



City Region
Food Systems

City Region Food Systems and Food Waste Management

Linking Urban and Rural Areas
for Sustainable and Resilient Development

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Executive Summary

Rapid urban growth; growing food and nutrition insecurity; unbalanced food availability, distribution and access; environmental degradation, resource scarcity and climate change; unsustainable production and consumption patterns, including generation of food waste – all of these have important developmental implications for both urban and rural areas alike. It is increasingly recognised that in order to respond to these challenges, integrated territorial development and balanced urban-rural linkages must be pursued for the benefit of both urban and rural populations.

City region food systems (CRFS) offer concrete policy and programme opportunities within which these developmental issues can be addressed and through which rural and urban areas and communities in a given city region can be directly linked. These specifically address Sustainable Development Goal (SDG) Target 11a – to support positive economic, social and environmental links between urban, peri-urban and rural areas – and are instrumental in linking SDG 11 with SDG 2 (on sustainable agriculture and food and nutrition security) and SDG 12 (on sustainable production and consumption).

This publication documents thirteen case studies from city regions around the world which are developing CRFS projects, programmes, and policies, including those related to the prevention, reduction and management of food waste. Lessons learned from the case studies for sustainable development of CRFS call for local, city regional, and (sub) national governments to institutionalise city region food systems, providing them an institutional setting and budget, linking them to larger city region development plans, and monitoring their developmental impacts across urban and rural areas.

They also call for (sub)national and legal frameworks which embed CRFS within broader legislation, specifically the ‘Right to Food’ and the ‘Right to the City’, acknowledging the need to guarantee both urban as well as rural food and nutrition security, as well as to regulate (unplanned) urban expansion on agricultural land in order to safeguard food and ecosystem services. The selected cases also highlight the need to strengthen horizontal and vertical governance systems as well as multi-stakeholder and cross-sectoral partnerships.

Finally, the cases offer a large number of strategies and tools that can be applied by city regions around the world, including the promotion of (peri)urban agriculture, preservation of agricultural land areas and watersheds through land use planning and zoning, development of food distribution and social protection programmes for vulnerable groups, support for short supply chains and local procurement of food, and promotion of food waste prevention, reduction and management, as well as the recovery and redistribution of safe and nutritious food for human consumption.

City Region Food Systems are vital to the implementation of the Agenda 2030 and the New Urban Agenda (NUA) in three key ways: i) City region food systems address several key policy areas of concern to the NUA, including local economic development and urban governance, spatial and economic planning, public health, and ecosystem protection; ii) Coalition building around city region food systems can generate positive political support for wider urban-rural linkages through coalition building centred on food; iii) City region food systems deserve particular attention, given their potential to address the challenges outlined above.

Call for Strengthening Urban-Rural Linkages

The New Urban Agenda, which is to be adopted at the third UN Conference on Housing and Sustainable Development – Habitat III – in October 2016 in Quito, Ecuador, will set out goals and guidelines for sustainable urban development that will be applicable to all UN member countries. The New Urban Agenda will thus support the work of solidifying and realising in urban settings the targets formulated in the Sustainable Development Goals.

Habitat III recognises that urbanisation has increasingly linked cities with their peri-urban and rural hinterland, spatially as well as functionally (Communitas, 2016). Given the large scale of urbanisation and the transformation of rural space, it is argued that sustainable urbanisation must promote integrated territorial development and balanced urban-rural linkages as part of a common system for the benefit of the urban and rural population alike (see also IFAD, 2015). Territorial approaches to food systems facilitate the inclusion of these important dimensions to assist in the identification of practical solutions to operationalise rural-urban linkages.

This view is also stated by the the Committee on World Food Security (CFS) draft document (March 2016): *‘Urbanisation and the transformation of agriculture, food systems and rural spaces present challenges and opportunities for inclusive growth, poverty eradication, economic, environmental and social sustainability, and food security and nutrition. As a result there is an increasing focus on rural-urban linkages and (territorial) approaches which can address these issues in a holistic and sustainable manner.’*

Although contexts differ across cities and regions, in all situations, functional linkages and flows among people, goods and services extend beyond traditional administrative boundaries. This calls indeed for new strategies of planning and management of urban, peri-urban and rural areas in an integrated way and for new forms of multi-level (‘vertical’) and horizontal governance.

