, A.L. P., Holmer, Robert J., Potutan, Gerald E., Schnitzler, Wilfried H. (2001)

Quality and quantity requirements for vegetables by private households, vendors and institutional users in a Philippine urban setting. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden, The Netherlands.

R&D Methodology horticulture

Philippines; market survey

Two studies were conducted to characterize the demands of private households, vendors and institutional users for fresh vegetables in Cagayan de Oro City, Philippines. Specifically, these surveys aimed to provide baseline data for decision-makers and farmer practitioners to further improve the market transparency for vegetables and, thus, contribute to better producer and consumer linkages. The first survey was conducted in February 1998 within different urban and periurban districts of Cagayan de Oro. The second survey using administered questionnaires was conducted in June 1999. A sample group of one hundred respondents was chosen randomly after clustering the various groups of institutional users of fresh vegetables. The generated data of both surveys were subjected to descriptive statistical analysis.

Ajaegbu, Hyacinth I; Berg, Leo van den (1997). Market gardening, urban growth and sustainable income generation on the Jos Plateau, Nigeria. 13; 115 p.

horticulture

Nigeria; Jos Plateau; small-scale agriculture; commercial agriculture; periurban agriculture

Examines small-scale commercial periurban horticulture on the Jos Plateau, Nigeria, focusing on marketing aspects. A number of economic models were tested to best describe the situation. Authors concluded that a differentiation of various zones in

the periurban area became more apparent. (WB)

Amend, Jörg; Magasini, I; Mutahiwa, Sergei; Swai, Ignaz (1997). Integrated pest management in urban vegetable production in Dar es Salaam. 17 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania
horticulture services
Tanzania; horticulture; home gardening; IPM

One of the objectives of urban food production is ensuring sustainable development of the cities. Proper agricultural practices are an important element for ensuring this sustainability. The underlying paper examines the application of Integrated Pest Management (IMP) methods in urban vegetable production in Dar es Salaam. Main objective of the research was to identify pest and diseases occurring in the most important crops cultivated and to develop strategies for IPM for these crops. This report contains the methodology used for the research and the results. The authors also give general recommendations for the vegetable growers in Dar es Salaam, as well as special recommendations for IPM management of the most important vegetables. (WB)

Anderton, Frances; Thompson, Mark (1999). Agriculture in a megalopolis: farming in the heart of Los Angeles presents opportunities along with challenges. On: <http://www.marketreport.com/lafarm.htm>. 5 p.
horticulture
United States; horticulture ; commercial agriculture

Describes city farms in the heart of Los Angeles. The main problem farmers face is insecurity of land tenure, complaining residents, vandalism and harassment by local officials. Most of the produce is directly marketed through farmers' markets which are close to consumers. (NB)

Andrews, S. (2001), The Allotment Handbook: A Guide To Promoting and Protecting Your Site.
Supplier : Eco-logic Books, 10-12 Picton St, Bristol BS6 5QA, England
urban horticulture
allotment gardens; land pressure; urbanisation

Allotments are increasingly threatened by development as land prices soar and space is needed to expand cities, towns and villages. Starting with a brief history of allotments and a look at legislation, this book shows how to make your allotment part of a thriving community. If your site is threatened, learn how to organize to stop development in their tracks. Easy to use with a comprehensive contacts, a vital tool for allotment holders, community groups and those who want to see an active use of urban open space.

Baudoin, W. (2001), Urban Micro-Gardens. Plant Production and Protection Division, FAO, In: Proceedings on the Sub-Regional Expert Consultation on the

Use of Low Cost and Simple Technologies for Crop Diversification by Small Scale Farmers in Urban and Peri-Urban Areas of Southern Africa, Stellenbosch, South Africa, January 15-18 2001

urban horticulture

urban areas; gardening

This presentation reviews the opportunities of a simple, low-cost technology adapted to the high-density areas of urban suburbs. The technology allows landless households to produce a broad range of vegetables for family consumption and sale to the neighbourhood. The system is based on growing crops on substrates or floating on water. The technical assessment highlighted the high cost of the mineral fertilizers required for the preparation of the nutrient solution. In this respect, research is needed for the use of alternative sources including organic nutrient solutions obtained from the fermentation of organic waste material. The micro-garden system is environmentally friendly since it not only uses recycled materials, but the 'closed system' growing allows a very high water use efficiency ratio. The cost-benefit analysis shows that these micro-gardens, when successfully implemented, can provide from US\$1 to US\$3 a day as an 'opportunity revenue' from 10 m², which is often competitive as compared to the casual labour wage the women could obtain by working outside the household.

Bergeron, Bernard (1998). Activités maraîchères au Congo. 4 p. Ministère des Affaires Étrangères, Coopération et Francophonie, Bureau Production Agricole, Industrielle et Échanges

horticulture

Congo; resource centres; development projects

Reports on activities in a periurban development programme in Congolese cities. At the heart are 'resource centres' functioning as centres for production, research, marketing, information and training. (WB)

Beverwijk, Jasmin; Baarsen, Dirk-Jan; Duuren, Bert (van) (199?). Extension and experiential learning in urban agriculture. 7 p. PGO Tropische Landbouw en Rurale Ontwikkeling T050-200

services horticulture

agricultural extension; allotment gardens

The underlying report analyses experiences with allotment gardening in the Netherlands. Information is given about existing organisations in the field of extension and allotment gardening. Interestingly, there is also information about Farmer Field Schools on IPM in rice as a learning model for other situations and countries. (WB)

Bishwapriya, Saynal (1985). Urban agriculture: who cultivates and why? A case-study of Lusaka, Zambia. In: Food and Nutrition Bulletin vol. 7 no. 3 (1985) p. 15-24. Massachusetts Institute of Technology, Cambridge, Massachusetts,

USA

horticulture food security and nutrition
case studies; horticulture; Zambia;

Most authorities are now convinced of the fact that urban agriculture is more than an accidental activity undertaken by recent rural migrants. This survey shows once more that many urban poor, who migrated to the city a long time ago, are engaged in food production in order to survive. Most of the urban farmers stated the lack of purchasing power as the major reason for farming. There were other reasons as well, however, ranging from the wish to feel settled in their city home to simple enjoyment in gardening. The survey identified two different types of gardens in Lusaka: plot gardens and rainy-season gardens, used for cultivating different types of crops. In plot gardens, higher-grade vegetables were cultivated, such as rape, tomato, cabbage, onion and spinach, as well as fruits, while in rainy-season gardens, staple food, i.e. root crops, maize and beans, were produced. The survey stressed the need for stronger support from local authorities. At this point of time, urban farmers often experience the reverse, jeopardising their activities. In addition, land tenure policies will have to be changed so as to render more land available for the urban poor. (WB)

Blair, Dorothy; Giesecke, Carol; Sherman, Sandra (1997). A dietary, social and economic evaluation of the Philadelphia urban gardening project. Urban Agriculture Notes on: <http://www.cityfarmer.org/nutritionstudy.html#diet>. 6 p. Nutrition Department, College of Health and Human Development, Pennsylvania State University, University Park, Pennsylvania 16802, USA Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture food security and nutrition economic impact
United States; home gardening; surveys

An evaluation study among 144 gardeners in the Philadelphia Urban Gardening Project and 67 non-gardening controls. Data collected included demographic variables, food frequencies and dietary habits, measures of life satisfaction, and neighbourhood involvement. The average value of garden site produce was assessed. Interestingly, gardening was positively associated with community involvement and life satisfaction. An interesting and important study. (WB - from original abstract)

Boissière, Thierry (1999). Jardiniers et société citadine dans la vallée de l'Oronte en Syrie centrale. Doctoral dissertation in ethnology, Université Lumière Lyon 2, Lyon, France. 2 volumes. 751 p.
horticulture community development
Syria; Homs; Hama; history; market gardening; water supply; urban gardening

This landmark study is unique in several regards. It is one of the only dissertations on urban agriculture that adopts the ethnological approach, and to be undertaken by an anthropologist. It is rare in its detailed historical analysis combined with a

thorough assessment of the present-day situation. It is a rare in-depth study of the Middle East, an underrepresented region in research on urban agriculture. Finally, it is exemplary in placing at its core the changes in water supply (in addition to farming practices); water is the oft-neglected element in such studies. "Through the management of water and crops, as well as through the human connections and the relation to the city, this study has the ambition to reconstitute the evolution of an entire society that organized itself long ago and to present its main characteristics." This ambition is admirably met in this dissertation. (JN)

Bon, Hubert de; Ducelier, D.; Hernandez, S.; Temple, L. Appui aux productions maraichères et fruitières périurbaines de Yaoundé. Agriculture périurbaine en Afrique subsaharienne, p. 89-92

rural-urban linkages horticulture

periurban agriculture; marketing; vegetables; sub-Saharan Africa

Vegetable crops are intended to be marketed and are often produced by young farmers, new to the business. The major species grown are: African spinach, jute, *Solanum aethiopicum* and lettuce. Green peppers, parsley, basil and dokra are also grown. CIRAD-FLHOR works on improving the production techniques practised and the sanitary quality of the marketed produce. The agronomic support for fruits aims to diversify the range of products with species adapted to the prevailing conditions. A number of varieties already has been selected and distributed. Vegetable and fruit crops from the periurban zone play an essential role in market supplies. A study under way includes quantifying fruit and vegetable movements and monitoring and analysing prices and urban market supplies. Major surveys of markets, notable in Yaoundé will determine the role of fruits and vegetables from urban and periurban areas compared to produce from further a field. (NB - Abstract adapted from original)

Boncodin R. Prain, G. and Campilan, D. (2000) Dynamics in Tropical Homegardens. In: Urban Agriculture Magazine, no 1, Maiden Issue, July 2000, RUF, Leusden The Netherlands.

horticulture food security and nutrition

Homegardens; Philippines;

The importance of home gardens, the small areas of cultivated land immediately surrounding a home or a homestead, is often underestimated despite its vital contribution to meeting various household-needs, especially for the poor families in developing countries. The authors explore the importance of homegardens in the Philippines and give the findings of the programme, Users' Perspectives with Agricultural Research and Development (UPWARD).

Brierley, John S (1985). West Indian kitchen gardens: a historical perspective with current insights from Grenada. In: Food and Nutrition Bulletin vol. 7 no. 3 (1985) p. 52-60. Dept. of Geography, Univ. of Manitoba, Winnipeg, Manitoba, Canada

horticulture

West Indies; Grenada; home gardening

Describes kitchen gardens in the West Indies and traces their history since the slave plantation days. Trees play an important role in West Indian homegardens as do root and tuber crops. Of all crops grown distribution tables with indices of occurrence are given. (WB)

Brownrigg, Leslie (1985). Home gardening in international development: what the literature shows. Washington, DC: League for International Food Education. 126 p. + app.

horticulture

home gardening; development projects; bibliographies; resource organisations; Nigeria; Chile; Mauritania

This is a pioneering (and little-known) literature review on home gardening, funded by USAID. The author not only reviewed the published writings on the subject, but also documented the activities of major international organizations concerned with home food production systems. The review was researched and written with two audiences in mind: international development professionals whose programs do or could include home gardening, and other readers from the range of academic disciplines which involve the home garden who have an interest in its history and traditions. It contains case histories from Nigeria, Chile and Mauritania, plus several shorter case descriptions. Three major appendices are on: resource organizations; garden projects and programs; and a bibliography. (adapted from original by JN)

Bruce, Hank; Folk, Tomi Jill (2001), Global Gardening: Increasing the Diversity of Plants in Your Own Garden While Feeding a Hungry World. Winner Enterprises

urban horticulture

globalisation; home gardening

All over this earth, our global garden, people are cultivating a great diversity of vegetables and fruits. There are over 15,000 edible plants that can help to sustain our global village, yet over 99% of the American diet is based on less than 100 plants. We have a world of unique, unusual and exotic vegetables to discover, enjoy and share at the dinner table of our global village. Some of these might even become a part of your garden and add diversity to your own mealtime adventure. This book is a safari into the exotic gardens of the world.

Burleigh, J.R. and Black, L.L. (2001) Supporting Farmers Towards Safe Year-round Vegetables in Manilla. In: *Urban Agriculture Magazine*, no 3, Health, March 2001, RUA, Leusden The Netherlands.

health and environment horticulture

Philippines; AVRDC; IPM; agrochemicals

AVRDC collaborates with the Central Luzon State University-Philippines, the Bureau of Plant Industry-Philippines, and the Technical University of Munich-Germany in a project entitled "Development of periurban vegetable production systems for

sustainable year-round supplies to tropical Asian cities". The project aims to design, test and implement production systems for sustainable year-round supplies of vegetables to markets in Metro Manila - and by model verification, to other tropical Asian cities as well. This article focuses on part of the work of the periurban vegetable production project, which is to decrease the ubiquitous use of pesticides in periurban Manila through introduction of IPM techniques.

Cáceres, D; Arbomo, M (1994). Surviving on little land: women's struggle in town and country. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 8-9. Department of Rural Development, Faculty of Agronomy, National University of Córdoba, CC 509-5014, Córdoba, Argentina
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands

horticulture

Argentina; home gardening; labour; urban communities; urban development; urban environment; urban population; urban wastes; women

Socioeconomic policies implemented in recent decades in Argentina have led to division of land into small plots (minifundización) and expanding poverty belts around the big cities. Growing food in small gardens is seen as one way to help the poor feed their families. Daniel Cáceres and Miryam Arbomo present two case examples - one urban and one rural - from Córdoba Province in central Argentina. (ILEIA)

Chaplowe, Scott G (1996). Local food security: Havana's popular gardens: sustainable agriculture. In: WSAA vol. 5 no.22 (Fall 1996). 4 p. World Sustainable Agriculture Association (WSAA), California Chapter, 8554 Melrose Ave., West Hollywood, California, 90069 USA

horticulture

Cuba; Havana; food security; community gardens; community organisation

A description of the emergence of private gardens, state owned intensive gardens and other forms of urban farming in Cuba. The gardens enhance community participation and organisation, food security and food diversity. (NB)

Chewya, JA; Eyzaguirre, PB (eds) (1999). The biodiversity of traditional leafy vegetables. IPGRI, Rome. 182 p.

horticulture

Africa; vegetables; nutrition; biodiversity; gender; small-scale agriculture

Here we are presented with five reports covering five African countries South, East & West. The studies document the value of green leafy vegetables as an efficient crop for small urban parcels, as a tool in maintaining the stability of ecosystems, for their capacity to repel insects and their micronutrient value in locally based food systems. Women in Africa are found to be the primary producers, beneficiaries and the custodians of green leafy vegetables. (JS)

Chibesa, L (et al.) (19??). Small-scale cultivation around Kalingalinga. In: In the shadow of Lusaka (source unknown) p. 13-29. 29 p.

horticulture

Zambia; home gardening; land use; urban construction; tenure rights

Reports on homegardening in a squatter area in the eastern part of Lusaka. The paper looked specifically into possible resettlements of those who owned -or rather: leased from the government- plots as a result of building activity in this area, but could not draw positive conclusions as to the degree of competition existing for this land nor as to the quality of new plots acquired. Final part of the paper contains a number of portraits of home gardeners. (WB)

Chivinge, A.O., V. Machakaire and G. Mudimu (2001), An Overview of Urban Agriculture in Zimbabwe, Constraints and Solutions. Crop Science Department, Faculty of Agriculture, University of Zimbabwe. Paper prepared for the Sub-Regional Expert Consultation Meeting on Urban and Peri-Urban Horticulture, University of Stellenbosch, Cape Town, South Africa, January 2001.

