



GROWING GREENER CITIES

in the Democratic Republic of the

CONGO



How a project for development of urban and peri-urban horticulture in five cities is helping to

- ▶ grow 150 000 tonnes of vegetables a year
- ▶ supply fresh, nutritious produce to 11.5 million urban residents
- ▶ build sustainable livelihoods for 16 000 small-scale market gardeners
- ▶ generate jobs and income for 60 000 people in the horticulture value chain



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FOREWORD

Growing food in greener cities

Expansion of the developing world's urban population is equivalent to one new city the size of Lagos, every two months. As urbanization accelerates in the decades ahead, many low-income countries will face the prospect of sprawling slums with large, young and vulnerable populations.

Action is needed now to steer urban development towards *green cities* that contribute to food security, decent work, a clean environment and good governance for all citizens. To help achieve that goal, FAO is promoting the development of productive and sustainable urban and peri-urban horticulture (UPH).

Market gardens in and around towns and cities contribute to urban food security and nutrition by increasing the supply of fresh produce rich in essential vitamins and minerals. Thanks to its low start-up costs, and the high market value of its produce, UPH provides livelihoods for the urban poor, and particularly for those newly arrived from rural areas. It generates further employment in input supply and value-addition from producer to consumer.

Moreover, recycling municipal organic waste as compost for vegetable gardens helps boost food production while keeping city streets clean. UPH reduces the need to transport produce from distant rural areas, thus generating fuel savings and reducing air pollution. Market garden "greenbelts" protect environmentally fragile land from unregulated urban growth.

Building a sustainable UPH sector provides a laboratory for good governance by fostering closer collaboration among government and municipal departments. Last but not least, UPH builds healthy communities – vegetable gardens provide vulnerable and excluded groups with food, income and a shared enterprise, and are a constructive channel for young people's energy.

This report on an FAO-assisted project in the Democratic Republic of the Congo illustrates the benefits of UPH development, and underscores its important contribution to growing greener cities.

Shivaji Pandey
Director, Plant Production
and Protection Division
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INTRODUCTION

A genuine "success story"

The Democratic Republic of the Congo is a giant of Africa. The size of Western Europe, it is endowed with vast natural wealth – water, arable land, minerals and, above all, its resourceful and resilient people. Following painful years of political instability, the country is now returning to the path of socio-economic development, determined to assume its rightful place in the region and the international community.

In the years ahead, the country will face a new challenge. Its population is growing by more than 2.6 percent a year, rising from 50 million in 2000 to 68 million just a decade later. Most of that growth is in towns and cities, owing to natural population increase and migration from rural areas. As in many other low-income countries, rapid urban growth is accompanied by high levels of poverty, unemployment and undernutrition.

But the Democratic Republic of the Congo is far better prepared than most to bear the impact of massive, rapid urbanization. For the past 10 years, FAO has worked with the country's national government, provincial governments and city administrations in a project aimed at developing urban and peri-urban horticulture in Kinshasa and four other cities.

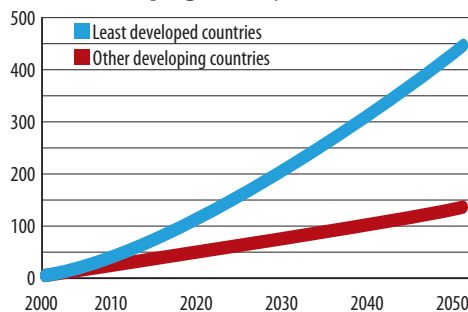
Project activities have reached more than 16 000 small-scale vegetable growers and improved irrigation and drainage on almost half of the total area dedicated to horticulture. Through farmer field schools, the project has introduced improved cultivation methods that have led to big increases in vegetable production and growers' incomes. Horticulture in and around the five cities now produces some 150 000 tonnes of vegetables a year, and has generated employment for an estimated 60 000 people in the value chain.

This project is a genuine "success story". It is an example of effective urban and peri-urban horticulture development that will benefit other cities and towns in the Democratic Republic of the Congo, as well as in many other African countries.

Ndiaga Gueye
FAO Representative
Democratic Republic of the Congo

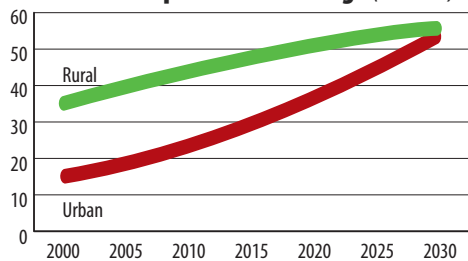


Urban population growth in the developing world (percent)



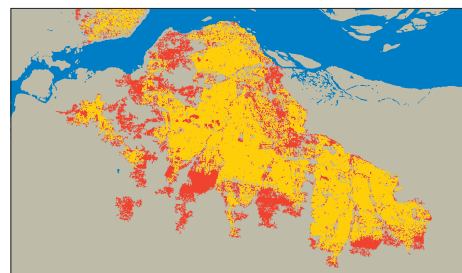
Source: UN

Urban and rural population growth, Democratic Republic of the Congo (millions)



Source: UN

Growth of Kinshasa (in red) 2000-2006



Source: FAO

BACKGROUND

An age-old survival strategy

In the year 2000, the Democratic Republic of the Congo was emerging from a five-year conflict in the eastern part of the country that had caused countless deaths and a massive flight of rural people to towns and cities. Between 1995

and 2000, the population of the capital, Kinshasa, had grown by more than one million people. With its population deeply impoverished and its food supply disrupted, Kinshasa was facing severe food shortages and rising rates of child malnutrition.

In the face of this adversity, resourceful *Kinois* revived an age-old survival strategy. Across the city, residents began growing vegetables and root

crops around their homes, on vacant lots and along roads and streams. The area under market gardens in and around the city also expanded rapidly. Many of the new growers were displaced rural people who had settled on the city's outskirts.

For the national government and FAO, that spontaneous growth of urban and peri-urban horticulture (or UPH, for short) presented an opportunity –

to look beyond the country's immediate needs for emergency food aid and to sow new seeds of hope.

Together, they launched a project aimed at building a vibrant UPH sector that would contribute to urban food security, improved nutrition and sustainable livelihoods in the future.



Congolese displaced by fighting in the country's eastern provinces

THE PROJECT

Support to the development of urban and peri-urban horticulture

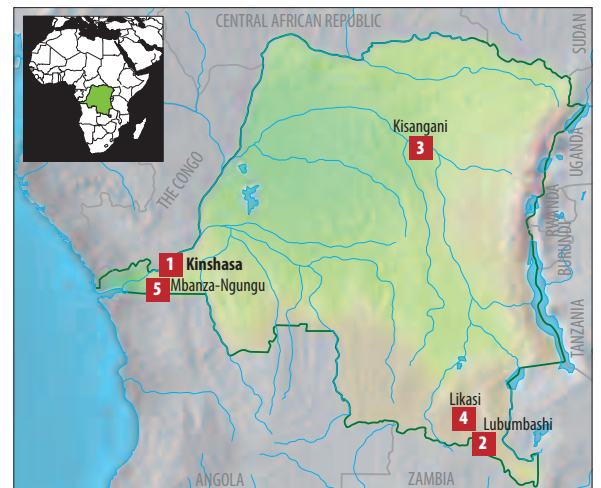
The project in the Democratic Republic of the Congo is implemented by the country's Ministry of Rural Development, with assistance from the Food and Agriculture Organization of the United Nations (FAO). Launched in June 2000, it was extended to a second phase starting in October 2004 and to a four-year third phase from January 2008. Funding totalling US\$10.4 million has been provided by Belgium.