It is for these reasons that integrated territorial approaches¹ and urban-rural linkages are included in the Agenda 2030 as a sustainable development target and are recognised as a key issue in the New Urban Agenda (Forster et al., 2015). These are relevant for achieving SDGs including: ending poverty and hunger (SDGs 1 and 2), employment (SDG 8), infrastructure (SDG 9), inequality (SDG 10), sustainability (SDGs 12, 13, 14 and 15) and achieving inclusive societies (SDG 16), and specifically important to Target 11a of SDG 11 to *‘[s]upport positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning’* (IFAD, 2015).

Rapid urbanisation, extending into peri-urban and rural areas, is also challenging traditional approaches to food and nutrition security, as well as and traditional thinking on how cities are fed (GFFA, 2016). Urban expansion goes hand in hand with an increase

¹ Integrated territorial approaches to development are characterised by planning and interventions in a particular territory (including more rural and more urban areas within a defined space), at the same time as addressing the development of multiple sectors, implemented by a range of stakeholders and multiple vertical and horizontal levels of government (CFS, 2016).

in the demand for natural resources (land, water), which provide vital food and ecosystem services to cities, as well as with increased challenges in terms of economic efficiency, land use and land rights (CFS, 2016). Large scale conversions of agricultural land to non-agricultural uses have caused, and may also cause in the future, problems in cities and rural areas with regards to drainage systems and flood retention, disruption of the drinking water supply, temperature increases, environmental pollution, and increased vulnerability to disruptions in safe and nutritious food availability and supply, especially in areas affected by climate change (see also UN Habitat n/d).



The Municipality of Uberlândia in Brazil grants authorisation for construction to private developers only within the perimeter of the city's ring road. The urban planning idea is to develop the city so that all vacant lots are filled before authorising either verticalisation of new buildings or the development of rural areas. Many lots, which are used by locals for agriculture until they are sold, remain available very close to the city centre.

@ UN-Habitat/
Alessandro Scotti

Coherence across policies on agriculture, human nutrition and health, rural development, urban planning, social protection, and environmental management is needed to address this issue. City region food systems offer a lens through which this coherence can be focused and through which rural and urban communities in a given city region can be directly linked. Food and food systems are among the ten priority areas considered by UN-Habitat as possible action entry points towards more balanced urban-rural development (UN-Habitat, 2015). Recent literature and experiences from cities around the world show that city region food systems are indeed an effective policy area through which urban-rural linkages can be strengthened (Forster et al., 2015).

A series of case studies, presented later in this report, concretely illustrates the ways in which city region food systems connect different systems and flows across rural and urban areas (see also Communitas, 2016):

-
- 1 Food produced in peri-urban areas and rural hinterlands guarantees supplies for both urban areas and their rural surroundings, while urban areas supply the markets upon which agricultural livelihoods depend;

 - 2 Rural watersheds supply potable water to urban areas and provide irrigation for urban, peri-urban and rural agriculture. Sustainable forms of urban water management can provide financial incentives for the preservation of such (agricultural) watersheds;

 - 3 Food loss and waste can be prevented, reduced, and managed, including through the recovery and redistribution of safe and nutritious food for human consumption along the food supply chain from production to consumption, spanning both rural and urban territory;

 - 4 Organic and agricultural waste resources produced in urban and rural areas can be used to generate energy and fertilisers, which are used in urban and rural areas respectively; and

 - 5 Preservation and sustainable management of agricultural lands in rural and peri-urban areas can help to enhance flood retention or mitigate increasing temperatures, thus reducing the climate change vulnerability of both urban and rural areas.
-

The above also illustrates how city region food systems are connected to many other rural and urban sectors (e.g. food security, economic development, water and waste management, energy, transport, health, climate change, governance and spatial planning, etc.) and can enhance linkages among dimensions of economic, social, and environmental sustainability.