Supplier: Crop Science Department, Faculty of Agriculture, University of Zimbabwe, P.O. Box MP 167, Mount Pleasant, Harare, Zimbabwe

urban horticulture

urban agriculture; Zimbabwe, Africa (Eastern)

The difficult economic conditions in Zimbabwe hit urban dwellers particularly hard. Urban agriculture was the consequence. Major activities include the growing of field crops (on any vacant piece of land), horticulture (within the confines of the land allocated for residential purposes), ornamental plants and livestock production. The history of urban agriculture indicates that it has been practised since the twons were established, although much of it started with the influx of foreigners as labour in the mining industry and as domestic workers, with the intensification of the Zimbabwean war of liberation after 1976 which brought rural people into urban areas, and with the influx of those fleeing from the Mozambican civil war after 1980 who could not get land in rural areas. In terms of horticulture , the poor in high density areas produce mostly for feeding the family, while those better off combine home consumption and selling. Constraints to increased production are the shortage of land, poor or non-existent extension services (due to lacking government support for urban agriculture) and failure to purchase inputs. These constraints vary with the location of the urban or peri-urban area. It is recommended that the city authorities accept urban agriculture as a reality and that they will come up with policies that create an enabling environment to train urban growers. This will expose them to the correct technologies, especially in horticultural production, which is sustainable and environmentally friendly. High yields can be achieved and poverty reduced as these growers are trained and other facilities are made available.

Chongwe, E.H. and J.L. Ngondo (2001), Urban and Peri-Urban Horticulture in Malawi. Paper prepared for the Sub-Regional Expert Consultation Meeting on

Urban Horticulture

Urban and Peri-Urban Horticulture, University of Stellenbosch, Cape Town, South Africa, January 2001.

Supplier: Ministry of Agriculture and Irrigation Development, P.O. Box 30134, Lilongwe 3, Malawi

urban horticulture

horticulture; urban areas; periurban area; Malawi, Africa (Eastern)

The paper examines the state of Urban and Peri-Urban Horticulture in Malawi where the industry is young but growing at a very fast rate. It is contributing between 30 - 40 % to the national horticultural crop demand. It is also generating cash income, raw materials for industries, foreign exchange earnings and creating employment opportunities for producers, vendors, hawkers, middlemen, input suppliers and institutions. Major urban areas in Malawi are Blantyre, Lilongwe, Mzuzu and Zomba. Out of an urbanisation rate of 14 %, about 11 % live in these four major urban areas. Broadly, horticulture in these Urban and Peri-Urban areas focuses on the growing of vegetables, fruit, spices, ornamental and floriculture. In spite of its importance, the sectors development has been spontaneous and uncoordinated hence it is being threatened by issues of pollution, high water rates, gender bias and sustainability due to urban development among many other setbacks. Policymakers have to be sensitised to these in order to bring about lasting development in the sector.

City Farmer (1996). Food gardens in South Africa. Urban Agriculture Notes on: <http://www.cityfarmer.org/s.africa.html>. 2 p. City Farmer, Canada's Office of Urban Agriculture

Supplier: City Farmer, Canada's Office of Urban Agriculture

food security and nutrition horticulture

vegetable gardens; gardening practices; Soweto; South Africa

A brief description of the Food Gardens Foundation in Soweto, South Africa. The Foundation developed a method for growing vegetables which is especially useful if there is shortage of land, water or money. (NB)

City Farmer, Canada's Office of Urban Agriculture (1999). City farm in Perth, Australia. Urban Agriculture Notes <http://www.cityfarmer.org/perth19.html>. 2 p. City Farmer, Canada's Office of Urban Agriculture

Supplier: City Farmer, Canada's Office of Urban Agriculture

horticulture community development

community gardens; Perth; Australia

Gives a description of a community garden in Perth, Australia. (NB)

City Farmer, Canada's Office of Urban Agriculture (1999). City farms in the United Kingdom. Urban Agriculture Notes <http://www.cityfarmer.org/cityfengland8.html>. 3 p. City Farmer, Canada's Office of Urban Agriculture

Supplier: City Farmer, Canada's Office of Urban Agriculture

Urban Horticulture

horticulture food security and nutrition services
city farms; United Kingdom

Brief description of some city farms organised in the Federation of City Farms in the United Kingdom. (NB)

Cornell University Extension (1999). Direct marketing today: challenges and opportunities. USDA On:

<http://www.ams.usda.gov/directmarketing/DirectMar2.pdf>.

horticulture services
market gardening; periurban agriculture

This manual presents every step the urban or rural farmer needs to take in order to be a direct marketer. Applicable everywhere, but especially in USA. Includes directory to resources. (JS)

Cosgrove, Sean (1994). Une histoire de deux villes: comparing Canadian community gardening programs in Montreal and Toronto. Cities Feeding People Series report no. 11. 9 p. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9

community development horticulture
Canada; Montreal; Toronto; Healthy Cities programme; community gardens

In the early 1970s Montreal developed gardening programmes. In Toronto this development has been much slower. Montreal has one of the best community gardening programmes in North America. Toronto has shown some leadership in urban environmental management including healthy cities approaches. Key challenges are to develop a valued community gardening culture in Toronto, the implementation of healthy cities principles and the establishment of effective partnerships between citizens and government. (NB)

Croon, Tom (de); Riel, Karel (van) (1998). Urban horticulture in Dar es Salaam: farming systems, risks, strategies and gaps in information. 7 p. Wageningen University and Research Centre

horticulture
Tanzania; home gardening; farming systems research

Describes and typifies various gardening systems within the city bounds of Dar es Salaam, in which the class depends on tenure rights, ranging from none to institutionalised rights. The different systems are typified and specific problems of the different systems are listed. (WB)

Decheng, Su (1999). Tree mushroom production for city farmers. Urban Agriculture Notes <http://www.cityfarmer.org/treemushroom.html>. 3 p. 5 Skaling Ct. Apt. 9, Saint John, New Brunswick, Canada, E2K 4G8

Supplier: City Farmer, Canada's Office of Urban Agriculture

horticulture
mushrooms

Describes how mushrooms are able to decompose polymer, cellulose and other products of organic waste and at the same time produce a crop. The remaining mushroom mycelia after harvesting are an excellent fertiliser. (NB)

Delphin Regis, Mildred (1999). Care Haiti: urban horticulture project Port-au-Prince, Haiti. Urban Agriculture Notes <http://www.cityfarmer.org/haiti.html>. 5 p. Urban Horticulture CARE-HAITI, 92, Rue Gregoire P.V., BP 15546, Pétion-Ville, Haiti

Supplier: City Farmer, Canada's Office of Urban Agriculture

horticulture R&D methodology
Haiti; home gardening; development projects

Offers a description of the recent initiatives in urban farming of CARE in Haiti. In two pilot sites activities started with the set up of demonstration gardens to generate interest and awareness. Based on this a number of groups have been formed for urban farming. The project aims to document technical approaches to urban agriculture, to document the food and income generation potential and to develop an effective extension and learning approach. (NB)

Dennery, Pascale (1999). Urban agriculture in informal settlements. Urban Agriculture Notes <http://www.cityfarmer.org/nairobi.html>. 5 p.

Supplier: City Farmer, Canada's Office of Urban Agriculture

horticulture
food security; urban policies; poverty; nutrition; Kenya

Discusses the results of a study in Kibera, Nairobi, Kenya. Findings indicate that engagement in food production is beneficial to low-income households. Produce is used directly and indirectly by the household to obtain food, access cash and educate children. In Nairobi in general and Kibera in particular, uncertainty with respect to access land is of major concern to food producers. Timely policy interventions are needed to legitimise food production in and around informal settlements. (NB)

Department of Horticulture (1990). The role of horticulture in human well-being and social development: setting the agenda. 25 p. Department of Horticulture, Virginia Polytechnic Institute & State University; American Society for Horticultural Science; American Association of Botanical Gardens and Arboreta; American Horticultural Therapy Association

horticulture
urban livelihoods; well-being; social aspects

The objectives of the symposium were to collect, present and analyse information on

the psychological, physiological and social responses of people to plants and to identify research priorities to further explore this issue. The underlying programme contains summaries of keynote papers as well as names and addresses of participants. (WB)

Doshi, RT (1992). City farming: an innovative technology. 27 p.

horticulture

India

Relates a number of horticultural practices the author has tested out in Bombay, India over a number of years. (WB)

**Drescher, Axel W. (1994). Gardening on garbage: opportunity or threat? In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 20-21. Institute for Physical Geography, Werderring 4, D-79098 Freiburg, Germany
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands**

wastewater reuse horticulture

community health; health; health hazards; home gardening; organic wastes; toxic substances; urban environment; waste management; Zambia

Gardening on waste disposal sites is common practice in many developing countries. Such sites offer fertile land not used for other purposes, but toxic wastes and heavy metal pollution may threaten human health. Axel Drescher presents a case study of such a periurban garden in Zambia. (ILEIA)

Drescher, Axel W. (1997). Management strategies in African homegardens and the need for extension approaches Paper presented at the International Conference on Sustainable Urban Food Systems. Ryerson Polytechnic University. Toronto, Canada. 22-25 May 1997. Papers

gender horticulture food security and nutrition

Africa, Zambia, household survey, food security, management strategy, women's role, gender differences, intervention strategy, extension services

The relationship between urban food production, food security and urban environments has been largely neglected. This paper focuses on results from a household garden survey conducted during 1992 and 1993. The main objective of the survey was to clarify the role of household gardens for household food security in Zambia and to identify differences and problems in management strategies and their effects on production in different areas. The results reveal that the main actors in urban agriculture are often women. In all compounds studied in Lusaka, women were to a greater extent involved in cropping and gardening than men. Gender analysis is used to reveal differences between men's and women's urban agriculture techniques with respect to alternative methods of plant production, crop species, and use of fertilizer, manure and compost. The paper argues that gender specific

differences in agricultural activities need to be paid more attention by extension services in urban and periurban areas. (AH)

Drescher, Axel W. (1997). Management strategies in African homegardens and the need for new extension approaches. In: Food Security and innovations: successes and lessons learned / F. Heidhues and A. Fadani. 11 p. Universitaet Freiburg, Hebelstrasse 27, D-79104, Freiburg, Germany
Supplier: City Farmer, Canada's Office of Urban Agriculture
services horticulture

home gardening; food production; food security; extension services; Zambia;

Reports on gardening and cropping in Lusaka. As stated elsewhere, these activities often take place in a setting of non-co-operative authorities. This paper comments on urban farming activities and examines the relationship between land access and social status of the compounds. The author argues that, while wet-season staple food cropping is practised on a broad scale, dry-season vegetable gardening is much less widespread because many city dwellers lack access to resources necessary for this activity. Urban farming has not been addressed by extension services as these solely focused on the rural sector. Output, especially of leafy vegetables, could be increased considerably, however, were such services provided to gardeners. Information needed primarily concerns with pest management, species diversity and soil fertility. (WB)

Drescher, Axel W. (1997). Urban agriculture in the seasonal tropics of central southern africa: a case study of Lusaka, Zambia. On:
<http://www.cityfarmer.org/axelB.html#axel>. University of Freiburg, Germany

horticulture R&D methodology

Zambia; periurban agriculture; home gardening; surveys

Analyses findings of the big Household Garden Survey in and around Lusaka and in Zambian rural areas in 1992-93. Purpose was to determine the role of household gardens for urban households; the contribution of garden produce to diet and budget of the household; to draw up an inventory of the main problems encountered with the household garden; and to find out about motives of households to be involved in gardening or not. A distinction is made throughout the text between different types of agriculture in and around Lusaka: gardening for food, semi-commercial and commercial gardening, and rainy season agriculture. In the rainy season the production of staple foods predominates, whereas during the dry season people concentrate on vegetable production. Factors influencing involvement in any of these types of gardening are governed by internal or external factors, such as labour availability, access or entitlement to resources, education, occupation, and more. The impression is that gardening actually does contribute to food security and/or generation of income. (WB)

Drescher, Axel W. (1999). Urban agriculture in Northern Spain: brief observations: La Huerta del Abuelo Rosel. Urban Agriculture Notes
<http://www.cityfarmer.org/spain.html>. 2 p. University of Freiburg
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture food security and nutrition
community gardens; Zaragoza; Spain

A brief description of 'La huerta del Abuelo Rosel' in Zaragoza, Spain. (NB)

Drescher, Axel W. (1999). Urban agriculture in the seasonal tropics: the case of Lusaka, Zambia. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds). p. 67-76. ISBN 0_88936_882_1. CAD 35.00.
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
horticulture
gardening; staple crops; food production; gender; food security; household economy

This paper focuses on different components of urban agriculture in Lusaka, Zambia. Both of the major agricultural activities - the dry-season gardening and rainy-season production of staple food crops largely depend on access to resources like water and land. It was found that dry-season cultivation is practiced by those with access to the resources essential to this activity. This access is lowest in the high-density, low-income compounds in Lusaka. There are significant differences between the roles of women and men in urban household food security. Women are the major actors in urban agriculture, but they are disadvantaged with respect to income generation and access to resources and markets. Special attention is given to the cultivation of indigenous vegetables ("locals") and ongoing vegetable-gathering activities, which play an important role in nutrition and are mainly undertaken by women. A household-gardening model that is also applicable to other household activities was developed to come to a better understanding of household activities in their social, economical, and environmental contexts. Urban agriculture in Lusaka contributes to household food security directly by providing food and indirectly by reducing expenditures. (Abstract adapted form original)

Drescher, Axel W. (2001), The German Allotment Gardens - A Model for Poverty Alleviation and Food Security in Southern African Cities? Paper prepared for the Sub-Regional Expert Consultation Meeting on Urban and Peri-Urban Horticulture, University of Stellenbosch, Cape Town, South Africa, January 2001
urban horticulture food security and nutrition
allotment gardens; food security; poverty alleviation, Africa (Southern)

This paper asks whether the German experience with urban allotment gardens can be a model for Southern Africa. The potential exists for urban gardens to help Southern African cities to reduce poverty and improve security and living conditions. Conditions of hunger and poverty were widespread in Germany and other European

Urban Horticulture

countries nearly 200 years ago when the first 'gardens for the poor' emerged. Allotment gardens consist of a piece of land between 200 and 400 square meters, most of them with a little shed for storing gardening tools. Shortly after WW II, Berlin contained 200,000 allotment gardens. Today there still are about 800,000.

Dubbeling, Marielle (1999). Urban agriculture and feeding Latin American and Caribbean cities. Urban Agriculture Notes
<http://www.cityfarmer.org/feedingLatAmer.html>. 5 p. Urban Management Program Latin America and the Caribbean, Garcia Moreno 1201 and Mejia, Quito, Ecuador

Supplier: City Farmer, Canada's Office of Urban Agriculture

food security and nutrition horticulture R&D methodology
food security; Latin America; best practices; poverty alleviation; waste; resource management; food security; nutrition; income generation; gender; environment

Presents the best practices and city consultation project of the Urban Management Program for Latin America and the Caribbean. The thematic orientation is on urban poverty alleviation, urban environmental management and participatory urban governance. The objective of the project is to assist a group of resource and associate cities with documenting urban agriculture experiences, producing analysis of urban agriculture activities and implement a city consultation process. (NB)

Eames-Sheavly, Marcia (1996). Radishes to riches. Member workbook. Cornell's Fruit and Vegetable Sciences Department. Ithaca, NY.

horticulture

market gardening; marketing; youth; United States

The "Radishes to Riches" MEMBER workbook (142M5) is a guide for youth or anyone who wants to get into the direct-market business. It takes the reader through the basics of marketing including deciding on what to grow, (what will people buy?; how much can I sell?), where to sell the produce, how to prepare it for sale, pricing, and promotion. It includes worksheets to make project and marketing plans, keep records of accounts, and tally a business summary. (JS)

Eberhard, R (1989) Urban agriculture: the potential in Cape Town. Summary Report, working paper 89/E1-E5. Cape Town, South Africa: City Planner's Department, Town Planning Branch, 1989.

horticulture

South Africa; Cape Town; urban planning; land use; literature review; economics; vegetable gardens; community gardens

This early report on urban agriculture in South Africa was prepared by a professional in Cape Town's Town Planning Branch. It contains five sections that are meant to be relatively free-standing. Part 1 is the summary report. Part 1 is labeled "Literature Review", but it is in fact a more substantial piece than that. First, it uses the literature

to assess the physical, economic, socio-cultural and institutional factors that influence the interest and participation in urban agriculture. Second, it presents summaries of around two dozen case studies of urban agriculture from across the world, with an emphasis on Africa. In Part 3, an attempt is made at estimating the economic value of small vegetable gardens in Cape Town. Part 4 then presents a detailed case description of an existing project in Cape Town, initiated and run by the Catholic Welfare Bureau. Finally, in Part 5 (26 p.), an assessment is made of the potential of introducing community gardens to Cape Town. (JN)

Eberlee, J (1999). Urban gardening in Haiti. IDRC Reports. May 28, 1999

<http://www.idrc.ca/reports>.

community development horticulture

Haiti; home gardening; urban poor; nutritional status

Residents of some of the poorest urban areas of Haiti are improving their health, nutrition status and income by growing vegetables in containers (old tires, baskets, pails, etc.) in confined spaces such as backyards, verandahs and rooftops. Under the supervision of CARE-Haiti and other partners, more than 400 people from 11 neighborhoods in Port-au-Prince and Gonaïves have attended training sessions on how to establish gardens where space is limited. Funds provided by the International Development Research Centre (IDRC), CARE-Canada, the Canadian International Development Agency (CIDA) and CARE-USA are helping CARE-Haiti design, implement, monitor and evaluate space-confined gardening methods, including technologies tested in other IDRC-sponsored projects. This article is also available in French. (HC, IDRC)

Egusquiza, Rolando (1987). Curso de cultivo de papa en huertos caseros.