The project is under way in five cities:

- 1 Kinshasa** (population: 8.7 million) Located on the south bank of the Congo River, Kinshasa is the capital city and the second largest city in sub-Saharan Africa
- 2 Lubumbashi** (population: 1.5 million) Lying at 1 200 m, Lubumbashi is the country's second largest city and capital of mineral-rich Katanga Province
- 3 Kisangani** (population: 810 000) Some 2 000 km from the mouth of the Congo River, Kisangani is the country's third largest city
- 4 Likasi** (population: 370 000) A mining centre on the Likasi River in Katanga Province, 140 km northwest of Lubumbashi
- 5 Mbanza-Ngungu** (population: 100 000) A hill town located some 120 km southwest of Kinshasa

THE COUNTRY

Democratic Republic of the Congo



Area:	2 344 860 sq km
Population:	67.8 million
Population growth rate:	2.6% a year
Urban population:	23.9 million (35.2%)
Urban population growth rate:	4.5% a year
GDP per capita per year:	US\$298
Life expectancy at birth:	47.6 years
Literacy rate:	67.2%
Number of undernourished:	51 million (76%)
Infant mortality rate:	205/1000 live births
Human Development Index country ranking:	176/182

Sources: FAO, UNDP, UN



An FAO project review mission visits a market garden in Lubumbashi, Democratic Republic of the Congo



Phase One: 2000-2004

Sowing seeds

In Lubumbashi, vegetable growers prepare a seedling nursery

The project's first phase focused on the cities of Kinshasa and Lubumbashi. Its goal was to expand and diversify the consumption of horticultural produce, while creating jobs and generating income for small-scale urban and peri-urban vegetable growers.

When the project began in June 2000, urban and peri-urban horticulture was producing an estimated 30 000 tonnes of vegetables a year in Kinshasa and 2 250 tonnes in Lubumbashi. While some vegetables were being grown in household gardens for family consumption and on a few large commercial farms, the

mainstay of production were the 5 000 small-scale market gardeners farming an area of 1 000 ha in Kinshasa and less than 100 ha in Lubumbashi.

Producers in and around Kinshasa cultivated plots as small as 300 sq m, and growing and selling vegetables was their only source of income. Some had been organized under previous government programmes into growers' associations of from 10 to 20 members. About one third of the growers were women.

Fruit and vegetable consumption in the two cities was less than half of the FAO/WHO minimum recommended intake of 400 g per head per day. But there was great potential for production increases: both cities had an ample supply of labour (particularly rural immigrants familiar with crop production) and, around Lubumbashi especially, sizeable areas of fertile land suitable for horticulture.

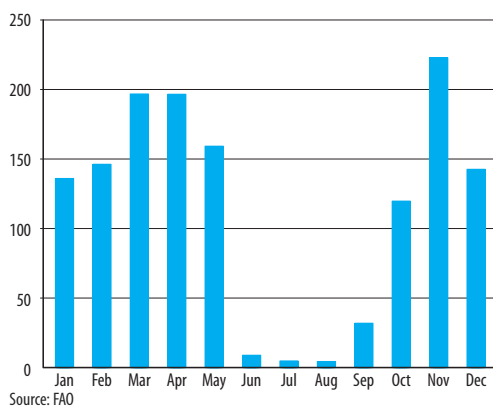


In 2000, market gardens in Kinshasa produced mainly traditional vegetables, such as amaranth

A sector in disarray. An earlier FAO baseline study of the country's urban and peri-urban horticulture sector had identified a number of constraints to its sustainable development:

- *Lack of clear government policies and strategies supporting the sector.* Urban and peri-urban horticulture was almost completely unregulated. Although the government had created a National Support Service for Urban and Peri-urban Horticulture (SENAHUP) in 1996, civil strife and unplanned urban growth had left the sector in disarray.
- *Lack of secure tenure over land used for vegetable production.* Most small growers were operating on vacant lots, without permits or land titles from municipal authorities. In Kinshasa, even growers' cooperatives had no legal title to the land they cultivated. Without secure tenure, growers' livelihoods were precarious and they had little incentive to invest in production.
- *Limited access to water, and inadequate irrigation and drainage.* Floods paralysed production at the height of the October-May rainy season, while the lack of irrigation reduced the cultivable area during the June-September dry season.

Average rainfall in Kinshasa (mm)



Women were fetching water in buckets from sources up to 500 m from their plots, and some growers used untreated wastewater.



The Ministry of Rural Development's National Support Service for Urban and Peri-urban Horticulture (SENAHUP) provides overall guidance through a coordinator based in Kinshasa.

SENAHUP's municipal horticultural offices, staffed by a UPH adviser and specialists in agricultural economics, agricultural engineering and horticultural extension, manage project activities in each city.

Municipal consultation committees, chaired by city mayors, facilitate the integration of UPH into urban planning. They include senior municipal officers responsible for agriculture, urban development and land affairs, as well as representatives of growers' associations and NGOs.

The FAO country office in Kinshasa manages FAO's assistance through a chief technical adviser.

FAO headquarters in Rome provides technical support, reviews progress and draws on lessons learned in order to optimize policies, institutional frameworks and support services for UPH in other developing countries.



Mbanza-Ngungu. UPH adviser Bruno Kitiaka (at left) confers with members of the municipal consultation committee on growers' requests for leases to gardening areas

- *Low output and a limited number of species and varieties.* Production technologies were rudimentary and yields were low. Mineral fertilizer was generally unavailable, while improved seed was costly and its supply irregular. Average tomato yields were less than 8 tonnes in Lubumbashi, compared to a world average of around 30 tonnes.
- *Weak organizations of growers and lack of support services.* Growers' associations had little contact with extensionists. Even when inputs were available, the supply often failed to coincide with the production calendar. As bank loans were not available to small growers, the only alternative were high-interest loans from money-lenders. The lack of post-harvest and processing facilities forced growers to sell directly from their fields, creating market gluts that depressed prices.

To overcome those constraints, the project planned a series of interventions aimed at strengthening the sector's productive base in Kinshasa and Lubumbashi. It put in place an institutional structure to support those activities by linking all project stakeholders: FAO, the Ministry of Rural Development, municipal authorities, horticulture support services and vegetable growers.

Rights to land. Since most growers were operating without permits, the project helped create a municipal consultation committee in each city. The committees managed the process of surveying and demarcating existing market garden areas and obtaining permits for the growers or growers' groups that were using them.

Often, "regularization" began with the registration of informal groups of growers as associations. Once the land and its users had been identified,



Chives growing in Kimwenza valley, a 60 ha market gardening area on the southern outskirts of the capital

the committees processed the associations' requests for permits, usually from the municipal lands department. During Phase 1, the committees arranged leases for 600 ha of land in Kinshasa and 150 ha in Lubumbashi. In some cases, they facilitated agreements between the growers and private or customary land owners.

In all, some 3 500 growers in 43 market garden areas of Kinshasa and Lubumbashi were identified for



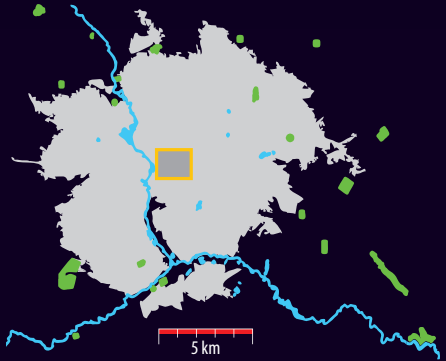
Greening Lubumbashi

The bustling city of Lubumbashi is a major commercial and industrial centre, and the hub for exports of copper and cobalt from Katanga Province. Since 2000, the population has expanded by more than 50 percent to a conservatively estimated 1.5 million inhabitants. Keeping pace with the city's growth, the project has created a flourishing urban and peri-urban horticulture sector. The area under commercial horticulture has grown from less than 100 ha to almost 725 ha.