City Region Food Systems as an Entry Point for Strengthening Urban-Rural Linkages

With urban population growth, the opportunities and challenges of ensuring food and nutrition security for all is becoming an increasingly urban concern. With most urban households being net consumers and with rapid changes in dietary patterns, urban food and nutrition security faces pressures including food price hikes, economic crises, and an alarming increase in diet-related health problems, such as obesity and other non-communicable diseases (FAO and WHO, 2016). At the same, and as stated above, rapidly expanding urban areas put pressure on agricultural land use and natural resources that are crucial to sustainable food production and supply in both urban and rural areas. Access to healthy food – meeting nutritional needs and free of harmful chemicals – is critical for those who buy more food from the market than they grow or

sell (most of the poor in both urban and rural areas), and urban-rural linkages are a vital component to ensuring such access (Hussein et al., 2015).

“...[c]urrent food systems are being challenged to provide permanent and reliable access to adequate, safe, local, diversified, fair, healthy and nutrient rich food for all; and [...] the task of feeding cities will face multiple constraints posed by inter alia, unbalanced distribution and access, environmental degradation, resource scarcity and climate change, unsustainable production and consumption patterns, and food loss and waste” (Milan Urban Food Policy Pact, 2015).

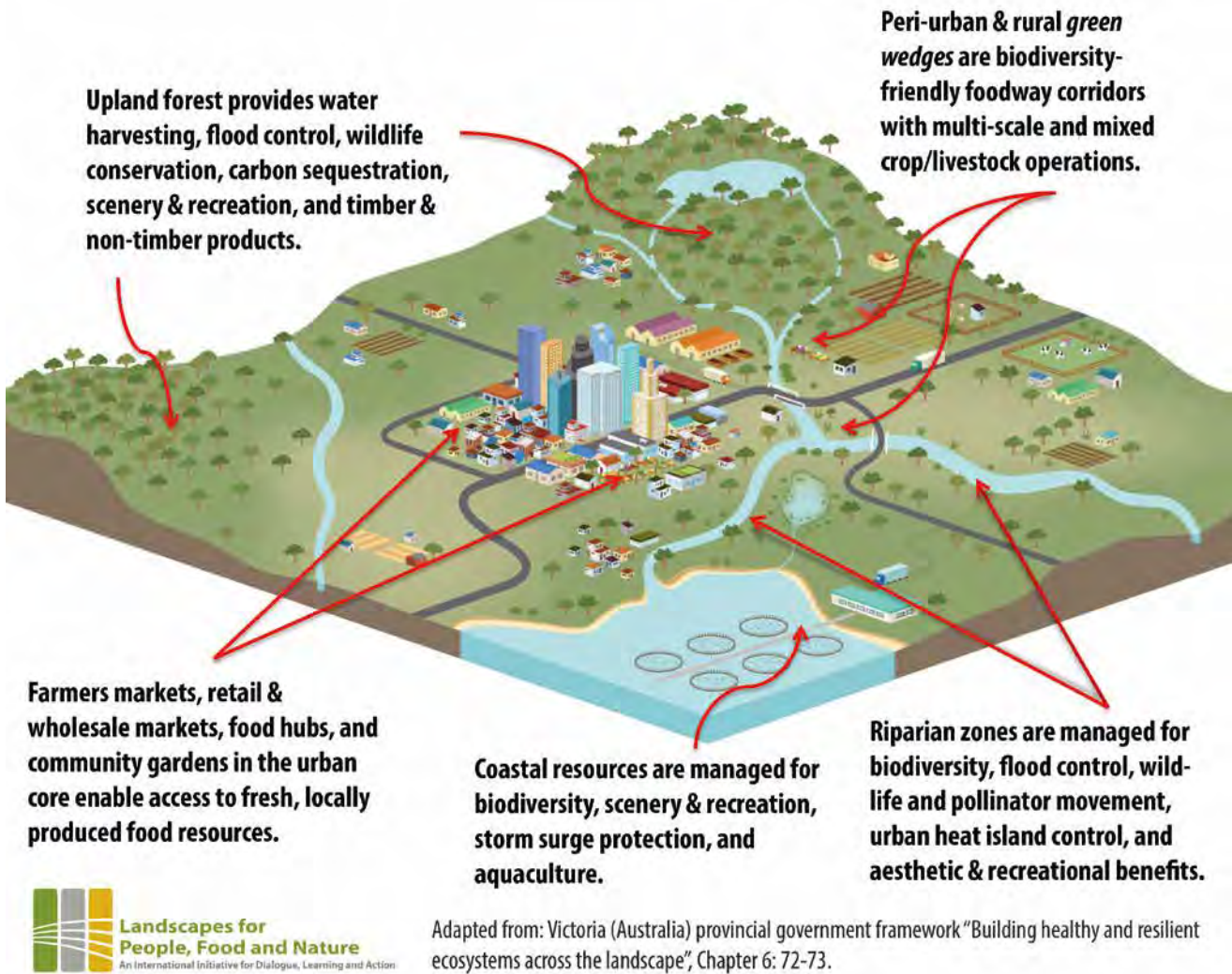
There is increasing recognition that the aforementioned challenges are most adequately addressed at the level of the city region, by reviewing the relationship between cities and their surrounding areas in a more sustainable way and by promoting stronger inter-linkages to rural areas as hubs for food production and as providers of natural resources and ecosystem services.