Asociación Perú Mujer & Universidad Agraria de la Molina, Lima.

horticulture services

home gardening; gender; training; root crops; Latin America

This is a trainers' manual for women raising potatoes in neighborhoods. The initial objective was to train trainers or promoters. The stated objectives were good nutrition, micro-enterprise, good health and provision of service to low-income women. Methods of cultivation offered in the course were experimental. (JS)

Flood, Carlos Alberto (1990). Small-scale sub-urban and periurban biological agriculture: a social-oriented program of local food production. 18 p.

horticulture

Argentina; education programmes; biological horticulture

Describes underlying considerations and implementation elements of an adult education programme promoting biological food production in the suburbs of Buenos Aires. (WB)

Floquet, Anne. Potentials and perils on (sic) periurban agriculture in a West African coastal region. Symposium 'Rural Farming Systems Analysis: Environmental Perspectives'. Workshop E: farming and rural systems in zones of transition. Paper E/6 p. 446-456. University of Hohenheim, Germany

horticulture health and environment

West Africa; Benin; periurban agriculture; environmental degradation; rural-urban migration

Market demands change quickly in West Africa as a result of fast-growing cities. The underlying paper describes the situation in Benin, where farmers from the south have largely failed to grasp the opportunity of the urban consumption market. Soil mining has led to a decrease in the production of staple food and fuelwood in the South of Benin and to soil depletion, with ensuing rural exodus. Based on six years of field research, changes in cropping and farming systems and socio-economic changes, in the light of a rapidly changing environment, are described in this paper. (WB)

Florin, Bénédicte (1997). Savoir faire son jardin au Caire. In: Les Annales de la Recherche Urbaine No. 74 (March 1997): 85-94.

horticulture

Egypt; resettlement; social housing; social relations; leisure; home gardening

In addition to the enjoyment, the small gardens in an old social housing complex in Cairo are useful in regulating relations between neighbors. In a new housing estate at the edge of Cairo, where earthquake refugees have been relocated, gardens are a means of building up hope again. (adapted from original by JN)

Food and Agriculture Organization (FAO) (2001) Proceeding of Regional Seminar "Feeding Asian Cities", Bangkok, Thailand, November 2000. On: <http://www.fao.org/waicent/faoinfo/agricult/ags/agsm/sada/asia/index.htm>

food security and nutrition horticulture services

Asia; marketing; horticulture

This seminar was organised by the Association of Food Marketing Agencies in Asia and the Pacific (AFMA), and the Regional Network of Local Authorities for the Management of Human Settlements (CITYNET), in collaboration with GTZ, International Union of Local Authorities (IULA), Ministère des Affaires étrangères (France), UNDP/UNCHS/World Bank - Urban Management Programme - Regional Office for Asia and the Pacific, World Union of Wholesale Markets (WUWM) and with the technical support of FAO.

Food and Agriculture Organization (FAO) (2001) Proceedings of Sub-Regional Expert Consultation on "Urban and Periurban Horticulture in South-African Countries". Stellenbosch, South Africa. January 2001.

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food security and nutrition horticulture

Southern Africa; horticulture; Malawi; Zimbabwe; South Africa; Botswana; Tanzania; Namibia; Mozambique

The papers of this expert consultation on urban agriculture, focusing on horticulture in Malawi, Zimbabwe, South Africa, Botswana, Tanzania, Namibia, and Mozambique. Three discussion groups were organised on Opportunities and Constraints; Assessment of Project Profiles on selected countries; and Training Needs and Methodologies.

Freeman, Donald B. (1991). A city of farmers: informal urban agriculture in the open spaces of Nairobi, Kenya. McGill-Queen's University Press, Montreal; 159 p.

horticulture city ecology

Kenya; land use; land tenure; informal sector; food security

This book – one of the first commercial publications on urban farming - presents a review of urban agriculture in Kenya over the past century. It reports on a 1987 six-city survey of urban food production and consumption. And it reports on a central Nairobi metro survey of who farms what, where. It defines the benefits of this activity from several points of view. It provides a good tool for future researcher due to its extensive tables, maps, and references. (JS)

Funes Monzote, Fernando (199?). Cuban agricultural alternatives: an overview of Cuba's experience in organic agriculture. 14 p. Pastures and Forages Research Institute (IIPF); Cuban Association of Organic Agriculture (CAAO), Apartado Postal 4029, CP 10400, Ciudad de la Habana, Cuba

horticulture

organic agriculture; Cuba; biological control; food production systems; integrated farming systems

Provides a historical overview of agricultural development in Cuba from the perspective of organic agriculture. The state of the art of integrated farming systems, biological pest control and other issues are presented. Possibilities and approaches to encourage new strategies for the support of an organic model at national level are presented. (NB)

Furedy, Christine (1998). Appropriate technology for urban wastes in Asia: avoiding past mistakes. In: Biocycle (July 1998) p. 56-59

wastewater reuse horticulture

urban wastes; Asia; appropriate technology, case studies

Compost-making is widely considered as a suitable way of reducing solid waste disposal problems but has become controversial in Asia as it is mostly based on waste treatment in complicated mechanical plants. Though these are easy to

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administer for municipalities with relatively few parties involved, they are often built without proper cost-benefit studies, and perform badly as a consequence. When looking, however, at composting taking place in community settings, one comes across flourishing composting systems. Among the many examples cited in this highly interesting article, we mention here the garbage farms in Calcutta, described as a model for community-based approaches to composting. Here, the wastes are used in situ, with a host of waste pickers sieving through the materials plots of mature dump land are leased out, thus avoiding the costs and complications of transportation, at the same time giving rise to a flourishing vegetable production on the dump sites. Apart from such economic or ecological arguments there is the argument of employment: an estimated 20,000 people find work as a result of this intensive farming. (WB)

Garden to kitchen newsletter. Family Food Production and Nutrition Project, Unicef Pacific Operations, c/o UNDP, Private Mail Bag, Suva, Fiji

food security and nutrition horticulture
Pacific Islands; children; malnutrition

This quarterly targets the Pacific Islands, contains interesting assorted information about homegardening in the pacific setting. The few issues in our possession report about pest control, country profiles, cultivation techniques, news from the field, malnutrition related diseases, and so forth. (WB)

Garnett, Tara (1996). Farming the city: the potential of urban agriculture. In: The Ecologist vol. 26 no. 6 p. 299-307

city ecology horticulture
home gardening; allotment gardens; political aspects; United Kingdom

Describes urban agriculture in Great Britain, primarily allotment gardens, of which there are around half a million in Britain nowadays. In spite of the fact they are thriving, with long waiting lists, allotment gardens are under heavy threat from urban development schemes. There is a highly interesting description of the rise of the allotment movement in Britain, as a result of political considerations. (WB)

**Gavrilov, Alexander (1997). Rooftop gardening in St. Petersburg, Russia. Urban Agriculture Notes on: <http://www.cityfarmer.org/russiastp.html#russiastp>. 3 p. Center for Citizen Initiatives, St. Petersburg, Russia
Supplier: City Farmer, Canada's Office of Urban Agriculture**

horticulture food security and nutrition
rooftop gardening; home gardening; St. Petersburg; Russia

The Rooftop Gardening Program in St. Petersburg started in 1993. This short article gives facts and figures and describes some of the techniques used in the project. The project achieves much impact with citizens despite a complete lack of interest from city administration. (WB)

Gbadegesin, Adeniyi (1991). Farming in the urban environment of a developing nation: a case study from Ibadan metropolis in Nigeria. In: The Environmentalist vol. 11 no. 2 (1991) p. 105-111

horticulture city ecology

Nigeria; Ibadan; surveys; food security; urban poor

Reports on a survey among 800 part-time or full-time farmers in the urban fringe of Ibadan. Results showed well-known considerations such as reducing people's expenses on food and supplementing the family's income. Major threat was reported to be competition from non-agricultural land uses. The article describes characteristics of the urban farming system in Ibadan, in which the proportion of crops grown for staple is high. Interestingly, roughly half of all those who had been approached to sell their land, had turned down this offer (though the article does not give information about prices offered). (WB)

Gockowski, J. Intensification of horticultural production in the urban periphery of Yaoundé. Agriculture périurbaine en Afrique subsaharienne p. 63-79

rural-urban linkages horticulture

Yaoundé; Cameroon; periurban agriculture; surveys; farming systems

Population growth of more than 6%, proximity to the largest urban centre and high rural population densities all contributed to intensification and diversification in Beti farming systems around Yaoundé. A random survey of 208 households in 16 villages 12 to 90 km from Yaoundé was conducted. Sixty-five % of the households interviewed adopted an intensive monocrop horticultural system with on average 3 monocrop fields per adopting household. They maintained roughly the same number of traditional field-systems as non-adopters, indicating an increased mobilisation of labour and increased tomatoes, okra, sweet green and hot peppers. Pests and diseases were cited most frequently as the major agronomic constraint. Variation in market access resulted in significant price differentials as a function of distance to market. The valuable genetic diversity in local land races of tomatoes and the indigenous West African okra is in danger of being lost. Many indigenous leafy vegetables are very important particularly to the urban poor. These crops have largely been neglected by research with the same risk of genetic erosion as farmers turn to cabbages and tomatoes. Rootknot nematodes were the most cited problem among commercial producers. Efforts to develop improved fallows at IITA and elsewhere need to focus on the impact of fallow species on cyst populations. Given the lack of resources at the disposal of public research institutes results should be shared through regional organisational frameworks. (NB - Abstract adapted from original)

Gonsalves, JF; Arizala (1986). The bio-intensive approach to small-scale household food production. IIRR & UNICEF, Silang Cavite Philippines, illustrations, tables

Urban Horticulture

horticulture services

household gardening; bio-intensive horticulture; poverty; gender; ecology; nutrition; integrated pest management; waste recycling; composting

This is a packet of 20 educational one to six-page items that constitute the substance of a short course. They present the concept of bio-intensive horticulture practice and specific methods for specific crops. (JS)

Gonzalez Novo, Mario; Murphy, Catherine (2000). Urban agriculture in the city of Havana: a popular response to a crisis. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 329-347. DSE, GTZ, CTA, SIDA

horticulture food security and nutrition

food security; food policy; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; land tenure; environmental regulation; hydroponics; Havana; vermiculture; biopesticides; biodiversity; reforestation; Cuba

Havana probably offers the most successful example for which the concept of urban agriculture was applied as a response to a food crisis, not only by individuals, but also as a government-supported strategy. The main idea of urban agriculture in Havana is "Production by the neighbourhood, for the neighbourhood". In general it is an intensive high input, high output system. There are many different forms of urban farming: (a) popular gardens, (b) basic production co-operative units with about 10 to 15 members, (c) state farms (d) individual farms (e) co-operative supply units. The organopónicos and intensive gardens, which work well in the urban setting, are important in the total production. The government made land available for farming providing secure land-use rights and there are a number of regulations concerning urban agriculture e.g. on the use of pesticides. There is a large network of support services for producers and direct marketing by the producers has been facilitated. Urban agriculture increased the diversity of crops and had a dramatic impact on the deteriorating food situation in Havana. Overall 117,000 people work in jobs related to urban agriculture. Waste is recycled through urban agriculture a reforestation programme started and urban agriculture has become an important element in urban development and different departments co-operate in improving the impacts of urban agriculture. (NB)

Gough, Robert E; Barclay Poling, E (eds) (1997). Small fruits in the home garden. 272 p. ISBN 1_56022_057_0 (pbk). USD 24.00

Supplier: Food Products Press, c/o Haworth Press, 10 Alice Street, Binghamton, NY 13904-1580, USA

horticulture

fruit culture; home gardening

A technical guide to growing and harvesting small fruit in home gardens. Species presented are for temperate zones (with the exception of grapevines). (WB)

Grand-Pierre, Reginald (1993). Preliminary investigations: periurban agriculture in Port au Prince.

horticulture

Haiti; periurban agriculture; food processing

This is a short sub-sector analysis of urban agriculture in a Caribbean city. Fourteen sub-sectors are defined and potentials for each projected. (JS)

Groening, Gert; Wolschke-Bulmahn, Joachim (1995). Ein Jahrhundert Kleingartenkulture in Frankfurt am Main. Frankfurt: W. Kramer & Co. 311 p.

horticulture community development

allotment gardens; leisure gardens; policy; organisation; food security; community greening; Germany

“One hundred years of community gardening in Frankfurt” is a special history book about urban agriculture in good times and not so good times. It provides a depth of written and visual history not provided in any other book. (JS)

Groening, Gert (1996). Politics of community gardening in Germany. In: Urban Agriculture Notes on: <http://www.cityfarmer.org/german99.html#german>, 16 p.

Supplier: City Farmer, Canada's Office of Urban Agriculture

community development horticulture land use planning

community gardens; Germany; municipal policies

Gives quantitative data about community gardening in Germany and highlights difficulties in obtaining urban land for small gardens in Berlin, Germany. The paper examines implications of zoning law in Germany. There is an interesting historic overview of community or allotment gardens and their contribution to community development. (WB)

Gura, Susanne (1996). Vegetable production: a challenge for urban and rural development. In: Agriculture + Rural Development, vol. 3 (1996) no. 1, p. 42-44

Supplier: Technical Centre for Agricultural and Rural Cooperation (CTA);

Deutsche Stiftung fuer Internationale Entwicklung / Zentralstelle fuer Ernaehrung und Landwirtschaft (DSE/ZEL); Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ)

horticulture food security and nutrition

vegetable production; consumption patterns; nutrition; farming systems

Vegetables play an important role in food security. Vegetable production has been mostly concentrated on species with a high market value. However, the poor usually can't afford these types of vegetables. Urban poor mainly consume leafy vegetables which wither quickly. Urban agriculture can play an important role to increase this production. Three systems of production are distinguished: urban shifting cultivators,

Urban Horticulture

household gardeners and periurban market producers. It is argued that these systems need development support for land saving technologies, improved recycling of waste, recycling technologies and urban community development approaches and interdisciplinary approaches. (NB)

Hargesheimer, Ken. Urban agriculture: gardening, market gardening, mini-farming, mini-ranching. Gardens / Mini-farms Network, Lubbock, TX, USA

horticulture economic impact rural-urban linkages

home gardening; gardening techniques; urban livestock production; youth; United States

Focuses on the potential of various forms of urban agriculture, notably from the perspective of an opportunity for youth employment. Much of this paper is a mapping of production techniques. In addition, a condensed overview is given of important publications and suppliers' addresses, for the American market. (WB)

Holl, Annegret (1998). Urbane Landwirtschaft in Havanna (Kuba) zwischen staatlicher Planung und 'moviemento popular'. 90 p.

food security and nutrition community development hydroponics

Havana; Cuba; home gardening; community gardens; food security; agricultural markets; commodity-oriented agriculture

Urban agriculture in Havana is considered by many authors as an essential contribution to Cuban food security, is very much instigated by the state and now covers over 6,000 hectares within the city boundaries. This paper reports on a fact-finding trip examining if urban agriculture in Havana is as successful as is often claimed. Doing a survey to that effect revealed itself difficult in the current political setting. The author highlights existing discrepancies from state regulations, more particularly with regard to the composition of crops produced: many citizens go for staple food production rather than vegetables. The paper concludes that the contribution of urban agriculture to food security is less than what is often reported and certainly not enough to feed Havana. Also, rural production should be much more directed towards the internal Cuban market. A refreshing look at things which are so often just taken for granted and therefore an important contribution paper. (WB)

Holmer, Robert J; Schnitzler, Wilfried H (1999). Urban and periurban small and medium-sized enterprise development for sustainable vegetable production and marketing systems: Vietnam, Laos and Philippines. Urban Agriculture Notes <http://www.cityfarmer.org/laos.html>. 5 p. Periurban Vegetable Production Project (PUVeP), Xavier University College of Agriculture, PO Box 78900, Cagayan de Oro, Philippines

Supplier: City Farmer, Canada's Office of Urban Agriculture

horticulture economic impact services

vegetable production; Vietnam; small- and medium-sized enterprises; Laos;

Philippines

Gives a description of the Urban and Periurban Small and Medium-Sized Enterprise Development for Sustainable Vegetable Production and Marketing Systems. The project is implemented in Vietnam (Ho Chi Minh City), Laos (Vientiane) and the Philippines (Cagayan de Oro). The project aims to facilitate small and medium sized enterprises in South-East Asia with access to the market by developing socially, economically and ecologically sustainable vegetable production systems. (NB)

Holmer, Robert J. (2001) Appropriate Methodologies for Microenterprise Development in Urban Agriculture. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAf, Leusden The Netherlands.