Lubumbashi

Democratic Republic of the Congo



Today, market gardens ringing the city – and, in some cases, just a few kilometres from the city centre – produce more than 60 000 tonnes of fresh vegetables a year. On pages throughout this publication, we take a closer look at Lubumbashi’s UPH sector, and its 7 800 small-scale market gardeners.

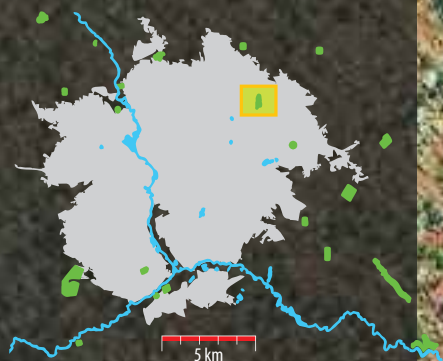
 Market gardens



The city's mayor, Marie Grégoire Tambila Sambwe, says horticulture is a key part of her plans for a "greener Lubumbashi"

“Historic” market garden resists urban sprawl

Naviundu is one of Lubumbashi’s oldest market gardens. When the first growers began cultivating amaranth there in 1996, the area was sparsely inhabited. Today, its 8.5 ha of gardens are surrounded by new homes. But the growers’ land rights are protected from urban sprawl by permits obtained through the municipal consultation committee. The Source Naviundu growers’ association, which has 85 members, now cultivates amaranth, Chinese cabbage and okra, using improved practices introduced by the project. Annual vegetable production is estimated at almost 1 000 tonnes.



Naviundu

Lubumbashi





Freshly harvested Chinese cabbage. More than half of the growers at Naviundu are women



In 2004, the project built a small catchment to divert stream water to the market garden. A fountain supplies water for gardening as well as potable water for surrounding households



Cecile Nsoni cultivates an area of 400 sq m at Naviundu. Regular income from sales of fresh produce has allowed her to pay her child's school fees and "build a brick house with a tin roof"



Growers at Naviundu employ more than 400 labourers during the main growing season from March to July. Average wages are around US\$3 a day

Kinshasa. This canal helps irrigate 30 ha of land used by 1 250 growers in the Kimpoko gardening area



INTERVENTIONS FOCUSED ON IMPROVING WATER MANAGEMENT

The project has invested US\$1.03 million in building or upgrading irrigation infrastructure and flood control works in market garden areas of the five cities. Growers' associations provide labour and are trained to manage and maintain the structures once completed. By 2010, more than 50 water control works were in place, providing irrigation and drainage for 1 500 ha of market gardens. More effective water control has allowed growers to expand the cultivable area, and to extend the cropping period during the dry season. Side benefit: safe drinking water for neighbouring communities.



Kisangani. Local residents use water fountains as a source of water for household use



Lubumbashi. A catchment basin (top) at Kaluako, north of the city, provides irrigation water throughout the year. Above, a water control structure nears completion on a stream at Kilobelobe

project support. In those areas, the project launched a series of interventions focused on improving water management and promoting intensification of production and cultivation of a wider range of vegetable crops.

In Kinshasa, irrigation, drainage and flood control works helped growers to expand the cultivated area by an estimated 250 hectares. For example, the Kimbanseke market gardening area grew from 11 ha to almost 100 ha and the number of growers from 115 to 900. In both cities, irrigation works improved the quality of water used on crops, and made water available for longer periods during the year.

Meanwhile, the national UPH support service (SENAHUP), had opened offices in Lubumbashi and in 24 municipalities of Kinshasa, to provide technical support to the growers' associations. The project adopted FAO's Farmer Field School approach, a system of adult informal education organized around regular group meetings with extensionists. During Phase 1, SENAHUP organized 60 field schools, which trained around 720 growers in Kinshasa and 600 in Lubumbashi in improved cultivation practices and technologies.

The project also contracted recognized national and international development NGOs to channel micro-credit to growers' associations. The NGOs processed loan requests and trained growers in finance management. Credit enabled the associations to buy the inputs – mainly improved seed – they needed to expand production.

In addition to traditional leafy vegetables, such as amaranth, sweet potato, sorrel and spinach, growers began cultivating more profitable crops, such as spring onions, celery, eggplant, cabbage and tomato. A major innovation was the construction of covered nurseries that allowed for the production of seedlings during the rainy season and,

in Lubumbashi, protected them from the cold during the dry season.

Increased production, profits. An evaluation of the project in 2003 found that it had boosted horticultural production, employment and growers' incomes, thanks mainly to expansion of the irrigated area, intensification of production and diversification to more profitable vegetables. In both Kinshasa and Lubumbashi, the average annual income of market gardeners participating in the project had increased from around US\$160 a year to US\$600.

The evaluation found that city authorities had "engaged positively" with the project by delineating zones for horticulture and promoting dialogue between growers' associations and input and service providers through the municipal consultation committees. The project had also strengthened SENAHP, which was playing a greater role in planning and monitoring.

The evaluation recommended a second project phase in Kinshasa and Lubumbashi and expansion of activities to other cities. Continued support was endorsed at a meeting in Kinshasa of United Nations agencies, donors and international NGOs. A report on the country's food security situation said that while overall food production continued to decline, there had been some positive developments. "The most important," it said, "is the emergence of urban and peri-urban agriculture. The FAO-assisted horticultural project has had a great impact on those activities."

ADULT EDUCATION IN GROWERS' OWN FIELDS



Mbanza-Ngungu. A field school facilitator discusses the results of an agro-ecosystem analysis with members of the Aproman growers' association

Farmer field schools use growers' own plots as training and demonstration sites where they discuss problems and conduct trials of potentially useful technologies. Over the past 10 years, the project has organized 500 field schools for more than 9 000 growers on a wide range of topics – from preparation of beds and correct plant spacing to irrigation management and the use of organic fertilizer. Often, participants are "facilitators" – representatives of growers' associations, who are trained and later share their knowledge with fellow producers.



Lubumbashi. At a field school, growers use peat blocks to transplant tomato seedlings



Kinshasa. Growers learn the advantages of planting seeds in rows on narrower beds, at right