City region food systems encompass the *‘complex network of actors, processes and relationships to do with food production, processing, marketing, and consumption that exist in a given geographical region that includes a more or less concentrated urban centre and its surrounding peri-urban and rural hinterland.’*² The term city region refers not only to larger cities and the agricultural areas directly surrounding them, but also to small and medium-sized towns that link rural producers to urban markets (Forster et al., 2015; FAO and RUAf, 2015³).

In improved city region food systems, affordable, nutritious, and fairly traded foods from local and regional producers are more easily available to all communities from rich to poor, rural to urban. Access to markets and support for alternative markets (e.g. community-supported agriculture, farmers’ markets, cooperatives, fair trade, etc.) become available to smallholders and other small-scale producers from urban, peri-urban and rural areas, not just large ones. Shorter value chains, and more broadly efficient and functioning agricultural value chains that link hinterland producers to market systems, can contribute to sustainable diets and stabilise livelihoods in the distribution, processing and manufacture of food and fibre products (Hussein et al., 2015). Food loss and waste is prevented, reduced and managed along the food supply chains in the city region, including the recovery and redistribution of safe and nutritious food for human consumption in both urban and rural areas, which directly enhances food security and nutrition. Ecosystem and natural resources management is promoted, as is agro-ecological diversity, and urban ecology and ecosystems are protected. The ecological footprint of the urban food system is minimised from production to consumption, and greenhouse gas emissions in food transport, processing, packaging and waste management are reduced (FAO and RUAf, 2015³).

2 Definition agreed during a meeting of CRFS partners in Rome, December 2013.

3 RUAf and FAO are currently jointly working on further operationalisation of the concept of CRFS in a number of cities at the global level. They are jointly implementing a City Region Food System programme aimed at assessing CRFS as a basis for further planning and informed decision making, as well as for prioritising investments and the design of food policies and strategies which aim at improving the resilience and sustainability of the entire food system. The programme is being implemented in 8 city regions: Lusaka and Kitwe (Zambia), Colombo (Sri Lanka), Medellín (Colombia), Dakar, (Senegal), Quito (Ecuador), Toronto (Canada), and Utrecht (The Netherlands). See also: <http://www.ruaf.org/projects/developing-tools-mapping-and-assessing-sustainable-city-region-food-systems-cityfoodtools> and <http://www.fao.org/in-action/food-for-cities-programme/en/>.



Generalised illustration of a city region food system spanning urban and rural areas.

@ T. Forster and A. G Escudero, 2014. City regions as landscapes for people, food and nature. EcoAgriculture Partners on behalf of the Landscapes for People, Food and Nature Initiative, Washington DC., USA

Cities – as hubs of consumption – increasingly recognise their responsibility in building more sustainable food systems that reduce food waste; providing decent livelihood opportunities for those producing, processing and selling food (be it in rural, peri-urban or urban areas); and promoting environmentally sustainable forms of food production. For many cities, the preservation and promotion of food production near areas of consumption is becoming a higher priority, in addition to the promotion of urban agriculture – with the understanding that cities will always continue to be dependent on hybrid food systems, e.g. sourcing part of their food from distant locations and global food supply chains, as well as from nearby rural, peri-urban and urban production and processing locations. Sole dependence on global food supply and systems, however, increases vulnerabilities and risk.