R&D Methodology horticulture services
micro enterprise; informal sector

Much of the developing countries' rapidly growing population forms part of the economy that lies outside the regulatory framework of governments in what is known as the informal sector. Although the definitions vary according to the country context, it is generally agreed that the informal sector, whether rural or urban, comprises small and micro-enterprises producing and distributing basic goods and services in unregulated, but competitive markets. This paper reviews available literature and the contributions to the workshop.

**Hoogerbrugge, ID; Fresco, LO (1993). Homegarden systems: agricultural characteristics and challenges. IIED Gatekeeper series no. SA39. 23 p. Department of Agronomy, Wageningen Agricultural University (WAO), PO Box 341, 6700 AH Wageningen, The Netherlands
Supplier: International Institute for Environment and Development (IIED), 3 Endsleigh Street, London WC1H 0DD, UK**

horticulture

Asia; cultivation; family labour; home gardening; labour; land use; marginal land; population density; small-scale agriculture

In the humid tropics only two systems of traditional, low input farming have evolved under high conditions of high population densities: wet rice cultivation and homegardening. Much is known about wet rice systems but surprisingly little about homegardens. Homegardens are defined as 'small scale, supplementary food production system by and for household members that mimics the natural, multi-layered ecosystem'. This paper discusses many sources of 'informal' or 'grey' literature on agronomic aspects of homegardens, including several unpublished field observations. It aims to increase the understanding of the homegardens flexibility in the light of changing conditions in Southeast Asia and discusses its applicability and potential for increasing food security in certain parts of Africa and Central America.

(RV)

Howorth, Chris; Convery, Ian; Majani, Bituro (1995). Feasibility study of urban horticulture in Dar es Salaam. 31 p. Natural Resources Institute (NRI), Central Avenue, Chatham Maritime, Kent ME4 4TB, UK
Supplier: ETC(UK)

horticulture economic impact

Tanzania; economic impact; political aspects

Gives an overview of the urban agriculture situation in Dar Es Salaam. The report provides figures about cost and benefits of urban and periurban farming. A number of other issues are also discussed: local authority perception of urban farming, water and land supply, urban waste management, composting and recycling. Different projects for the promotion of urban horticulture undertaken in the Dar Es Salaam area are briefly described. (WB)

Ignacio, NG (1994). Resettle and survive. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 18. International Institute of Rural Reconstruction (IIRR), Silang, Cavite, Philippines
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands

land use planning horticulture

home gardening; Philippines; small-scale agriculture; urban communities; urban development; urban environment; urban population; vegetables

Urban populations in developing countries are growing fast. It's expected that by 2025, urban centres in the developing world will be home to some four billion people, a figure equal to the world's total population in 1975 (World Resources 1994). Rapid population growth and urbanisation are straining resources. Shelter, sewerage, clean water and even the most basic of amenities, food, are at a premium and malnutrition is endemic. (ILEIA)

International Institute of Rural Reconstruction (IIRR). Urban agriculture issues: case study of DBB (Dasmarinas Bagong Bayan) Project. 6 p. International Institute of Rural Reconstruction (IIRR), Silang, Cavite, Philippines

horticulture

Philippines; development projects; resettlement projects; home gardening

Describes the Dasmarinas Bagong Bayan Project, a major semi-urban resettlement project south of Manila. In order to boost low incomes of recent settlers, the Philippine government encouraged the development of a semi-commercial bio-intensive gardening project among just over 50 growers. (WB)

Jacobi, Petra (1997). Importance of vegetable promotion in Dar es Salaam, Tanzania. 15 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania

horticulture economic impact services

Tanzania; agricultural production systems; economic analysis; marketing

Urban agriculture in Dar es Salaam involves a large proportion of the city population, Therefore, the city has been of major interest for research undertaken in this area for many years. The Urban Vegetable Promotion Project, started in 1993, deals with the different production systems of vegetables in and around Dar es Salaam. Three major production systems are determined: periurban production, open space system and homegarden production. The report gives useful information about the number of people engaged in gardening, different cropping patterns and cultivars used, cultivation periods, and approximate yield. It is argued that the different production systems all occupy a specific niche with regard to vegetable production and consumption in Dar es Salaam. (WB)

Jacobi, Petra ; Amend, Jörg; Kiango, Suzan (1999). Farming in the city: Vegetable production in Tanzania. In: Gate: Technology and Development no. 2 (April-June 1999) p. 14-20

horticulture food security and nutrition

Tanzania; vegetable production

Dar es Salaam is a good example of the potential of urban farming. Besides cattle raising, vegetable production is the most prominent activity, with a clear focus on leafy vegetables. The reasons are: a huge demand, it can be grown throughout the year, there are pest resistant crops, investments are reasonable, certain crops can be picked continuously and competition from outside the town is minimal. The authors conclude that urban farming creates jobs and income, reduces household spending, maintains green space and contributes to reusing organic waste. More and more stakeholders acknowledge the importance of urban agriculture in Dar es Salaam. An extended version of the article can be found in 'Growing Cities, Growing Food: Urban Agriculture on the Policy Agenda' published by DSE. (NB)

Jacobi, Petra; Amend, Jörg; Kiango, Suzan (2000). Urban agriculture in Dar es Salaam: providing for an indispensable part of the diet. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 257-283. DSE, GTZ, CTA, SIDA

horticulture food security and nutrition

vegetable production; dairy farming; community gardens; food security; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; Tanzania

Homegarden production, Livestock production in homesteads, community gardens, open space production, and periurban production in Dar es Salaam are discussed. Perishables (milk, leafy vegetables) are produced in intraurban areas the periurban area supplies a mix of perishables and staples (maize, rice a.o.). More than 90% of

leafy vegetables come from open spaces and home gardens while 60% of the milk is produced in urban and periurban areas. Urban farming contributes to the maintenance of green open spaces, improving the micro climate and preventing illegal dumpsites. The different production systems contribute considerably to family income. There is a strong link between the socio-economic status of a family, the objective of the production and the involvement of women. "Female agriculture" contributes more to the household. Urban agriculture is affected by, access to resources (water), insecure land-use titles, the unsatisfied demand for fresh food especially green leafy vegetables. Level of organisation is low and urban retail poses problems. Urban agriculture has received attention on various policy levels. Its recognition is reflected in several laws and regulations. It is expected to keep its importance especially for the urban poor. (NB)

Jacobi, Petra. and Kiango, Suzan. (2001) Ways to monitor & evaluate Urban and Periurban Agriculture – Experiences from Dar Es Salaam, Tanzania. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.

R&D Methodology land use planning horticulture

Tanzania; monitoring and evaluation; participatory monitoring; indicators

In Tanzania urban and peri-urban agriculture is a well-known activity and it has reached the level of official acceptance. Systematic monitoring and evaluation as well as channelling generated information and feedback from the field to the relevant levels has supported this acceptance. In the discussion about participatory M&E against conventional M&E it appears that the former should replace the latter. It is argued in this paper that there should be a balance to be struck between "conventional" and "participatory" monitoring. There should be both "hard data" and a system that allows primary stakeholders to monitor and evaluate their activities using different methods and own indicators. Truly appropriate monitoring and evaluation should enhance internal learning and provide evidence to support qualitative statements about the impact of an action.

Jansen, Hans GP et al (1995). Sustainable periurban vegetable production and natural resources management in Nepal: results of a diagnostic survey. AVRDC, Taiwan; 40 p.

horticulture

irrigation; marketing; agricultural extension; economics; Nepal

This report is concerning a diagnostic survey of vegetable production in three districts of the Katmandu valley, daily delivery to the city markets. A good analysis is done of annual cropping patterns and methods of production. The economic analysis leads to a set of recommendations leading to increased production. (JS)

Jeavons, John (1974). How to grow more vegetables than you ever thought possible on less land than you can imagine. Palo Alto, CA: Ecology Action of the Peninsula. 81 p.

community development horticulture
history; composting; biodynamic gardening; vegetable crops; integrated pest management

This book has continued to be updated and reissued until recently. It is a manual of biodynamic raised-bed horticulture, a history, a philosophic statement and a vision. At its core are methods developed in the Marais in Paris in the 1890s, to which were added the biodynamic techniques of Rudolf Steiner in the 1920s. Alan Chadwick integrated biodynamic and intensive farming in the 1940s and brought them to California in the 1960s. This book reports on results and methods carried out at the University of California at Santa Barbara, on the basis of Chadwick's lessons. (JS)

Karaan, M. (2001), Urban Horticulture in the Cape Metropolitan Area: An Appraisal of Activities and Institutional Support. Department of Agricultural Economics, University of Stellenbosch. In: Proceedings on the Sub-Regional Expert Consultation on the Use of Low Cost and Simple Technologies for Crop Diversification by Small Scale Farmers in Urban and Peri-Urban Areas of Southern Africa, Stellenbosch, South Africa, January 15-18 2001.

urban horticulture
institutional support; horticulture; urban areas; South Africa,

This paper reports on research done to evaluate the contribution of urban agriculture to the livelihoods of recently urbanised people in the Cape Town Metropole. The study emanated from an evaluation of non-government support to promote urban agriculture and hence is also an appraisal of the effectiveness of NGO support. The NGO under evaluation was Abalimi Bezekhaya. The investigation is specifically an evaluation of people's motivations for engaging in urban farming, the efficiency of such activity and the effectiveness of existing support structures. First, a brief background of the study area is sketched, followed by a concise history of Abalimi Bezekhaya. The analysis that follows is specifically an assessment of motivations, production costs and support measures. A short account is also given of recent efforts by local authorities to cater for urban agriculture. Conclusions and recommendations follow.

Kalumba, KV (19??). Ten case studies of small-scale gardening in the Thornpark / Villa Elisabetta area of Lusaka. In: In the shadow of Lusaka (source unknown) p. 37-45

horticulture
home gardening; Zambia; surveys

Paints a picture of the typical Lusaka urban gardener and infers general conclusions about the gardener's position vis-à-vis city authorities and about his attitude towards poverty and how to cope with it. (WB)

Kiango, Suzan and M.E. Nzalawahe (2001), Urban and Peri Urban Horticultural Production in Tanzania. Ministry of Agriculture and Co-operatives, Dar es Salaam, Tanzania. In: Proceedings on the Sub-Regional Expert Consultation on the Use of Low Cost and Simple Technologies for Crop Diversification by Small Scale Farmers in Urban and Peri-Urban Areas of Southern Africa, Stellenbosch, South Africa, January 15-18 2001

urban horticulture

Tanzania; urban areas; periurban area; horticulture, Africa (Eastern)

In Tanzania, high urban growth rates with limited formal employment have meant a mushrooming of all kinds of informal employment. Here, urban agriculture is one of the important informal activities, as it provides income to a cross section of the urban population. It contributes to the city economy, as it is an industry in itself that includes production and marketing activities. It has proved to be one of the survival strategies for all social classes to cope with the declining standard of living. It provides and increases access to high value food for relatively poor urban dwellers. Wide ranges of ethnic groups participate in urban agriculture. Some background in horticulture and limited formal employment is the major reason for a farmer to engage in urban agriculture. The farmers represent the average working population (50-60% in the ages of 20-40). Men and women both participate: men are more active in open space production while women are responsible for home gardening in high-density areas. Availability of intra-urban land and a variety of water sources favour urban agriculture. However, land tenure, illegal land use and insecurity of land use limits long term investment in these open spaces. On the other hand, access and reliability of water supply plays a major role in the size and duration of production. In some areas, low surface water quality and high rates of water bills limit production. The nature of urban agriculture offers opportunities for nutrient recycling from one production system to another. Composting of organic wastes contributes to the availability of inputs, especially manure, and benefits the city environment. Informal land acquisition gives equal chance on access to land to both genders. Access to formal credit to subsistence producers appears to be difficult while capital investment in peri urban areas could play a significant role. Furthermore, a variety of recommendations looking at different institutions as well as follow up activities are highlighted.

Kleer, Jerzy (1987). Small-scale agricultural production in urban areas in Poland. In: Food and Nutrition Bulletin vol. 9 no. 2 (1987) p. 24-28. University of Warsaw

food security and nutrition horticulture

home gardening; allotment gardens; agricultural production; Poland

Contains a historic overview of small-scale food production in Polish towns and cities. One interesting figure: in the mid-1980s, total output from allotment gardens accounted for over 6% of total agricultural production in Poland. (WB)

Knierim, Andrea (1996). Agricultural development potential around Dolisie in the

Congo: a case study in the catchment area of a small town. In: Agriculture + Rural Development vol. 3 (1996) no. 2 p. 51-54
Supplier: Technical Centre for Agricultural and Rural Cooperation (CTA), PO Box 380, 6700 AJ Wageningen, The Netherlands; Deutsche Stiftung fuer Internationale Entwicklung / Zentralstelle fuer Ernaehrung und Landwirtschaft (DSE/ZEL)

economic impact horticulture rural-urban linkages

Congo; periurban agriculture; socio-economic aspects

Examines the potential of periurban agriculture around the city of Dolisie in the Congo. Technical issues are addressed, but also who are the target groups for agricultural innovations and intensification activities. In this analysis, a distinction is made into 3 agricultural circles in and around the town: (1) lots within the town and around its fringes; (2) areas within a radius of 10 to 15 kilometres; (3) villages in a radius of up to 50 kilometres. All 3 different circles are farmed by different groups of producers. (WB)

Kogi-Makau, Wambui (1998). Production and utilization of vegetable (sic) and fruits in two urban sites in Dar es Salaam: a case study in Mbuyuni and Manzese, Dar es Salaam, November 1995 to November 1996. 74 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania

horticulture services

household survey; Tanzania; consumption patterns; home gardening; marketing

Presents the results of a household survey in two areas of Dar es Salaam. Data are given on acquisition and consumption patterns of vegetables and fruits and on production and utilisation of agricultural produce. (WB)

Koizumi, M; Abbas, D; Stares, J (2000). AVRDC report 1999. Asian Vegetable Research and Development Center Publ. No. 300-503, 152 p.

horticulture

vegetables; Asia; Africa; Central America; nutrition; periurban agriculture; composting

This research report is full of data from Asia, Central America and Africa. Program II *Year-round vegetable production systems* includes: (i) a significant degree of data and reportage on periurban food production, (ii) its socio-economic impact, (iii) the nutritive value of policy interventions, and (iv) municipal composting. Its 134 tables are an essential resource to be up-to-date on the advance of research in vegetable production technology. (JS)

Kouvonou, FM; Honfoga, BG; Debrah, SK (1999). Sécurité alimentaire et gestion intégrée de la fertilité des sols: contribution du maraîchage périurbain à Lomé. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa:

contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.), p. 83-103. Institut International pour la Gestion de la Fertilité des Sols - Afrique horticulture

vegetable production; nutrition; income generation; soil fertility management

Vegetable production can be a good example of integrated soil fertility management. Vegetable production benefits from stable markets and accessible inputs. The average net monthly income of vegetable production is relatively high. Production is sensitive to the use of organic and inorganic fertilisers. (NB)

Kropotkin, Peter (1985). Fields, factories and workshops. Tomorrow Freedom Press First published in 1890, 199 p.

horticulture

periurban agriculture; market gardening; environment; organic agriculture; bio-intensive production; Europe; history

This reissue of a classic work serves as a background to understanding the beginnings of modern urban agriculture in the mid-19th century. It thus assists us in perceiving the possible future of sustainable urbanization. (JS)

Kuiler, Esther (1998). Toekomstperspectieven voor biologische stadslandbouw in Nederland: stadslandbouw als onderdeel van de urbane bosbouw. AV no. 98-07. 72 p. Departement Omgevingswetenschappen, Sectie Bosbouw, Agricultural University Wageningen, The Netherlands

horticulture urban forestry rural-urban linkages

landscape design; urban livelihoods; biological agriculture; home gardening; Netherlands

Looks at urban agriculture from the livelihood point of view and examines its contribution to creating an attractive urban landscape in the setting of The Netherlands. In Dutch. (WB)

Lanting, H., M.S. Rao and K. Ravi (2001), Tomato: A Field Guide to Ecofriendly Crop Protection.