Progress in the heart of the city

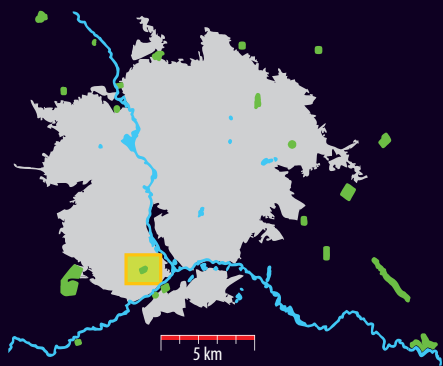
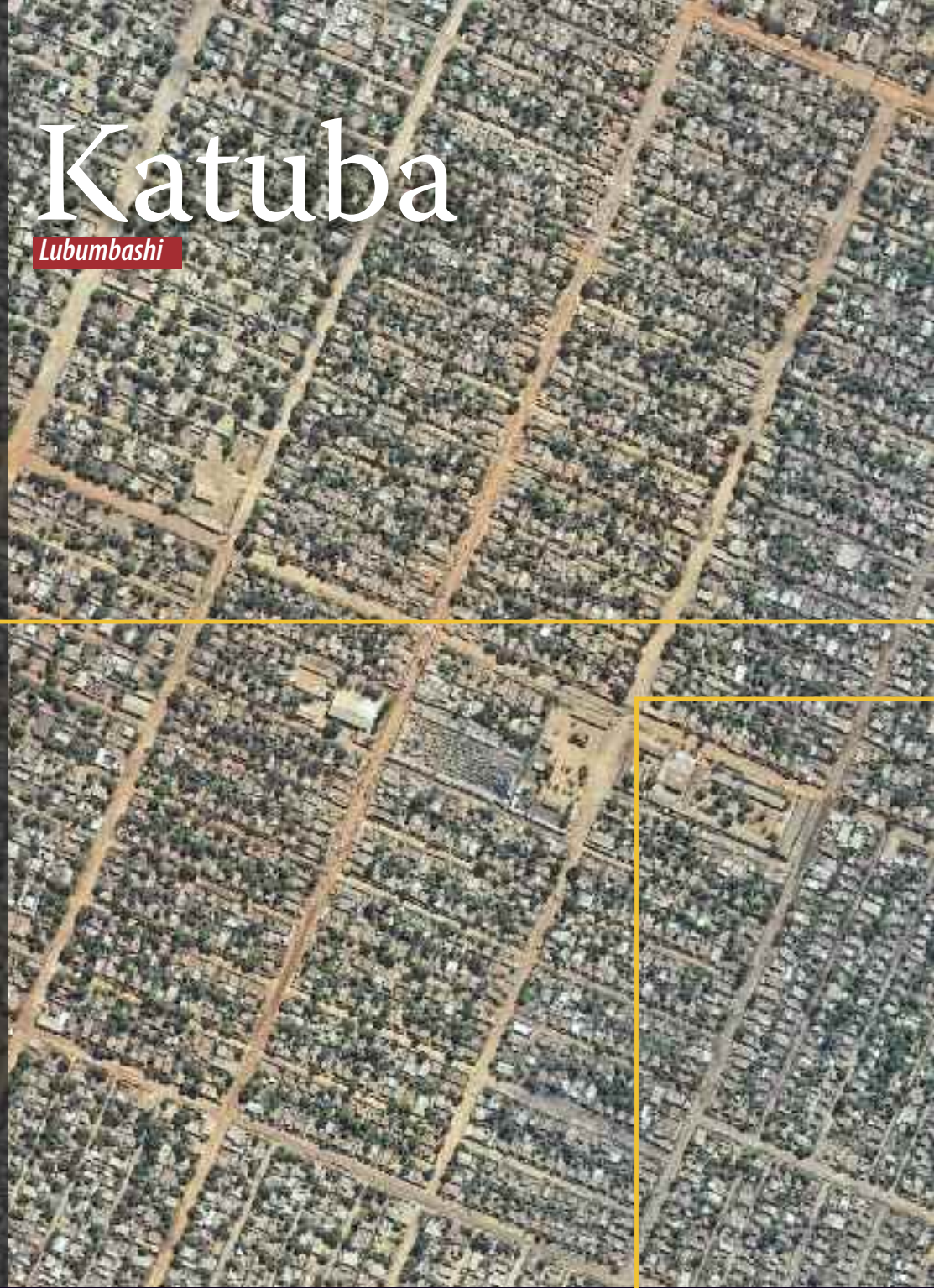
During a severe economic recession in the mid-1990s, women living in Lubumbashi's downtown neighbourhood of Katuba began growing vegetables for their families on a three-hectare field belonging to a local church. Later, they formed an association, Maendeleo (meaning "progress" in Swahili), which now has 250 members and produces an estimated 360 tonnes of vegetables a year, most of it for sale through local markets. Maendeleo is one of the city's most active associations – facilitators trained by the project conduct regular courses for fellow growers in bed preparation, composting and use of improved varieties.



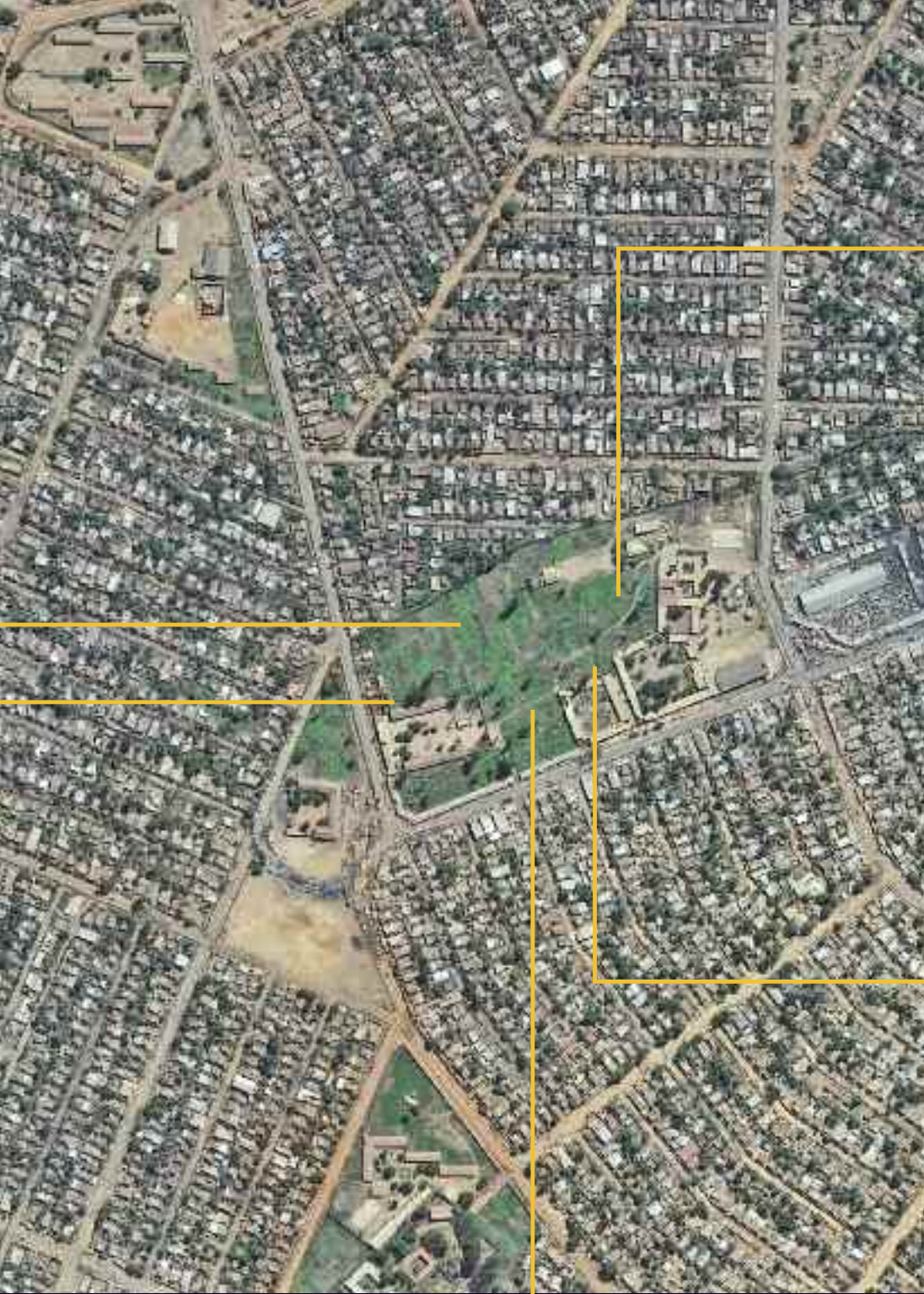
Freshly harvested vegetables are bagged for transport to market

Katuba

Lubumbashi



Growing vegetables in Katuba is a community activity. In the peak growing season, hundreds of growers are working in their gardens