Supplier: Bangalore: Agriculture Man Ecology (AME) AME, 368, ath Cross, JP Nagar 3rd Phase, Bangalore 560 078, Karnataka, India

urban horticulture

India; pest management; vegetable production; vegetables; organic agriculture

This is an illustrated handbook of insect pests and diseases most commonly found in the tomato-growing regions of India. This book aims to promote organic plant protection practices. It does not aim to cover all the other aspects of organic tomato farming, but encourages adoption of many useful organic plant protection practices through minimal use of chemicals. For each important insect pest, disease or nematode, the reader will find recommendations and strategies for appropriate biocontrol, and simple instructions for the preparation of bio-inputs.

Urban Horticulture

This guide is primarily intended for tomato growers in India and their service groups - agricultural extension workers, farm managers, horticulturists, agronomists, tomato processing units, agro-input manufacturers and seed companies. Its main objective is to serve as a quick reference tool for effective and ecofriendly management of the more economically important and prevalent pests of tomato in India.

Lahr, PF; Lehen, CC (1989). Techniques and resources for fast growing hot weather vegetable gardening in Port-au-Prince, Haiti. ECHO (Educational Concerns for Hunger Organization) North Fort Myers, Florida. 49 p.

horticulture

Haiti; Caribbean; small-scale agriculture; irrigation; composting; vegetables

This is a useful manual for many tropical urban areas. It includes 15 Appendices on how to do it. Eight specific types of gardens are described. (JS)

Lawrence, Joseph (1999). Urban agriculture: the potential of rooftop gardening. Urban Agriculture Notes <http://www.cityfarmer.org/roofthesisIntr.html>. York University, North York, Ontario, Canada

Supplier: City Farmer, Canada's Office of Urban Agriculture

horticulture

rooftop gardening

This elaborate thesis explores rooftop gardening based on the author's experience. Practicalities like farm layout, crop selection as well as analyses on economic potential and other issues are presented. (NB)

Lewis, Ingrid U (1996). The promotion of traditional vegetables: examples from Africa. In: Agriculture + Rural Development vol. 3 (1996) no. 1 p. 48-49
Supplier: Technical Centre for Agricultural and Rural Cooperation (CTA), PO Box 380, 6700 AJ Wageningen, The Netherlands; Deutsche Stiftung fuer Internationale Entwicklung / Zentralstelle fuer Ernaehrung und Landwirtschaft (DSE/ZEL)

horticulture

Africa; traditional vegetables; nutrition; conservation; gender issues

There has been a drastic decline in the use of traditional vegetables in the world. In the framework of the Urban Vegetable Promotion Project in Tanzania, research was conducted into the scope for restoring traditional strains of vegetables to the position of importance which their nutritional value merits. Improvement, distribution and in-situ conservation are discussed. This seems a very praiseworthy initiative in which there is much scope for community involvement, especially of women. (WB)

LifeSpin (1997). Pocket-sized Farms - kid's garden book. LifeSpin. On:

www.execulink.com/~life/

community development

horticulture

Urban Horticulture

youth; education; organic gardening

Organized around the seasons the book is designed for children to use as members of a school garden club or in their own backyards. The book uses two fictional characters, the Crow and the scarecrow, in a rhyming story format to guide children through a series of important organic gardening principles. It is intended both as a source of inspiration and a learning opportunity for children. A second part of a package *Teacher's and Parent's Guide to Organic Gardening*, includes organic gardening advice, a number of educational activities, and specific tips for gardening with young kids. A third component is *The Kid's Workbook* – (JS)

Loraine, Isabelle (1994). Agriculture in the non-urban areas of Melbourne Region. Government of Victoria, Australia.

horticulture

periurban agriculture; Australia; urban planning; environment

This is an exceptional comprehensive analysis of periurban agriculture in a temperate climate. Its focus is urban planning and urban development strategies. The elements analyzed include: (i) land values, (ii) agricultural production and marketing, (iii) environmental impacts, (iv) recreation, natural resource conservation, (v) comparisons to France and the USA, (vi) comparisons of metropolitan sub-regions. In all a model worthy of considering when setting out to do an agricultural metropolitan study. (JS)

Losada, Hermenegildo (et al.) (1998). Urban agriculture in the metropolitan zone of Mexico city: changes over time in urban, suburban and periurban areas. In: Environment and Urbanization vol. 10 (1998) no.2 p. 37-54

horticulture food security and nutrition

urban livestock; ornamental plants; urban farming systems; environment; environmental pollution; urban planning; land tenure; cultural aspects

The paper describes the scale and nature of agricultural production in Mexico City, according to the different zones defined and how these have adapted to the changing demands from urban populations for food, wood and recreation. Evidence is provided that agriculture has successfully adapted its products and production methods to the changes, which include a deteriorating environment and lack of government support. The producers developed ways to use degraded land and use large volumes of waste in the production process. It is argued that appropriate support for the diverse urban agricultural production comes with many ecological advantages and creates new jobs. However this also requires important changes in the ways city authorities manage urban expansion. (NB - Abstract adapted from summary)

Losada, Hermenegildo et al (1999). Assessing the sustainability of a periurban agroecosystem: the terraced production of Nopal-vegetable (Opuntia ficus

indica) in Milpa Alta, Mexico City. (Unpublished). Universidad Autonoma Metropolitana-Iztalpalapa, Mexico DF, 29 p.

horticulture

Mexico; sustainable agriculture; farmers' organisations; economics

This study report presents a phenomenal growth of the production of Nopal (edible cactus) within a large metropolitan area by four items in 15 years. It studies this urban agriculture success story from several points of view and comes to a positive conclusion. (JS)

Madisa, M.E. and D.L. Keboneilwe (2001), Urban and Peri-Urban Horticulture in Southern African Countries: Status of Urban and Peri-Urban Agriculture in Botswana. Department of Agricultural Research / Division of Agricultural Planning and Statistics, Paper prepared for the Sub-Regional Expert Consultation Meeting on Urban and Peri-Urban Horticulture, University of Stellenbosch, Cape Town, South Africa, January 2001.

urban horticulture

horticulture; urban areas; periurban area; Botswana, Africa (Southern)

The contribution and performance of the horticultural subsector in Botswana continue to pose a great challenge to government, particularly the Ministry of Agriculture. Whilst physical and climatic factors that constrain the productivity of the sector cannot be ignored, the infancy of the horticulture as an industry need to be acknowledged. Horticultural farming that includes products such as cabbage, carrots, tomatoes, etc. is not part of the traditional farming systems. However, as socio-economic and demographic changes set in, urban and peri-urban agriculture has become increasingly relevant, particularly in the midst of unemployment, food insecurity and poverty. As government policy strives to improve quality of life for all people, diversification of agricultural production base has been adopted. The National Masterplan for Agricultural Development (NAMPAD) has also identified the need to better plan agricultural production zone as well as putting sewage water and contaminated well fields and dams to productive use. This will go a long way in addressing unemployment, waste management and food security problems in urban and peri-urban centers. There is, however, a need to develop a public policy that can ensure the integration and sustainability of urban and peri-urban agriculture in urban and peri-urban centers. Furthermore, low-cost technologies and training on horticultural skills will need to be developed.

**Marsh, R (1994). Nutritional benefits from home gardening. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 14-15. Asian Vegetable Research and Development Center (AVRDC), PO Box 205, Taipei 10099, Taiwan; IICA, PO Box 55-2200, San Jose, Costa Rica
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands**

horticulture food security and nutrition

Bangladesh; community health; home gardening; nutrition; nutritive value; urban communities; urban development; urban environment; urban population; vegetables

Seasonal hunger and malnutrition are ever-present conditions for the landless or near landless rural poor and urban slum dwellers. These groups are particularly vulnerable because of low and irregular cash incomes. In Bangladesh, as in other tropical countries, many such households use the small area around their house to grow food to supplement field crops, purchased food and generate income for households with access to markets. The pilot homegarden project of Helen Keller International (HKI) reported here has looked specifically at the impact of improved home gardening on the nutritional status and health of poor households. (ILEIA)

Marulanda C; Izquierdo J (1991, 1998). La huerta hidropónica popular. FAO. On: www.rlc.fao.org/prior/segalim/prodalim/prodveg/10046.pdf.

hydroponics
horticulture; training

This manual presents the step by step method of "popular hydroponic agriculture" as invented in Colombia in the 1980s. It uses illustrations and checklists. English and Portuguese versions available on paper at request. An audio-visual video training course, with nine classes, available in Spanish and Portuguese, (JS from authors)

Mbaye, Alain; Bon, Hubert de ; Pages, Jacques. Vers une gestion concertée de ressources naturelles en zone périurbaine: Le cas de la région de Dakar. Agriculture périurbaine en Afrique subsaharienne p. 125-139

horticulture
Senegal; natural resource management; farming systems; water management

With increasing urbanisation and industrialisation the pressure on natural resources has increased. An analysis of agricultural production systems in the Dakar periurban region revealed substantial diversity, with a predominance of irrigated systems in the Niayes and Cape Verde areas. Urban agriculture faces several challenges: the deterioration and increasing scarcity of natural resources decreasing agricultural production with increasing food requirements, the development of periurban agricultural production and associated industries and the importance of horticultural and fruit production sector in the national economy. The paper focuses on the methods of water resource management and on activities of the "Centre pour le Développement de l'Horticulture" (CDH). After describing the impact of water availability on production systems and outlining a typology of farms, the main problems related to water availability are discussed. The CDH was set up to guide the development of market gardening in the Niayes region. Many innovations have been developed including pest management cropping schedules and monitoring marketing operations. TH CDH is to work on improving , diversifying and intensifying production, developing integrated systems, develop natural resource management techniques and develop decision making tools. (NB - abstract adapted form original)

Mbaye, Alain (1999). Production des légumes à Dakar: importance, constraints et

potentialités. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.), p. 55-66. Institut Sénégalais de Recherches Agricoles (ISRA), Centre pour le Développement de l'Horticulture (CDH)

horticulture

vegetable production; Senegal; production systems

Vegetable production in Dakar represents 40% of the national production. In Dakar there is strong pressure on available resources, which are rapidly degraded. Whereby urban vegetable production systems directly compete with non-agricultural urban needs. (NB)

Mbaye, Alain; Moustier, Paule (2000). Market-oriented urban agricultural production in Dakar. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 235-256. DSE, GTZ, CTA, SIDA

horticulture

commercial agriculture; food security; food policy; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; Senegal

The article defines urban agriculture as agriculture for which there is an alternative in the use of resources – one agricultural and an other non-agricultural. This generates competition but also possible complementarity. Five production systems are discussed: (a) family periurban vegetable production systems, (b) commercial periurban vegetable production, (c) specialised systems of poultry farming, (d) periurban systems of combined agriculture and poultry production, (e) backyard horticulture and livestock systems. The contribution of urban agriculture is substantial for vegetables and poultry. Cereals and tubers are of less importance. Organic waste is systematically used in farming. Dakar's principal site of agricultural production has an important function for drainage and erosion prevention. It is estimated that urban agriculture creates 15,000 jobs. There is no formal policy framework for urban agriculture, it is no priority in urban planning. This affects mainly small producers as they have insecure land use rights. The final part contains recommendations with regard to urban agriculture, the preservation of physical resources and in the area of collaborative efforts and information systems. (NB)

Mbiba, Beacon M (1993). Urban agriculture in Zimbabwe: implications for urban poverty and management. The Making of Modern Africa Series. ISBN 1 85628 857 9. NLG 225.00. Department of Rural and Urban Planning, University of Zimbabwe, PO Box MP 167, Harare, Zimbabwe

horticulture food security and nutrition

Zimbabwe; urban environment; urban development; development policies

The book is based on research conducted in Zimbabwe in 1991 and rejuvenated local interest on urban agriculture. In southern and eastern Africa, urbanisation is a major process transforming the economies. Most urban centres were planned for

Urban Horticulture

much smaller populations and they lack adequate formal sector employment for the growing workforce. As a result most urban environments are characterised by informal sector activities, of which urban agriculture is increasingly an important feature. While it acknowledges that the activity is a significant source of food and income for the urban poor, the book draws attention to development conflicts raised by the activity. The book places urban agriculture within the context of urban economy, urban management, and urban development also discussed are the gender dimension, environment institutional aspects. Lastly ways to develop urban agriculture to its full potential in Harare are explored. (NB)

Mbiba, Beacon M (1999). Urban agriculture in Zimbabwe. Urban Agriculture Notes <http://www.cityfarmer.org/zimbabwe.html>. 2 p. Department of Rural and Urban Planning, University of Zimbabwe, PO Box MP 167, Harare, Zimbabwe
Supplier: City Farmer, Canada's Office of Urban Agriculture

horticulture food security and nutrition
Zimbabwe; poverty; income generation; food production

A summary of the book "Urban agriculture in Zimbabwe" by Beacon Mbiba. A table of contents is provided. The book addresses the phenomenon of urban agriculture in Zimbabwe. (NB)

Mbiba, Beacon M (2000). Urban agriculture in Harare: between suspicion and repression. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 285-301. DSE, GTZ, CTA, SIDA

horticulture food security and nutrition
farming systems; food security; food policy; land use systems; ecology; economic impact; gender; urban policies; poverty; land tenure; legislation; Zimbabwe

Harare has several conditions favourable to urban agriculture including a relatively wet climate, large residential plot size and large open spaces in the city. Urban agriculture can be classified into on-plot agriculture, off-plot agriculture, and periurban agriculture. The collapse of the formal economy gives rise to urban agriculture. Most of the production is for subsistence. Whereby women provide the bulk of the labour and management inputs. This can be related to their traditional roles of food procurers. The official view is that urban agriculture poses a threat to the environment, but potential contributions to the environment remain unexplored. Existing policies swing between repression and tolerance, while urban agriculture is not perceived as a viable solution for food security or job creation. The general opinion is that there is ample rural land available for production, rather the problem is the inequitable distribution of land. Research and lobbying helped to create a basis for dialogue around the potential of urban agriculture. For this the target should be to increase food production and make it available, affordable and adequate through out the year. The challenge is to discover how the ambiguity of the legal framework can be used to extent urban agriculture. (NB)

Medellín Erdmann, Rodrigo A (1995). Container farming: organic food production in slums of Mexico City. In: Gate (March 1995) p. 32-35

hydroponics horticulture

Mexico

Reports on ANADEGES, a joint project by some 20 NGOs launched to help urban poor in Mexico City develop a capacity to produce food organically in backyards or on rooftops or balconies. Several techniques were introduced to increase production, mostly in relation to production and application of fertiliser. (WB)

Memon, Pyar Ali; Lee-Smith, Diana (1993). Urban agriculture in Kenya. In: CJAS/RCEA (January 1993) p. 25-42. Mazingira Institute, Nairobi, Kenya

horticulture food security and nutrition

food security; surveys; Kenya

Presents the results of a survey among urban farmers in Kenyan cities by the Mazingira Institute. The study concludes, once more, that subsistence production in towns and cities has been neglected in economic and spatial planning to the point of being outlawed. Still, the economic value of urban subsistence farming is both significant at the national level and crucial to the poor themselves. (WB)

Meyer-Renschhausen, Elisabeth; Holl, Annegret (eds) 2000. Die Wiederkehr der Gärten: Kleinlandwirtschaft im Zeitalter der Globalisierung. 229 p. ISBN 3-7065-1534-2. Innsbruck: Studien-Verlag

horticulture food security and nutrition community development

horticulture; gardening; allotment gardens; vegetables; conferences; Germany; United States; Cuba; Mexico; Burkina Faso

More and more city dwellers become involved in producing vegetables and fruit, rather than consume commercially produced food. The reasons strongly vary, however, from sheer necessity in many Eastern European and developing countries to a reaction to the unhealthy commercial products and the benefits of a relaxed pastime for overstressed urban citizens.