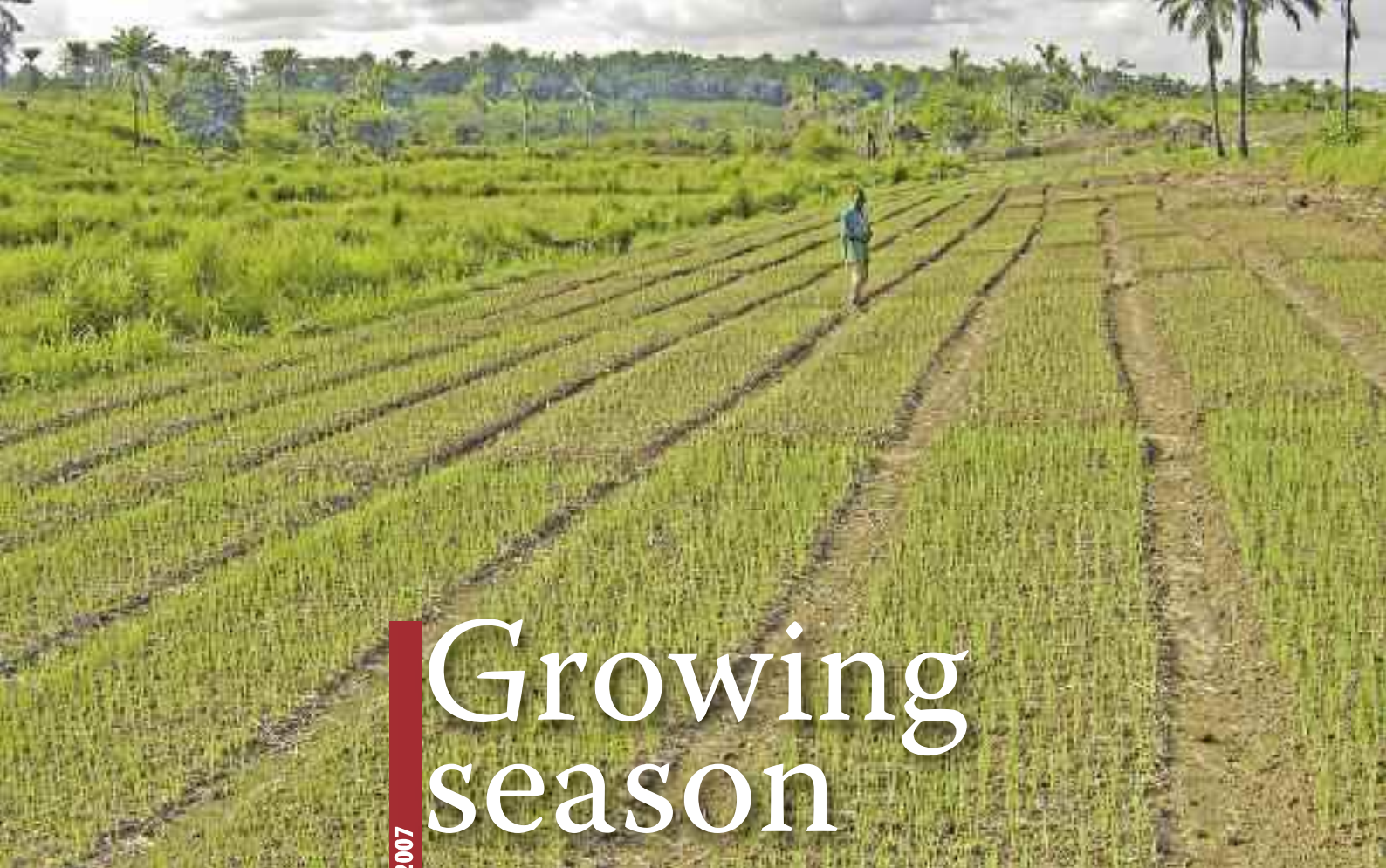
Growers at Katuba say income from horticulture has helped them improve their houses, pay for school fees and feed their families



Angèle Nsomo earns about US\$100 a month from the sale of vegetables



Watering plants on a Saturday afternoon



A field of onions in the Mpiangu valley, Mbanza-Ngungu

Phase Two: 2004-2007

Growing season

As the second phase of the project began in October 2004, the Democratic Republic of the Congo was firmly set on a path towards reconciliation and reconstruction. Peace and power-sharing agreements had ended civil strife in most of the country, and annual GDP was growing at a rate of 6.4 percent.

With the security situation steadily improving, the project aimed at consolidating its achievements in Kinshasa and Lubumbashi and extending its approach to three other cities: Kisangani, Likasi and Mbanza-Ngungu. Kisangani was chosen as part of government efforts to stimulate economic recovery in Oriental Province, while Mbanza-Ngungu and Likasi were selected for their close proximity to technical support services and markets in Kinshasa and Lubumbashi.

From lessons learned in the first four years, the project based its

Phase 2 interventions on what became known as the “Three-S” approach, which is now central to FAO’s overall strategy for UPH development:

- *Secure access to land and water for horticulture*, through regularization of land titles and irrigation and drainage works;
- *Secure high quality horticultural produce*, through intensification and diversification of crop production, field demonstrations, pest management training and improved access to quality seed;
- *Secure “ownership” of UPH by stakeholders in the sector*, by establishing horticulture as a profitable, sustainable livelihood, improving growers’ access to credit and strengthening support services.

Implementation of the “Three-S” approach was ensured at national level by closer integration of the project with the programme of SENAHUP. Within 12 months of the launch of Phase 2, municipal horticulture offices and municipal

consultation committees were functioning in Kisangani, Likasi and Mbanza-Ngungu.

In the three “new cities”, the project first identified market garden areas which were to be targets for interventions. Although small-scale growers were already organized in groups, most groups were not legally recognized and lacked secure title to their plots.

In Likasi, the municipal consultation committee arranged leases to two-thirds of the city’s existing market gardens for 38 associations, representing 1 500 growers. In Mbanza-Ngungu, surveys identified 200 ha under commercial horticulture and 1 500 operators, more than half of them women. Agreements between the town’s municipal consultation committee and the growers’ associations provided secure tenure over 18 areas totalling 112 hectares. In Kisangani, all nine of the city’s market gardening zones were secured through leases of up to 10 years.

In Kinshasa and Lubumbashi, meanwhile, the project helped associations gain secure title to 10 of the city’s 23 project sites and expanded its assistance to a total of 11 800 vegetable growers. By 2008, growers participating in the project in Lubumbashi had won secure access to two-thirds of the market garden area. The city’s vegetable growers were organized in 130 associations and in two cooperatives for input supply and credit.

During Phase 2, the project provided almost US\$750 000 for irrigation, drainage and flood control works in the five cities. In Kinshasa, the construction of 10 small-scale irrigation systems helped reduce watering times from nine to four hours per day, and cut by almost half the average distance from water sources to plots (from 50 m to 30 m).

In Likasi, the project introduced drip irrigation systems, while interventions in Mbanza-Ngungu

CONTROLLING PESTS, WITHOUT TOXIC PESTICIDES



Mbanza-Ngungu. A grower (top) tests a bio-pesticide, based on tephrosia leaves, against onion thrip. Above, a chili mix is prepared for use as a bio-pesticide by growers in the Zamba market garden

To ensure the safety of produce, the project introduced FAO’s Integrated Production and Pest Management (IPPM) approach, which helps reduce the need for pesticides. After studying common problems – such as bacterial wilt, aphids and spider mite – growers tested bio-pesticides based on papaya leaf, tobacco, garlic, *tephrosia* and lemongrass. To record their findings, growers use IPPM cards – one showing a current cultivation practice and its related pest or disease problem and one showing a “better practice” in line with the IPPM principles. So far, the project has generated more than 200 pairs of IPPM cards.