A number of chapters in this book were originally presented at the 'International Symposium on Urban Agriculture and Horticulture: the Linkage with Urban Planning' held in Berlin in July 2000. Cases described are from Western Europe -Germany, in particular-, Eastern Europe, the USA and from developing countries. Many different aspects are described, ranging from the land use issues, that never fail to come up in these cases, to community development and to descriptions of gardening systems, like the chinampas near Mexico City. Interestingly, a number of projects are analysed that were unsuccessful in involving the beneficiaries. Invariably, these projects did not take traditional production and consumption patterns enough into account. This is an important warning not to automatically paint a rosy picture of urban gardening. (WB)

Midmore, David J (1994). Simple hydroponics for food security. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 11-12

hydroponics

vegetable production; pesticides

Vegetable growing can be intensified by means of a simple system of hydroponics - growing plants without soil - which uses resources efficiently and can be adapted to local conditions. David Midmore from the Asian Vegetable Research and Development Center (AVRDC) presents a space-saving production system which can be used worldwide. ILEIA)

Midmore, David J (1996). Sustainable and ecologically sound vegetable growing in periurban farming. In: Agriculture + Rural Development vol. 3 (1996) no. 1 p. 50-52

Supplier: Technical Centre for Agricultural and Rural Cooperation (CTA), PO Box 380, 6700 AJ Wageningen, The Netherlands; Deutsche Stiftung fuer Internationale Entwicklung / Zentralstelle fuer Ernaehrung und Landwirtschaft (DSE/ZEL)

horticulture hydroponics

periurban agriculture; vegetable production; nutrition, South East Asia

Examines how growing vegetables around cities can be done on a more sustainable and, at the same time, more economically sound basis. Often, claims on land and other inputs for this activity are very high in view of increased demand for foodstuffs. The author provides alternatives, notably hydroponics, based on his experience in South East Asia with the Asian Vegetable Research Development Center (AVRDC). (WB)

Midmore, David J; Nifenz, Vera K; Venkataraman, Ramesh (1991). Household gardening projects in Asia: past experience and future directions. AVRDC Technical Bulletin no. 19. 28 p. ISBN 92_9058_049_6. Asian Vegetable Research and Development Center (AVRDC), PO Box 205, Taipei 10099, Taiwan

horticulture

gardening; vegetables; home economics; home gardening; Asia; humid zones

Household gardens have never received much attention from development agencies. During the 1980s, however, small-scale family food production came to receive the backing of UNICEF, FAO, USAID and a number of NGOs. These small agricultural plots are mainly cultivated by women. Their importance lies in the enrichment of the staple diet. They also mean, sometimes, a much-needed additional source of income for the family, and a -relative- financial independence of women in male-dominated societies. In order to consolidate lessons learned from experiences with household garden projects, an International Workshop on Household Garden Projects was held in Bangkok, on 13-15 May 1991. During this workshop, effectiveness of projects was analysed and also which were the factors

contributing to success or failure of the projects. (WB)

Mnidga, H; Lyimo, M (1997). Communication manual. 87 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania

horticulture R&D methodology

agricultural extension; communication; participatory learning

Ten different sessions are covered in this manual, ranging from practising basic knowledge on communication, adult learning, and working in groups to facilitation. Apart from the extensionists involved in the Urban Vegetable Promotion Project (UVPP), this course was open to other interested extensionists in the Dar es Salaam region. Sessions shared a common factor: concentrating on improving the flow of information and supporting the participatory approach for distributing technical knowledge. (WB)

Mougeot, Luc JA (1994). The rise of city farming: research must catch up with reality. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 4-5.

Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands

horticulture food security and nutrition

home gardening; urban communities; urban development; urban environment; urban population; urban wastes

Farming has probably been carried out in cities ever since they came into being. Luc Mougeot from the International Development Research Centre (IDRC) in Canada traces the history of farming from ancient cities to the challenges facing urban planning and research in the North and South at the dawn of the 21st century. (ILEIA)

Moustier, Paule; Mbaye, Alain; Bon, Hubert de; Guérin, Hubert; Pages, Jacques (eds)

(1999). Agriculture périurbaine en Afrique subsaharienne: actes de l'atelier international 20-24 avril 1998, Montpellier, France. 278 p. Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), Montpellier, France; Conférence des Responsables de Recherche Agronomique en Afrique de l'Ouest et du Centre (CORAF)

horticulture

Africa; horticulture; periurban agriculture; animal husbandry

Conference proceedings providing a state-of-the-art overview of periurban agriculture and horticulture in Africa south of the Sahara. This important publication highlights the wide array of agricultural activities in and around cities in Africa and the important place these activities occupy in the unofficial economy of African states. After a general introduction defining periurban agriculture and setting its limits, numerous case studies are presented, grouped according to ecozone (humid tropical and soudano-sahelian). (WB)

Moustier, Paule (2001) Assessing The Socio-Economic Impact Of Urban And Periurban Agricultural Development. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: Urban Agriculture Magazine, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.

R&D Methodology economic impact horticulture

West Africa; Central Africa; policy; vegetables

The paper provides practical indicators and field methods for assessing the impact of urban and periurban agriculture in social and economic terms (employment, income, added value, and food supply). In a context of growing advocacy for policy support in favour of urban agriculture, while public resources are shrinking, it is more and more necessary that researchers provide rigorous assessment of the contribution of urban agriculture to policy objectives. The paper is based on the author's fieldwork in West and Central Africa, mostly centred on vegetable production and marketing, as well as some literature review.

Mulenga, Bowa (et al.) (1979). Gardening in the city. 16 p.

horticulture

Zambia; home gardening; surveys

An early account of urban, rainfed, agriculture in areas in Lusaka and Mufulira. Many of the later so frequently advanced pros and cons of urban agriculture are already presented here. Socio-economic characteristics are given, as a result of surveys done. (WB)

Muster, Gisa (1997). Environmental problems of urban agriculture: a case study of Dar es Salaam, Tanzania. Master's thesis, University of London, School of Oriental and African Studies. Dar es Salaam, Tanzania: GTZ, Urban Vegetable Promotion Project, 1997. 33 p.

horticulture

Tanzania; ecology; environmental problems

This thesis was prepared through the Urban Vegetable Promotion Project (UVPP) of Tanzania. It assesses four types of environmental concerns associated with urban farming: air quality, water quality, erosion, and pollution from agriculture. The results show that farming can generally benefit the urban environment. (JN)

**Muster, Gisa (1998). Environmental problems of urban agriculture: a case study of Dar es Salaam, Tanzania. 58 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania
Supplier: Ministry of Agriculture and Co-operatives (MoA&C) and Deutsche**

Gesellschaft fuer Technische Zusammenarbeit (GTZ).

city ecology horticulture R&D methodology

Tanzania; open space management; off-plot cultivation; vegetable production

Shows the interaction between the urban environment of Dar es Salaam and agricultural production in open spaces, examining environmental effects in particular. In addition, the role played by urban agriculture in the city's economy is examined. A methodology is presented to estimate the environmental impact of vegetable production on the city's environment. (WB)

Niang, Seydou (19??). L'agriculture urbaine au Sénégal: bilan et perspectives. 26

p.

horticulture

Senegal; vegetable production; surveys

Traces the history of urban and periurban horticulture in the region of Niayes and provides factual and quantified information about horticultural activities in the area. (WB)

Niñez, Vera K (1985). Introduction: household gardens and small-scale food production. In: Food and Nutrition Bulletin vol. 7 no. 3 (1985) p. 1-5.

horticulture food security and nutrition

home gardening; food production; gardening practices

Discusses household gardens as a household-level food production strategy and provides a useful list of functions and benefits, apart from the obvious food supply. Definitions are given of home gardens as against field production and market gardening and a systematic comparison is made between these three production modes. Interestingly, the author remarks on the fact that those who were involved in traditional gardening systems are rarely the ones who participate in the design and implementation of garden projects. This seems a strange state of affairs. (WB)

Niñez, Vera K (1985). Working at half-potential: constructive analysis of home garden programmes in the Lima slums with suggestions for an alternative approach. In: Food and Nutrition Bulletin vol. 7 no. 3 (1985) p. 6-14.

International Potato Center (CIP), Lima, Peru

community development horticulture

Peru; home gardening; food security; development projects; programme evaluation

Describes gardening and garden development projects in Lima, Peru, providing the socio-economic and nutritional background of low-income target populations against which small-scale food production development projects were conceived at a time when such initiatives were still rare. (WB)

Niñez, Vera K (1986). **The household garden as a lifeboat. In: Ceres no. 112 (July/Aug 1986) p. 31-36. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy**

horticulture food security and nutrition

home gardening; food security; Peru; traditional gardens

Describes household gardens as an additional source of food for the urban poor. A typology for these gardens is given, both from a biophysical and a socio-economic viewpoint. Initial gardening programmes were unsuccessful, the author argues, as they were mostly a replica of temperate, 'budget' gardens and took local conditions and customs insufficiently into account. A Peruvian urban gardening project is analysed in detail. Community gardens evolved from European-style gardens to traditional Peruvian gardens as external financial support came to an end. This resulted in a shift of species planted, with a stronger staple food component, in more intercropping, and in a multi-layered set-up, including banana, papaya and climbing species. The author draws a number of conclusions based on such project experiences all hinting at the importance to link up with existing practices. Extension and advertising campaigns are important to interest as wide a range of people as possible. (WB)

Nitsch, Egbert; Aue, Christina (1997). **Bedeutung staedtischer Land- und Gartenwirtschaft in Einer Welt: Gaerten als Beitrag zur Welternahrung und zur Oekologisierung der Staedte. 33 p.**

horticulture food security and nutrition city ecology

food security; urban poor; urban policies

Examines the role and position of urban agriculture in the light of food security for the urban poor. A number of policy measures are presented that are necessary to reach a wider impact. The authors argue that this role is not restricted to cities in developing countries but plays an important role in greening cities in industrialised countries as well. (WB)

Nitsch, Egbert; Aue, Christina; Schmitt, Brigitte (1998). **Zur staedtischen Land- und Gartenwirtschaft in einer Welt: Beitraege der gruenen Veranstaltung vom 22 Juni 1998 in Bonn. 139 p. Arbeitskreis II (Umwelt, Raumordnung und Staedtebau, Verkehr, Landwirtschaft) der Bundestagfraktion von Buendis 90 / der Gruenen, Bundeeshaus, 53113 Bonn, Germany**

R&D methodology rural-urban linkages horticulture

Agenda 21; Germany

Contains a number of papers presented in the framework of a seminar organised by the German Green Party. In quite a number of German cities, processes are taking place that are local implementations of Agenda 21. The underlying discussion aims at giving a more practical focus to the Agenda 21 discussion. (WB)

Nugent, Rachel A. The sustainability of urban agriculture: a case study in Hartford, Connecticut. Urban agriculture notes; on: <http://www.cityfarmer.org/rachel.html#rachel>. 20 p. City Farmer, Canada's Office of Urban Agriculture

horticulture economic impact

economic impact; sustainable agriculture; sustainability; United States

This study defines a framework for examining the impacts of urban agriculture and applies it to data from the city of Hartford, Connecticut, USA. It uses an extended cost-benefit approach which includes market and non-market economic, social, and environmental factors affected by urban agriculture. Non-quantifiable factors are discussed qualitatively as they are integral to understanding the effects of urban agriculture. The author concludes that, on the basis of data gathered, it cannot be concluded that urban agriculture in and around Hartford is sustainable, be it economically, socially, or ecologically. A longer time frame would be needed to draw conclusions about this issue (WB - from original abstract)

Orione, Julio (1990). The cultivated city: kitchen gardens in Buenos Aires. In: UNESCO Sources no. 17 (July/August 1990) p. 13

horticulture community development

home gardening; Argentina; food security

Describes the research work on homegardening done by the Center of Urban and Regional Studies (CEUR), Buenos Aires. Much of this article deals with the motives of urban dwellers to engage in this activity. (WB)

Pérez Rivero, Roberto (19??). Permacultura: un proyecto exitoso? Enseñanzas para el futuro. Foundation for the Nature and Humankind, Cuba

horticulture

Cuba; permaculture

A brief historic overview of permaculture experiences related to urban agriculture in Cuba. (NB)

Permacultuur in de stad (1996). In: Permacultuur nieuws: ontwerpen van een duurzame samenleving / vruchtbare intergratie van cultuur & natuur vol. 7 (1996) no. 22/23. 24 p.

horticulture

United Kingdom; permaculture; community gardens; mulching; composting; rooftop gardening; city farms

An issue on different aspects of permaculture in the city, covering a wide array of themes like community gardening, balcony gardening, mulching, composting, and the City Farms programme in the UK. In Dutch. (WB)

Pinzás, Teobaldo (1994). Can city farming survive? In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 10. Instituto de Estudios Peruanos, Horacio Urteaga 694, Lima 11, Peru

Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands

economic impact food security and nutrition horticulture
home gardening; horticulture; Peru; urban communities; urban development; urban environment; urban population; urban wastes; vegetables; waste recycling; women

Early 1994 ETC Foundation asked Theobaldo Pinzás to make an exploratory study on urban agriculture in Peru. This is an excerpt from his report, focusing on his findings about urban vegetable growing. In his full report, he suggests that more attention be given to recycling of waste and sewage water. (ILEIA)

Portable gardens made from old tires (1996). In: Echo Development Notes (April 1996). 1 p.

hydroponics horticulture
San Salvador; tyres; containers

Brief introduction about growing plants in tyres in San Salvador. (WB)

Potutan, Gerald E; Schnitzler, Wilfried H; Arnado, JM; Janubas, LG; Holmer, Robert J (2000). Urban agriculture in Cagayan de Oro: a favourable response of city government and NGOs. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 413-428. DSE, GTZ, CTA, SIDA

city ecology horticulture food security and nutrition
vegetable production; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; land tenure; nutrition; NGOs; school gardens; home gardening; Philippines

Cagayan de Oro is a boomtown in Mindanao. A considerable number of farmers work in the periurban area mainly in vegetable production. Within town about 40% of the households engages in backyard farming and the majority of schools maintain nurseries. Vegetables are considered 'poor man's food'. Farmers consume more vegetables than wealthier people and farming contributes considerably to in-kind family income. There are initiatives to produce and improve composting of urban organic material. As powers became more decentralised, a City Agriculture Office was established. Awareness on urban agriculture is increasing. This all helps to promote urban agricultural initiatives. Legislation has been passed to secure agricultural land. Activities at local level are backed by a sustained flow of information through the media and by successful co-operation of NGOs and local government. (NB)

Pro Huerta (1990?). Promoción de la autoproducción de alimentos: proyecto

integrado. Buenos Aires, Argentina: Subsecretaria de Agricultura, Ganaderia y Pesca, Instituto Nacional de Tecnología Agropecuaria, (INTA).

community development horticulture

Argentina; manuals; training; home consumption; organic agriculture

This binder was prepared by Argentina's Pro Huerta, one of the largest and most important programs for training gardeners in the world. It contains seven training booklets: (0) a general booklet on Pro Huerta and one can use it; (1) a booklet on the small farm; (2) one on the intensive organic garden; (3) one on the organic soil; (4) one on organic soil additives; (5) one on planning for work in the garden; and (7) one on the management of the organic garden. Some technical sheets complete this well-organized collection.