Likasi. Growers harvesting onions from a trial plot where they tested integrated pest management



Before and after: IPPM cards recommend staking to avoid fungal disease of tomato





The start of a 6 km long canal, one of the project's first interventions



A grower waters his field of white cabbage



Bernard Mwelwa grows capsicum, cabbage and tomatoes and earns around US\$200 a month – less than a copper miner, he says, "but the work is more pleasant"



A gardener and family prepare bunches of onions for sale

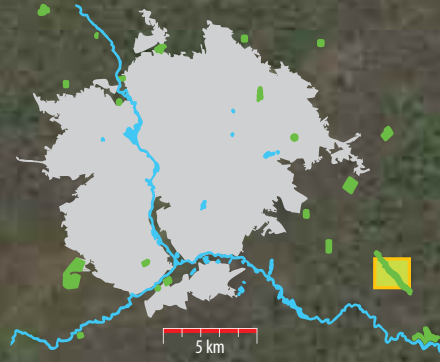


Kilobelobe

Lubumbashi

City's "home garden" provides fresh produce, employment

Located 20 km east of Lubumbashi, the Kilobelobe market garden is the city's biggest producer of leafy vegetables, such as beets, cabbage, sweet potato leaves and spinach. Total vegetable output is estimated at almost 15 000 tonnes a year. The secret of Kilobelobe's success is its good quality soil and ample water supply – one of the project's first interventions was to build a small water regulation structure and a canal that feeds water to the entire 55 ha area. Some 720 growers have gardens in Kilobelobe and provide employment for up to 4 000 labourers.

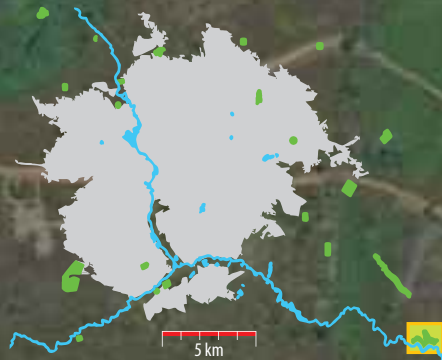


Kamilombe

Lubumbashi

Green acres attract traders

Measuring around 70 ha, the almost perfectly flat Kamilombe market garden curls along the Kafubu river about 2 km south of Kilobelobe. Here, the area's 300 market gardeners grow cabbage, celery, capsicum, onion and leek practically all year round. Traders come from the city to harvest produce and consign it to transporters, who haul it by bicycle to Pande market, 12 km away. Kamilombe's annual vegetable production is estimated at 14 500 tonnes.



Although water is supplied by irrigation canals, watering at Kamilombe is still done by hand



Growers on their way to work pass a field of emerging cabbages



Elizabeth Kaulu with daughter Alpha, the youngest of her eight children. She cultivates a plot of 80 m by 90 m all year round



Katanga Musonda bicycles to Kamilombe twice a day to collect vegetables and transport them to Pande market

The project supplies seeds of improved varieties for trials by growers' associations, and encourages them to share the results through Hortivar (www.fao.org/hortivar), FAO's online, geo-referenced database on cultivar performance and appropriate cropping practices. In Lubumbashi, project staff added more than 800 entries to Hortivar, based on trial results. In turn, growers regularly consult Hortivar to identify promising varieties and improve their cultivation practices. Thanks to the project, the Democratic Republic of the Congo has become a major contributor to Hortivar, with more than 1 700 entries by November 2010.

DEMONSTRATION PLOTS TEST NEW CROPS AND CULTIVATION TECHNIQUES



Likasi. In the Panda market garden, trials of a high-yielding white cabbage hybrid variety



Kinshasa. Growers test improved varieties of beetroot, chives, cabbage and onion



Lubumbashi. Production of amaranth seeds

included construction of two small dams. In Kisangani, where horticulture was limited to the relatively flood-free months of December to February, new flood control basins helped extend the growing season.

More power to growers' associations. A major aim of Phase 2 was to improve the growers' technical capacity and skills in enterprise management, and to give their associations a greater role in organizing training and basic services. The project helped growers set up demonstration plots to test new crops and cultivation techniques, and enlisted "pilot farmers" to multiply improved plant material and produce seedlings.

The Farmer Field School programme was expanded, both to train facilitators selected among the growers and to cover a wider range of production issues, such as nursery management, floriculture and soil fertilization. In all, the project organized more than 200 schools in the five cities, involving some 3 500 growers.

In Kinshasa, SENA HUP organized management training for 200 officers of growers' associations, as well as 50 farmer field schools involving 1 500 producers. A review of Kinshasa's UPH sector in 2007 said that the project "excelled in technical support", providing specialists to assist growers for 12 days a month. It also noted an increase in the supply of seed and fertilizer.

In Mbanza-Ngungu, the municipal horticulture office organized 47 field schools, trained 60 facilitators, and

Field school facilitators in Likasi at the end of a 16-week training course



conducted specialized training at the growers' request on composting, bio-pesticides and accounting. The Kisangani office organized 32 field schools attended by 480 growers, half of them women. In Likasi, some 520 growers took part in field schools that focused on the use of bio-pesticides and organic fertilizers.

The project's approach to micro-credit was also reviewed and improved. The lack of a "repayment culture" among vegetable growers – stemming from long exposure to emergency aid – had led to high loan default rates. In Phase 2, therefore, the project set criteria for assessing associations' "credit rating", while its NGO partners provided practical training in bookkeeping, accounting, financial planning and the value of savings.

In Kinshasa, loans were invested in growing higher value vegetable crops, as well as in micro-enterprises, including the construction of input stores and composting units. One association invested in small-scale pig farming, which had an added benefit: the pigs also provided organic fertilizer for the vegetable gardens. In Lubumbashi, one project assessment reported, "80 percent of women now own farm tools thanks to micro-credit".

The project also took a new direction by encouraging schools to start their own vegetable gardens. It provided tools, seed and practical advice to help start gardens at a total of 40 schools in Kinshasa, Lubumbashi, Kisangani, Likasi and Mbanza-Ngungu.



Growers in Kisangani tripled their average incomes by switching to more profitable crops, such as beans

Lower rents, higher incomes. As Phase 2 neared its end in 2007, the project was providing assistance to some 17 350 small-scale market gardeners working an area of 1 900 ha. An evaluation mission found that the project had helped growers obtain secure title to 1 120 hectares of land, with term of leases ranging from one or two years in Lubumbashi to 10 years in one area of Kinshasa. One effect of increasingly secure tenure for growers was a decline in the rent being charged for land.

In all five cities, growers had expanded the cultivated area and extended production into the rainy season. Thanks to increased productivity, market gardeners' incomes had risen significantly. In Kisangani, where many growers were adopting profitable new crops, such as green beans, cabbage, carrots and lettuce, the average monthly income of a market gardener had risen from US\$18 to US\$60. Between March 2005 and March 2007, the average income of market gardeners in Likasi rose from US\$70 to US\$160 a month, and in Kinshasa from US\$50 to US\$142.

The evaluation recommended a third phase of the project aimed at applying its approach within a nationwide initiative for UPH development. In support of the new phase, the mission called for streamlining procedures for the issuance of land permits. It also recommended action to promote school gardens, improve post-harvest management and processing, and increase the consumption of fruits and vegetables.

ENABLING GROWERS TO BUY THE INPUTS THEY NEED

Between 2000 and 2010, the project disbursed to market gardeners loans worth US\$1.08 million for investment in crop production and other income-generating activities. Most of that credit was channelled through "micro-banks" managed by development NGOs and growers' own associations. Each *micro-caisse* serves from 50 to 75 growers, who contribute 20 percent of the loan amount for approved activities. The loans, averaging US\$60 per grower, are used mainly to buy inputs and farm tools, or invested in small-scale enterprises, such as seedling nurseries, composting units and small-scale animal production.



Lubumbashi. The president of a growers' association (at right) signs an agreement with a development NGO for a loan to buy seed, compost and bio-pesticides



Likasi. A course in micro-credit management for officers from 72 growers' associations



Kinshasa. A growers' association used credit to start a profitable business making nutrient-rich fertilizer in a vermicomposting unit

A brisk trade in locally grown produce

A pavilion built with project support in Lubumbashi's Pande market in 2003 now serves as the main hub for the marketing of horticultural produce grown at Kilobelobe and Kamilombe. The pavilion hosts some 30 vendors, most of them women, who report incomes of up to US\$50 a day. Thanks to the project, the vendors say, locally grown vegetables have replaced produce that, until recently, was imported from neighbouring Zambia. Business is so brisk that the vendors have requested at least three times more space in order to meet consumer demand.



A steady stream of transporters delivers fresh produce from the city's peri-urban market gardens



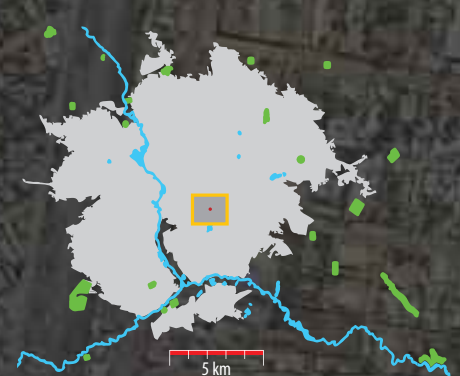
The pavilion newly constructed



Scenes from a typical day in Pande market



Vendor Kally Nyembo (at right) buys vegetables directly from market gardeners in Kilobelobe



Pande market

Lubumbashi





Traders harvest crops directly from growers' fields

Phase Three: 2008-2012

Harvest

By 2008, the Democratic Republic of the Congo had finally achieved the stability it needed for its sustainable socio-economic development.

Multiparty presidential elections in 2006 – the first since 1960 – had given the country a broad coalition government committed to drastically improving the Congolese people's living conditions within a generation.

In the agriculture sector, the government was preparing an agriculture master plan giving full recognition to the role of urban and peri-urban horticulture in ensuring

food and nutrition security and alleviating urban poverty. It was also implementing constitutional reforms that would decentralize agricultural planning and decision-making to provincial governments.

The third phase of the project, which began in January 2008, is contributing to the country's recovery by laying the foundations for UPH development programmes at national and provincial levels.

It is helping to set up municipal consultation committees in all provincial capitals, and sponsoring workshops to formulate horticultural development plans for each province. Meanwhile, SENA HUP has opened new offices in eight cities.

"Five-S" approach. Building on the strategy validated in Phase 2 – securing access to land and water, improving the quality of produce and professionalizing growers – the project has developed a "Five-S" approach with two new objectives.

Because vegetable consumption is



Horticulture Day in Lubumbashi. The key to increased production is boosting demand

still below FAO/WHO recommended levels, FAO says the key to increased production is interventions focused on boosting demand. One of the new objectives, therefore, is to secure increased consumption of fruits and vegetables by offering consumers a wider variety of safe, quality produce, promoting school gardens, and creating a more efficient horticulture supply chain.

The project is sponsoring public information campaigns, investing in the construction or improvement of neighbourhood markets, and encouraging the labelling of produce to build consumer confidence.

The project's second new objective is to secure capitalization of methodologies and technologies developed over the past decade, and to transfer the project's approach to other cities of the Democratic Republic of the Congo and to other African countries. The project is bringing together all municipal UPH advisers for regular consultations, and preparing manuals for trainers and briefing kits for decision-makers.

It has sponsored regional dialogue on UPH with neighbouring countries, such as Burundi, Rwanda and Zambia, and forged links with the Dimitra programme, a Belgium-funded initiative that shares development ideas and good practices throughout Africa.

Taking stock. In July 2010, FAO took stock of the project's achievements since 2000. It found that the project is now assisting directly some 16 100 vegetable growers working an area of 2 000 ha in and around Kinshasa, Lubumbashi, Kisangani, Likasi and Mbanza-Ngungu.

Project sites account for more than half the total area dedicated to commercial horticulture in the five cities. Secure land tenure to 1 225 ha has been guaranteed through leases, permits and zoning facilitated by the project.

Water control structures, built or

TOOLS, SEEDS AND PRACTICAL ADVICE FOR SCHOOL GARDENERS



Mbanza-Ngungu. Pupils of the Kola primary school at work on their school garden

The project has helped establish vegetable gardens in 74 primary schools and high schools. School gardens are powerful tools for improving child nutrition: they familiarize children with horticulture, provide fresh food for healthy school meals and help teachers develop nutrition courses. When replicated at home, they improve family nutrition. In 2010, more than 18 700 students were participating in the project's school gardens programme. One objective of Phase 3 is to foster a national programme in collaboration with health and education ministries and WHO.



Lubumbashi. At the Maadini school, children clear scrub, prepare seed beds and tend their cabbage nursery

Tshamalale

Lubumbashi

With drip irrigation, intensified production

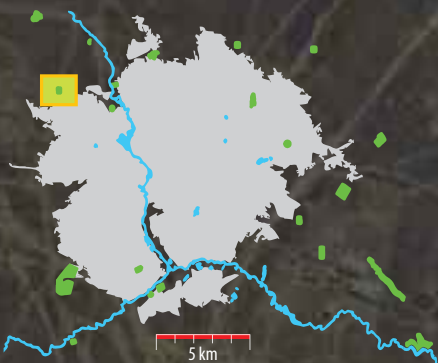
Tshamalale represents the future of Lubumbashi's urban and peri-urban horticulture sector. On 6 ha of land on the city's western outskirts, three growers' associations dug five wells 5 m deep to tap into the area's rich groundwater resources. Then they used a project loan to buy a low-pressure drip irrigation system for their fields of tomatoes, cabbages, green beans, onions and zucchini. The area currently produces around 2.5 tonnes of produce a week, all year round, for sale mainly to the city's supermarkets. The project is using Tshamalale to train other market gardeners in sustainable intensification of production.



Five wells 5 m deep provide water to Tshamalale's fields



The wells supply groundwater to cabbage fields through a low-pressure drip irrigation system





A drainage canal dug through marshes helped increase the cultivable area from 4 to 6 ha



A field of ripening tomatoes at Tshamalale



The onion nursery



Likasi. Members of the Hodari Mothers' association, who grow vegetables in the Nguya area 18 km from the city centre

INVESTING IN **WOMEN** – AND THE NEXT GENERATION

Of the more than 16 000 growers participating in Phase 3 of the project, almost 10 000 are women. In Lubumbashi, more than 6 000 women have taken out micro-credit loans over the past 10 years, using them to buy inputs and farm tools. Thanks to training through farmer field schools, the women now cultivate 15 types of leafy vegetables, compared to just four when the project began. Some women have also invested in small-scale livestock, dressmaking and child-care enterprises. Higher incomes mean improved child nutrition – one study found that market gardeners' children ate on average 3.3 meals a day, compared to "less than two" when the project began.



Mbanza-Ngungu. A bumper crop of cabbage in the Kinzau market garden



Lubumbashi. Thanks to micro-credit, many women can afford pedal-pumps

upgraded, now provide water for market gardens throughout the year in Kinshasa, Lubumbashi, Kisangani and Likasi, and have extended water availability from four months to eight months in Mbanza-Ngungu.

Through farmer field schools involving a total of 350 growers' associations, the project has introduced and disseminated new production and processing technologies, and doubled to 50 the number of vegetable varieties being grown. Organic fertilizers and bio-pesticides are steadily replacing more expensive chemical fertilizers and synthetic pesticides. More than 75 percent of growers are using improved seed and have adopted other good practices – soil preparation, crop diversification, improved nursery management and crop rotation.

Thanks mainly to the project, vegetable production in Kinshasa has increased from an estimated 30 000 tonnes in 2000 to around 80 000 tonnes in 2009. The city's market gardens now account for 65 percent of its vegetable supply. In Lubumbashi, the area under commercial horticulture has grown from less than 100 ha in 2000 to 720 ha, and production from 2 250 tonnes to an estimated 60 000 tonnes. Women there make up more than 70 percent of growers benefiting from project activities.