Prudencio Boehrt, Julio (ed.) (1997). Agricultura urbana en americana latina: memoria. 252 p. Agricultura Urbana Investigaciones Latino Americana (AGUILA), c/o ETC Andes, La Paz, Bolivia. Casilla 9355, La Paz, Bolivia

hydroponics wastewater reuse urban livestock

Latin America; workshops

The outcome of a seminar on urban agriculture, held in La Paz in 1995, these proceedings are subdivided in a number of themes for which the situation in Latin America is analysed: (1) hydroponics; (2) waste recycling; (3) homegardens and communal gardens; (4) small livestock rearing. (WB)

Prudencio Boehrt, Julio (1994). People's hydroponics in Latin America. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 13. Casilla 6254, La Paz, Bolivia Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands

hydroponics

home gardening; horticulture; Latin America; plant production; vegetables

In Latin America urban farming is primarily a survival strategy for the poorest. This usually involves some form of gardening and small-scale animal keeping, but there have also been efforts to introduce hydroponics as a solution for landless people. This account of experience with People's Hydroponics comes from a longer article by Julio Prudencio Böhr (1994), which gives an overview of urban farming in Latin America. (ILEIA)

Purnomohadi, Ning (2000). Jakarta: agriculture as an alternative strategy to face the economic crisis. In: Growing cities, growing food: urban agriculture on the policy agenda. - p. 453-465. DSE, GTZ, CTA, SIDA

horticulture economic impact

crisis response; commercial agriculture; vegetable production; food security; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; land tenure; Jakarta; Indonesia

Urban Horticulture

The production of fresh vegetables in Jakarta is essential as the congestion of the city inhibits timely rural imports. As a result of the Asian crisis urban farming spread rapidly and the governor of Jakarta gave permission to the people to farm vacant land left by broke developers. There are two main types of farmers: land owners and workers. Most workers are male migrant workers who lost their jobs in the fallout of the crisis. Farming occurs among others on vacant land, along rivers and roadsides and in home gardens. Almost all produce is marketed. Despite the widespread nature of urban agriculture it is seen as a temporary phenomenon and is not included in the city master planning. The city government could play an important role to expand the activity in Jakarta. (NB)

Research, Development and Consultancy Division (REDEC) (1996). Urban agriculture in Gweru: proceedings of a one-day workshop organized by ENDA - Zimbabwe, Midlands Hotel, Gweru, 16 October 1996. 24 p. Research, Development and Consultancy Division (REDEC), Environment and Development Activities (ENDA) - Zimbabwe, PO Box 3492, Harare, Zimbabwe
food security and nutrition economic impact horticulture
Gweru; Zimbabwe; workshops; home gardening; off-plot cultivation

At this workshop, results of a household survey conducted by ENDA in Gweru in 1996 were presented, looking both at on-plot and off-plot cultivation. A fair number of parameters was discussed and quantified. (WB)

Research, Development and Consultancy Division (REDEC) (1996). Urban agriculture in Zimbabwe: realities and prospects: proceedings of a workshop organised by ETC International and ENDA-Zimbabwe. 36 p. Research, Development and Consultancy Division (REDEC) of Environment and Development Activities (ENDA), Zimbabwe; PO Box 3492, Harare, Zimbabwe; ETC International, PO Box 64, 3830 AB Leusden, The Netherlands
horticulture food security and nutrition
Zimbabwe; urban policies; organisation of producers; socio-economic aspects; environment; health

The four-day workshop of practitioners, researchers and policy makers included stakeholders' perspectives, field visits, and the policy context of urban agriculture and research experiences. From different towns (Harare, Gweru, Mutare) perspectives on urban agriculture were presented. Issues discussed were: organisation of farmers, land tenure, technical support, risks of urban agriculture. Conclusions and recommendations regarding urban agriculture in Zimbabwe are given. (NB)

Richter, Juergen; Schnitzler, Wilfried H; Gura, Susanne (eds) (1995). Vegetable production in periurban areas in the tropics and subtropics: food, income and quality of life. DOK no. 1721 A/a. 160 p. Zentralstelle fuer Ernaehrung und

Landwirtschaft (ZEL), German Foundation for International Development (DSE), Wielinger Strasse 52, D-82336 Feldafing, Germany

horticulture rural-urban linkages

Africa; Asia; Latin America; marketing; plant production; vegetable crops; case studies; Chile; food supply; urban planning; workshops

Urban agriculture is receiving more and more attention as a way to improve livelihood in third-world country cities. Ensuring food supply through boosting food production in rural areas and establishing storage facilities has insufficiently reached the newly established urban masses. A figure to illustrate the upcoming of this new activity: about 200 million urban dwellers in developing countries are now urban farmers, thereby providing food to about 700 million people. Also to be considered is the aspect of food quality: vegetables, a very important produce of urban agriculture, complete the food basket of the urban population. These proceedings primarily address an audience of researchers and policy makers and have for objective to analyse the contribution to food, income and quality of life by urban agriculture. From the conclusions it appears that most European-sponsored urban agriculture projects deal with genetics and breeding of a few species -legumes, potato, tomato- with little attention given to traditional vegetable crops. Most projects are in Africa, probably reflecting priorities of development policies of European countries. As a result of this workshop, a number of preconditions for successful interventions were identified with regard to social participation, resource use, infrastructure, marketing and credit facilities. (WB)

Robson, Emma (1989). Growing crops: rooftop gardens offer Colombia city dwellers alternatives to poverty. In: World Development Journal of the UNDP (November 1989) p. 28-29. United Nations Development Program (UNDP)

hydroponics horticulture

rooftop gardening; Bolivia; Bogotá; waste recycling

A story about a UNDP project on rooftop gardening in Jerusalem, a poor area of Bogotá. All vegetables are grown as hydroponics, in a local low-cost version using recycled materials, like rice bran, wooden crates and recycled polythene. (WB)

Rocha, JL; Barahona, T (1998). Puerto Morazan: la camaricultura: un espejismo en tiere salada? Nitlapan-UCA, CIFOR, Proterrierra-Inifom; 99 pages

services hydroponics

aquaculture; ecology; financing; cooperatives

Puerto Morazan, a town famous for its shrimp farms, was hit by Hurricane Mitch in 1998, with a devastating effect on its most important industry, shrimp production, processing and shipping. The producers are grouped into cooperatives and they have a capital demand that they can not afford, and have been forced to contract heavy debts at high interest rates. This is at a time when the price of shrimp is falling worldwide. The future of the town, closely linked to shrimp with its (negative) ecological consequences, is in a state of uncertainty. Shrimp culture can be either an

Urban Horticulture

oasis or an illusion. This study may have significant awareness raising capacity for other one-product urban agriculture towns and cities. (JS adapted from authors)

Rosset, Peter; Medea, Benjamin (eds) (1994). The greening of the revolution: Cuba's experiment with organic agriculture. Ocean Press, Melbourne, Australia: 85 p.

food security and nutrition horticulture

organic agriculture; bio-intensive horticulture; community-based agriculture; policy; planning; emergency agriculture; Cuba

This is the story of Cuba responding to an economic and health crises with an organic and urban agriculture strategy. It is particularly strong in the area of knowledge systems. It stretches from history, to policy to narrow focus specifics of how it was done. (JS)

Sanyal, Biswapriya (1986). Urban cultivation in East Africa. UNU Paris, 75 p.

horticulture urban livestock city ecology

home gardening; surveys; urban livestock; urban forestry; urban management; geography

This is a groundbreaking report, predecessor to a doctoral dissertation defining the role of agriculture in East African cities, focus on Lusaka. It has an economic slant with excellent micro-geography. (JS)

Schilter, Christine (1991). L'agriculture urbaine à Lomé. Geneva: IUED, and Paris: Karthala Press. 334 p.

horticulture economic impact

Togo; food supply; farming practices; cooperatives; marketing; economics

This is one of the first book-length commercially published studies on urban agriculture. It considers the range of farming practices found in Togo's capital, Lome. A whole chapter is devoted to the role of cooperatives. The second half of the book assesses the economic dimension of the urban food production system. (JN)

SEMATA (1991). Manual de cultivos protegidos. Mtec 17. La Paz, Bolivia: SEMTA, Unidad de Capacitación y Transferencia Tecnológica. 120 p.

horticulture

Bolivia; manuals; cultivation practices; sheltered cultivation; climate protection; raised beds

This "manual on protected cultivation" is much broader than the title implies. Protection includes here general climate consideration, choice of plants, soil understanding, raised beds, as well as sheltered cultivation. It includes excellent graphics to explain practices to the lay person. (JN)

Skinner, G. William (1981). Vegetable supply and marketing in Chinese cities. In: Vegetable farming systems in China: report of the visit of the vegetable farming systems delegation to China / Donald L. Pluckett, Halsey L. Beemer, Jr. (eds), p. 215-280

horticulture services

China; vegetable production; marketing; selfsufficiency; zoning; urban planning

Describes the marketing situation in China with respect to vegetables in the early 1980s. All cities visited had in common that the larger part, well over 85%, of vegetable demand could be fulfilled through production within the city bounds. The author also reports on production ecology differences at the various locations and highlights stringent zoning aspects as an outcome of political ideology. Very detailed information, but relevant for those interested in China. (WB)

Skinner, G. William (1981). Vegetable supply and marketing in Chinese cities. In: Vegetable Farming Systems in China / D.L. Plucknett and H.L. Beemer, Jr. (eds). Boulder, Colo.: Westview Press, 86 p.

food security and nutrition horticulture

food security; city planning; China; metropolitan area; periurban agriculture; waste management; livestock

This is a breakthrough study of the potential of large cities to be significantly nutritionally self-reliant in the areas of micronutrients and protein. The survey included the 15 largest cities in China, and found them to be 85 percent self-sufficient in vegetables. All aspects of the urban food security issue are examined including: (I) production methods, (ii) marketing, (iii) policy, (iv) locus (inner, suburb and peri), (v) organization (government and civic, (vi) health, (vii) waste management, (viii) land use management and more. Comparisons amongst cities are well presented. (JS)

Skoloda, David (1984). Farming in the big apple. In: Farmfutures (April 1984) p. 32-33

horticulture

herbs; commercial herb production; UNITED STATES; New York; marketing; greenhouses

Describes the operation of a commercial herb farm in the Bronx, New York. The city farm has managed to created itself a market niche for all year-round, high quality locally grown herbs, flowers, and specialty vegetables. (WB)

Smit, Jac (1992). Farm in a box. Developing Countries Farm Radio Network package no. 27 script 5. 4 p. Developing Countries Farm Radio Network, 40 Dundas Street West, Box 12, Suite 227B, Toronto, Ontario, Canada M5G 2C2

Urban Horticulture

hydroponics horticulture
container gardening; composting

A radio script for dissemination in a large number of developing countries, explaining how to produce crops in containers. As usual with the Developing Countries Farm Radio Network and Jac Smit for author, this makes for nice reading, full of practical information. (WB)

Smit, Jac (1993). Analysis of the urban agriculture sector in the metropolitan area of Port-au-Prince, Haiti. CARE. International, Atlanta. 3 Volumes.

economic impact horticulture
Haiti; small livestock; land use

The purpose of the study reported herein was a rapid appraisal of the opportunities, constraints and potential interventions in assisting small-scale agricultural producers, processors and marketers within the Port-au-Prince metro area to increase their incomes. Twenty-two sub-sectors were analyzed and twelve identified as worthy of support. Bidonville Agriculture was particularly commended. CARE selected Vegetable production for further study and support. (JS)

Smit, Jac (1993). Grow food cheaply by the roadside. Developing Countries Farm Radio Network package no. 29 script 8. 5 p. Developing Countries Farm Radio Network, 40 Dundas Street West, Box 12, Suite 227B, Toronto, Ontario, Canada M5G 2C2

food security and nutrition horticulture
roadside cultivation; home gardening; vacant lands

A radio script for dissemination in a large number of developing countries, explaining how even the landless can farm using vacant land along road sides for food production or as a grazing area for their animals. Interestingly, there are some unexpected advantages to be found in roadside farming: it is easier for bringing inputs to the garden or for delivering products, even selling them along the roadside. Obviously, much of the farmers' worry concerns the many thefts, which farmers often avoid by harvesting their crops before they are completely ripe. Protecting oneself against theft eminently lends itself to group initiatives, where all farmers take turns in guarding the area. The author also gives hints at how to get the water necessary for gardening. There is a special paragraph on the hazards of lead poisoning, as a result of exhaust fumes settling on the crops. Fruiting plants or root crops are, in this context, generally safer to grow than leafy vegetables. Full of practical information, and presented clearly. (WB)

Smit, Jac (1995). Food for the poor: urban and rural vegetable production. In: Development & Cooperation no. 5 (1995) p. 22-23

food security and nutrition horticulture
vegetable production; deficiency diseases; horticulture; periurban agriculture; small-

Urban Horticulture

and medium-sized enterprises; food security; nutrition

Describes small-scale vegetable production in Africa and Latin America, both in urban and in rural settings, and its contribution to food security and in fighting deficiency-related diseases. (WB)

Socorro Castro, Alejandro R (1999). Cienfuegos, the capital of urban agriculture in Cuba. Urban Agriculture Notes <http://www.cityfarmer.org/cubacastro.html>. 4 p.
University of Cienfuegos, Cuba
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture
Cuba; vegetable production

Provides production and area data on urban agriculture in Cuba. According to the indicators of the Ministry of Agriculture, Cienfuegos is the most productive province with regard to urban agriculture. (NB)

SODEM (1990). Curso de huertos familiares. La Paz, Bolivia: SODEM. 20 p.
horticulture food security and nutrition services
training; home gardening; Bolivia

This binder contains a collection of Spanish-language training material on home gardening. It is intended for trainers rather than gardeners themselves. (JN)

Stanhill, G (1977). An urban agro-ecosystem: the example of nineteenth-century Paris. In: Agro-Ecosystems no. 3 (1977) p. 269-284. Institute of Soils and Water, The Volcani Center, ARO, Bet Dagan, Israel
city ecology horticulture waste recycling
France; Paris; ecological systems; waste recycling; horses; manures

One hundred years ago a sixth of the area of Paris was used to produce annually more than 100,000 tons of high-value, out-of-season, salad crops, grown on very heavily manured 'hotbeds', partly under glass or protected from the winter cold by straw mats. The cropping system was sustained by the use of approximately one million tons of stable manure produced each year by the horses who provided the power for the city's transport area. This article gives a very detailed, quantitative account of this unique farming system, with a wealth of figures demonstrating its extent and importance. In the first quarter of the 20th century, the system declined rapidly, as a consequence of the replacement of the horse by the motor car, competition for land within the city, and competition from areas with a more favourable climate outside the city, facilitated by improvements in the transport system. A fascinating description of an outstanding system that once was known to the English-reading world under the name of 'French gardening'. (WB)

Stevenson, Christopher; Kinabo, Joyce; Nyange, David (1994). Urban horticulture in

Tanzania: a situation analysis of the production, marketing and consumption of fruits and vegetables in Dar es Salaam, Dodoma and Arusha. 94 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania

horticulture services

Tanzania; agricultural production; marketing; home gardening; consumption patterns

Presents facts and figures about urban agriculture in Tanzania's three largest cities, looking at: production of fruits and vegetables, consumption patterns, and marketing systems. A major, thorough study, putting in evidence differences between the cities due to differences in climate, land use patterns and population growth rates. (WB)

Stevenson, Christopher (1996). Market production of fruits and vegetables in the periurban area of Dar es Salaam, Tanzania. Dar es Salaam, Tanzania: GTZ, Urban Vegetable Promotion Project. 40 p.

horticulture economic impact

Tanzania; fruits; vegetables; market gardening; periurban agriculture

This report is one of the publications to come out of the Urban Vegetable Promotion Project (UVPP) of Tanzania. This study surveys the characteristics of urban horticultural farmers and their activities in Dar. It includes consideration of spatial and marketing characteristics. (JN)

Sumberg, James; Kleih, U (1994). Fostering the development of periurban agriculture: the case of Port-au-Prince, Haiti. 14 p. School of Development Studies, University of East Anglia, Norwich NR4 7TJ, UK

horticulture rural-urban linkages

Haiti; marketing; plant production; ; vegetable crops

Argues that an analysis of periurban production and marketing systems should go beyond a singular concern with the producer and consider a wide set of issues. The case of vegetable production and marketing around Port-au-Prince, Haiti, is used to briefly explore some of these issues. Vegetable production and marketing in Port-au-Prince is well established, significant in quantity and value and generating income. Public sector research and extension contribute little to the development of the sector while market opportunities, input Suppliers, farmer organisations and innovative farmers provide the stimulus for technical change. The main areas of concern are presented, among others: reduced turnover, low purchasing power of consumers, transport (costs and infrastructure), poor sanitary conditions and fluctuation in market prices. (NB)

Sumberg, James; Kleih, U; Grand-Pierre, Reginald (1994). Production and marketing of vegetables in the Port-au-Prince periurban area: a sub-sector study. CARE International. 56 p.

horticulture services

periurban agriculture; Caribbean ; Haiti; marketing; policy; trade; information

Urban Horticulture

This report considers the production of vegetables and flowers for the daily Port-au-Prince market. It defines the periurban agriculture sector as dominated by 10,000 small-scale producers in two districts and proposes ways to improve both food distribution to the city and to improve the income of the farmers. (JS)

TEGON; HARP (1998). Surviving in the city: resources of the urban poor in developing countries. 12 p. TEGON, Costerweg 27, 6700 AG Wageningen, The Netherlands; HARP, PO Box 1781, 3000 BT Rotterdam, The Netherlands

horticulture

urban poor; urbanisation; informal sector; access to land; access to water

The outcome of a series of lectures called 'Surviving in the City'. In this report there are summaries of 4 lectures on: causes and consequences of urbanisation; access to land, water and houses; functioning of the informal sector; and potentials and problems in connection with urban agriculture. (WB)

Tha Hla, Patima (1999). Bangkok gardens: how does your garden grow? Urban Agriculture Notes <http://www.cityfarmer.org/Thaigardens8.html>. 3 p.