Meanwhile, growers in Mbanza-Ngungu are shifting to highly profitable cultivation of potatoes, achieving yields of up to 30 tonnes per hectare, and the town is now supplying seed potatoes to farmers in Kinshasa. In Likasi, the average monthly income of the city's vegetable growers is almost US\$300 a month, compared to less than US\$70 five years earlier.

In all cities, the project has promoted simple post-harvest technologies for popular vegetables – for example, chili paste is being sold in local supermarkets. Market

collection and sales points have been constructed or improved in 15 neighbourhoods to link growers to consumers.

Because they are cultivating larger areas with more profitable crops, market gardeners have higher profit margins, and are better able to meet health and child care costs. In 2000, less than 30 percent of growers in Kinshasa and less than 20 percent of those in Lubumbashi said they had cash reserves. Today, the proportion has reached 80 percent in Kinshasa and almost 100 percent in Lubumbashi. Savings are being invested in children's education and home improvements, and many growers have opened accounts with credit unions or banks.

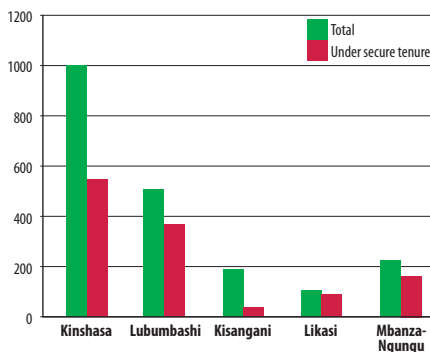
FAO concluded that the "Five-S" approach to UPH development has produced a truly bountiful harvest. By securing growers' access to land and water, and registering their associations as formal organizations, the project stabilized the sector and provided the basis for its sustainable development. The technical guidance and capacity building provided through farmer field schools have proven effective in improving the quantity, quality and safety of horticultural produce.

Finally, the decade-long collaboration between FAO, SENAHUP and municipal authorities has laid a solid foundation for national and provincial programmes for UPH development. FAO believes that the project in the Democratic Republic of the Congo will serve as a platform for dissemination of sustainable urban and peri-urban horticulture in the Great Lakes sub-region of Africa, and beyond.

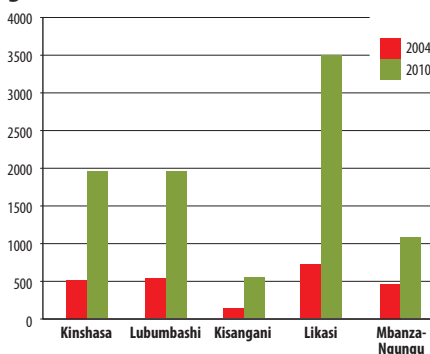
MEASURES OF IMPACT

Source: FAO/SENAHUP

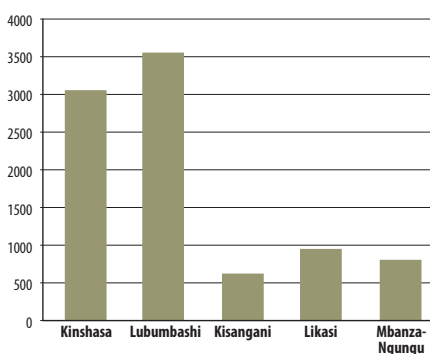
Market gardens covered by project activities, 2010 (hectares)



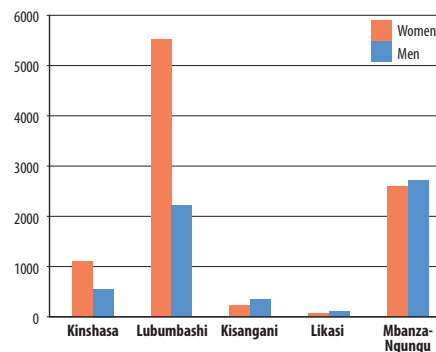
Average annual income of market gardeners (US\$)



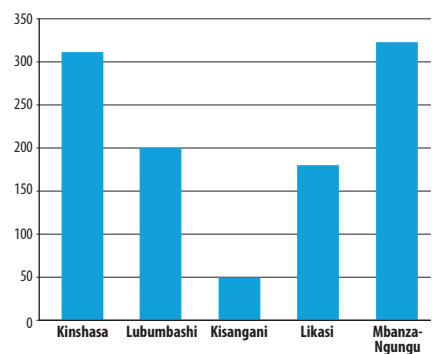
Number of market gardeners attending field schools, 2000-2010



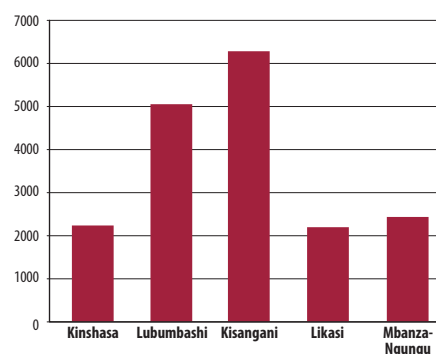
Number of market gardeners participating in project, 2010



Loans disbursed to market gardeners, 2000-2010 (US\$ thousands)



Number of students participating in school gardens programme, 2010



"All of my life is here"

In 2004, Irène Kalenga joined fellow growers at the Kashamata market garden in digging a 3 km-long canal to divert water from the Kafubu river to their fields. It took them three months, using machetes, picks and shovels, and a route survey carried out by the project. Their hard labour now provides a year-round water supply that has allowed them to expand their vegetable gardens from 3.5 ha to 9 ha. "All of my life is here," says grower Irène Kalenga, who earns monthly income of around US\$375 from the sale of cabbages, onions, tomatoes and eggplant.

Kashamata

Lubumbashi



Two growers' associations with 71 members cultivate vegetables at Kashamata



Belgium's Minister of Development Cooperation, Charles Michel (centre), visits the Kashamata canal in 2009



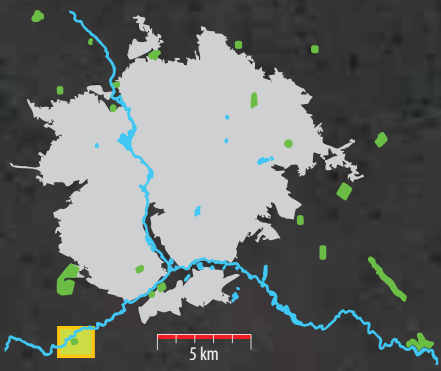
The canal provides water to 9 ha of vegetable gardens

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Route of the canal





*Irène Kalenga
beside her fields
at Kashamata*



Partners in urban and peri-urban horticulture

Ministry of Rural Development, Democratic Republic of the Congo

Boulevard du 30 juin,
Commune de la Gombe, Kinshasa



The Ministry promotes UPH through its National Support Service for Urban and Peri-urban Horticulture (SENAHUP), which has municipal horticultural offices in 13 cities.

Food and Agriculture Organization of the United Nations

Viale delle Terme di Caracalla,
00153 Rome, Italy



FAO's Programme for Urban and Peri-urban Horticulture helps governments and city administrations to optimize policies, institutional frameworks and support services for UPH, to improve production and marketing systems, and to enhance the horticulture value chain.

Belgian Development Cooperation

Rue des Petits Carmes, 15
B-1000 Brussels, Belgium



Belgium has provided funding of US\$15 million in support of FAO-assisted projects for UPH development in Bolivia, Burundi, the Democratic Republic of the Congo, Côte d'Ivoire and Namibia, and for an ongoing global initiative aimed at disseminating lessons learned.

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Satellite imagery

DigitalGlobe



The FAO/SENAHUP project office in Lubumbashi



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Special thanks to the citizens of Lubumbashi, Democratic Republic of the Congo



**GROWING
GREENER
CITIES**

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