Supplier: City Farmer, Canada's Office of Urban Agriculture

horticulture city ecology

Thailand; Bangkok; vegetable production; home gardening

The article is a report of a seminar on how to grow vegetables in urban areas, more specifically in Bangkok, and what are problems encountered. (NB)

Thaman, Randolph R (1995). Urban food gardening in the pacific islands: a basis for food security in rapidly urbanising small-island states. In: Habitat International vol. 19 (1995) no. 2 p. 209-224. The University of the South Pacific, Fiji

horticulture

home gardening; Pacific Islands

Urban food gardening is seen as an important means of overcoming problems caused by unemployment, inequality, poverty, falling real wages, malnutrition and nutrition-related degenerative diseases in the small-island states of the Pacific Ocean, such as Papua New Guinea, Fiji, Tonga, Kiribati and Nauru. This paper argues that the formal promotion, expansion and improvement of small-scale urban food gardening is a direct and economically, socially, technologically and nutritionally appropriate means of bringing about sustainable national development and promoting food security. Despite the fact that the potential urban food production is not clearly understood by planners and policy makers, it should be viewed as a component of agricultural development strategies given the benefits it confers. Policies which would lead to its growth are discussed. (original abstract)

Torres Lima, Pablo A; Canabal Cristiani, Beatriz; Burela-Rueda, Gilberto (1994). Urban sustainable agriculture: the paradox of the Chinampa system in Mexico City. In: Agriculture and Human Values vol. 11 (Winter 1994) no. 1 p. 37-46

horticulture

Chinampas; Mexico; sustainable agriculture; urban development; economic impact

Informs about the historical chinampa system near Mexico City. The paper examines this ancient and sustainable farming system and assesses how it has been affected by the expansion of Mexico City. The chinampa system's economic viability is based on the efficient use of farming technologies and resources management strategies that tend to maintain levels of productivity in horticulture and floriculture. Chinampa agriculture generates high income and employment for families and other local residents. It will require much effort and determination, above all from the farmers themselves, to withstand the demands for urban land for other purposes with, on the short term, a higher economic profit. (WB)

Tricaud, Pierre-Marie (1987). Urban agriculture in Ibadan and Freetown. 45 p. The Food Nexus Programme, The United Nations University, Toho Seimei Building, 15-1, Shibuya 2-chome, Shibuya-ku, Tokyo 150, Japan

horticulture food security and nutrition

case studies; Nigeria; Ibadan; Sierra Leone; Freetown; land tenure; urban management; forestry; livestock

This report presents urban agriculture in Nigeria and Sierra Leone. It identifies the extent of the practice, the urban farmers, the role of agriculture in the urban ambiance and the methods of cultivation. There are many similarities between two case study cities, Freetown and Ibadan, both being capitals of anglophone countries, with a similar climate and historical background. However, there are also a number of differences, Freetown being a coastal city while Ibadan is located inland. The two cities have developed in a different manner: while Ibadan grew from 600,000 to 2,500,000, Freetown simply doubled its population to 400,000. This report describes the situation with regard to land and land tenure systems in both cities. Information is given about origin and composition of city gardeners. There is a difference in the type of crops cultivated in the two cities. In Ibadan, urban farmers mostly cultivate staple food, whereas in Freetown the interest for vegetable cash crops is prevalent, due to differences in consumer habits. Actions are suggested for developing urban agriculture including land policies, composting programmes and organising the gardeners. (WB)

UNDP (1989). The productive home and urban community. UNDP Bogota Colombia, 28 p.

community development hydroponics

housing; poverty; hydroponics; urbanisation; Latin America

This community planning document makes an excellent presentation of rooftop hydroponics with scale models and economic analysis. (JS)

UN-FAO (1990). Development of Pekarangan Land. FAO (TCP/INS/8852) 50 p.

community development horticulture

home gardening; policy; training; agricultural extension; ecology; nutrition; micro enterprise; medicinal plants; herbs

This report presents the results of four surveys of home gardens in Java, Sumatra and Timor (240 farmers in all). In addition, it reviews 22 papers covering the fields of policy, ecology, nutrition, commodities, and case studies. Further, it presents the results of a desktop review of 50 papers written between 1975 and 1988. It suggests the formation of a new institution in Indonesia to support home gardens, as well as further research, extension, training, better inputs, and improved marketing. (JS)

Vasey, Daniel E (1985). Household gardens and their niche in Port Moresby, Papua New Guinea. In: Food and Nutrition Bulletin vol. 7 no. 3 (1985) p. 37-43. Dept. of Sociology, Divine World College, Epworth, Iowa, USA

horticulture

Port Moresby; Papua New Guinea; surveys

Reports on the results of a study of urban gardening in Papua New Guinea assessing the economic importance of urban food production in and around Port Moresby and aiming to improve future household garden programmes in that area. Data were collected through a survey in 1981 among 700 households. Improvements in home gardening might be brought about through instituting land allotments, regular water supply, and improved extension. (WB)

Vasey, Daniel E (1984) Management of food gardens in the national capital district. Unpublished. University of Papua New Guinea at Port Moresby, 70 p.

horticulture

Papua New Guinea; home gardening; agricultural extension; plant diseases; horticulture

This is an analysis of an extensive survey and reports on the management methods and state of the crops in home gardens, managed by the majority of household in the capital metropolitan area. Some highlights were: (i) crops grown are typically good nutritional compliments to bulk purchased food, (ii) cassava and banana most common, (iii) sweet potato and maize are the prime problem crops, (iv) one-fifth of urban farmers use commercial inputs, (v) in-migrants quickly learn the urban way of farming. Interestingly, most households raised crops, one in four of the gardeners sold their produce regularly, but only one in ten at a formal market. Two of three principal gardeners were women. Recommendations are made for extension services. (JS)

Wasescha, Anna; Ness, Karla (1999). Involving children in children's gardens: farm in the city, St. Paul, Minnesota. Urban Agriculture Notes.

<http://www.cityfarmer.org/AnnaW.html>. 11 p. **Farm in the City, 1312 Dayton Avenue, St. Paul, Minnesota, USA**

Supplier: City Farmer, Canada's Office of Urban Agriculture

community development horticulture

children; urban gardens; education; United States; environmental awareness

Description of the project 'Farm in the City' and its achievements. The project area, Dunning Field, lies between two educational institutions. It was hoped that the project would serve as a new town square uniting educational and residential communities and providing a gathering place for community building events. The mission of Farm in the City is to educate children about the environment, food creativity and the importance of diversity. (NB)

Webber, Tammy (1999). Green roofs cool city rooftop gardens in Chicago to fight smog, heat. Urban Agriculture Notes

<http://www.cityfarmer.org/greenroofs.html>. 2 p.

Supplier: City Farmer, Canada's Office of Urban Agriculture

city ecology horticulture

United States; rooftop gardening; city microclimate

Discusses the potential and developments of rooftop gardening for Chicago to fight smog and improve the city's microclimate. (NB)

Weber, Florence (1998). L'honneur des jardiniers: les potagers dans la France du XXe siècle. Socio-Histoires, ed. Gérard Noiriel and Michel Offerlé. Paris: Belin. 287 p.

horticulture

France; history; gardeners; ethnology

This remarkable book is a combination of historical and ethnological research. It studies the evolution of the gardener in France from one end of the Twentieth Century to the other. It shows how the "jardin potager" is an invention of the turn of the (20th) century, resulting from the concerted actions of philanthropists, horticultural professionals and poor citizens. She shows how, among the latter, northern industrial workers played a key role in the development of the activity, which now involves one out of three households in France, whether at a home garden or in a community garden. Belin also demonstrates how, apart from economic and recreational considerations, pride in one's work plays a key motivation for the involvement of the latter group in gardening. (JN)

Wekerle, G.R. (2001) Multicultural Gardens: Changing the Landscape of the City. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin, July 2000. (on cd-rom).

land use planning

community development

horticulture

Canada; leisure; PRA; multi-cultural society; immigration

Toronto is one of the world's most multicultural cities, yet, until recent years, the landscape of the city reflected primarily an Anglo-American tradition in landscape design and private gardens. This has changed. The landscapes of private gardens and public spaces, including parks, have begun to reflect the diversity of ethnocultural communities that inhabit and use these spaces. Horticulture forms the basis for communication across cultures; in some instances, it generates conflicts over public plantings and the appropriate use of public space. Immigrants to Toronto bring with them rural traditions formed in far flung parts of the world. Gardeners from Southern Europe, Latin America, the Caribbean, and South Asia bring to the city their agricultural experiences and make new demands on the city to meet their needs for earth to grow foods and plants from their homelands. Drawing from intensive interviews with immigrant gardeners, the paper reports on key themes emerging from the research: the importance of urban agriculture in maintaining cultures and traditional knowledge; the use of urban gardens to transmit culture to the next generation; how horticulture forms the basis for communication across cultures; and the emergence of an underground economy, divorced from the market economy, of seeds and plants to meet the needs of immigrant gardens.

Wilson, Geoff (2002) Can Urban Rooftop Microfarms be Profitable? Urban Agriculture Network-Western Pacific. In: The Economics of Urban Agriculture - Urban Agriculture Magazine no. 7, August 2002, pp.22-24.

urban horticulture economic impact

rooftop gardening; urban areas; Australia, Oceania (incl. Australia and NZ)

This question has been answered (on paper) by the Southside Chamber of Commerce in the city of Brisbane, in sub-tropical Australia. The Chamber calculated that with a little more than A \$200,000, a "rooftop microfarm" based on waste management could yield around 20% return on invested capital, and employ three to four people. The Southside Chamber of Commerce Urban Agriculture Group is now considering how to fund a pilot project in Mt Gravatt Central in Brisbane, in the state of Queensland to prove the feasibility study findings.

Wilson, Geoff (ed.) Urban agriculture and microfarming: growing food in small places. The Urban Agriculture Network Western Pacific (TUAN), PO Box 2223, Mansfield, Queensland 4122, Australia

food security and nutrition horticulture hydroponics

urban food; Singapore

The first issue of the magazine published by The Urban Agriculture Network Western Pacific (TUAN). This issue is a free insert in 'Practical Hydroponics and Greenhouses' with a global circulation of 12,500 six times a year. It remains unclear whether the magazine by TUAN will be published with the same frequency. From its look, the magazine primarily addresses those who practice, or are interested to start, agriculture in a confined urban space, with a clear business orientation. The first issue features Singapore for having a well advanced urban agriculture within its city limits.

Winterbottom, Daniel (1999). Hopeless future for gardens of hope? Casitas gardens of reclamation. Urban Agriculture Notes
<http://www.cityfarmer.org/casitas.html>. 12 p. El Museo del Barrio, 1230 Fifth Avenue at 104th Street, New York, NY, USA

Supplier: City Farmer, Canada's Office of Urban Agriculture

horticulture community development

United States; community gardens

Documents community gardening among Puerto Ricans in New York. Ten cases of gardens with casitas or wood frame structures are displayed. The people transformed vacant and garbage strewn lots into productive vegetable and flower gardens. The gardeners provide comments and emphasise the community aspect of their work. (NB)

Yachkaschi, Jasmin (199?). Production, marketing and consumption of urban and periurban fruit and vegetables in Tanzania: introduction. 2 p. AFC Consultants, Bonn, Germany

horticulture

periurban agriculture; vegetables; marketing; food consumption; Tanzania

The introductory chapter to a thesis. The study was centred around various field surveys conducted in three selected cities of Tanzania. In these cities, comprehensive investigations were made both at different levels of the production and marketing system, and at the level of household consumption. (WB)

Yapi Affou, S. Agriculture intra-urbaine en Côte d'Ivoire: les cultures et les acteurs. Agriculture périurbaine en Afrique subsaharienne p. 101-109

horticulture

Ivory Coast; Abidjan; Bouaké; commercial enterprises

The emergence of commercial intra-urban agricultural activities benefited from various factors. Intra-urban agriculture has grown in the main two cities of Ivory Coast (Abidjan and Bouaké) despite urban sprawl. Farming in the city has been favoured by urban growth, changes in dietary habits, increasing demand for vegetable products, availability of cheap labour and the laxity of municipal authorities. (NB - Adapted form original)

Zapp, Jorge (1992). Cultivos sin tierra. 46 p.

hydroponics

containers

A detailed description of how to grow plants as hydroponics. There are interesting appendices on production costs and revenues and on a comparison between plants grown in soil and in hydroponics. (WB)

Zurayk, R., Talhouk, S., Chatila, J. and Abdul-Samad, L. (2000) **Environmental costs of periurban agriculture in coastal Lebanon**. . In: H. Hoffmann, K. Mathey (eds.). **Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin, July 2000. (on cd-rom)**.

land use planning horticulture
Lebanon; environment; cost-benefit; commercial

The notion of urban agriculture carries an intrinsic "small scale" connotation. On Lebanon's heavily urbanised coastal zone, intensive agriculture occupies large areas, and competes for space with human

settlements and natural ecosystems. Urban farming is favoured by a mild climate, the availability of water and a closeness to markets. In this paper, we describe the main periurban agricultural systems, which include open field vegetables, protected cultures and banana orchards. The environmental significance of the high input production, such as heavy fertiliser and pesticide application is also addressed.

Special reference

is made to the implications of the competition between agriculture and natural space on plant biodiversity. Data on plant biodiversity in periurban agriculture and natural space is presented, along with GIS analysis of the dynamics of land use in selected locations on the Lebanese coast.

Zurick, David N (1983). **Food production in the urban environment of Katmandu, Nepal. Unpublished. Honolulu: University of Hawaii; 28 p.**

horticulture food security and nutrition
Nepal; land use; household economy; planning; organisation; history; land tenure; water; livestock; consumption; ecology

This study is quite comprehensive and based on grassroots observation as well as library research. It is found that urban agriculture is an important economic activity in the Katmandu metropolitan area, and in need of policy and programmatic support.

(JS)