While private sector, civil society, and national government actors initiate many innovative food system approaches, local and provincial authorities and governance systems are the key to creating an enabling environment to help institutionalise these approaches. There are an increasing number of cities developing (or committed to developing, including the 120 cities that signed the Milan Urban Policy Pact) nutrition-sensitive food system policies that link farmers, consumers, and other food chain actors across rural, peri-urban and urban areas.

Milan Urban Food Policy Pact – currently signed by 120 cities world-wide

On 15 October 2015, 116 cities across the world signed the Milan Urban Food Policy Pact and Framework for Action. The Pact was presented to the UN Secretary General Ban Ki Moon on 16 October – World Food Day.

BY SIGNING THE MILAN URBAN FOOD POLICY PACT, WE, THE MAYORS AND REPRESENTATIVES OF LOCAL GOVERNMENTS, COMMIT TO THE FOLLOWING:

1. We will work to develop sustainable food systems that are inclusive, resilient, safe and diverse, that provide healthy and affordable food to all people in a human rights-based framework, that minimise waste and conserve biodiversity while adapting to and mitigating impacts of climate change;
2. We will encourage interdepartmental and cross-sector coordination at municipal and community levels, working to integrate urban food policy considerations into social, economic and environment policies, programmes and initiatives, such as, inter alia, food supply and distribution, social protection, nutrition, equity, food production, education, food safety and waste reduction;
3. We will seek coherence between municipal food-related policies and programmes and relevant subnational, national, regional and international policies and processes;
4. We will engage all sectors within the food system (including neighbouring authorities, technical and academic organizations, civil society, small scale producers, and the private sector) in the formulation, implementation and assessment of all food-related policies, programmes and initiatives;
5. We will review and amend existing urban policies, plans and regulations in order to encourage the establishment of equitable, resilient and sustainable food systems;
6. We will use the Framework for Action* as a starting point for each city to address the development of their own urban food system and we will share developments with participating cities and our national governments and international agencies when appropriate;
7. We will encourage other cities to join our food policy actions.

* The Pact is accompanied by a voluntary Framework of Action that consists of 37 provisions in six thematic areas, including governance, sustainable diets and nutrition, social and economic equity, food production, food supply and distribution and food waste reduction and recovery.

Source: <http://www.foodpolicymilano.org/en/urban-food-policy-pact-2/>

The Milan Urban Food Policy Pact is significant in the sense that:

- It commits cities to inclusive, resilient and nutrition-sensitive sustainable food system strategies;
- It commits mayors to seeking ways to integrate food policy into existing mandates and departments and to link food policy to other policies and programmes related to food supply and distribution, food production; food chain development; food waste prevention, reduction and management; nutrition; education; and social protection;
- It commits mayors to integrating all food system actors (including from urban and rural territorial areas) in the formulation, implementation and monitoring of food policies and to coordinating with national and international levels (Forster et al., 2015).

Urban policy-makers, planners and programme managers, along with their rural counterparts, are at the forefront of meeting the challenges of a stable, safe, affordable and nutritious food supply for their populations (Forster et al., 2015). For instance, New York City’s food strategy – entitled ‘FoodWorks: a vision to improve NYC’s food system’ – is a good example of a City Council’s understanding of these responsibilities and relations: *‘Although many of these problems are national and global in nature, there are immediate steps that can be taken within New York City to strengthen our food system. The city can facilitate urban-rural linkages, support a market for regional products, and use its institutional purchasing power to support small and local producers. Moreover, by helping green the city’s landscape, assisting companies with adopting new technologies, and exploring better distribution networks, we can begin to address the high energy usage and greenhouse gas emissions characteristic of our food system’* (RUAF Foundation, 2015).

Vegetable prices in Kathmandu, Nepal increase as supply from rural areas drops.

@ República, 2012



A large percentage of agricultural production⁴ can be found in peri-urban and rural areas within reach of cities, with a recent study indicating that approximately 60% of all irrigated cropland and 35% of all rain-fed cropland is within 20 kilometres of city boundaries (Thebo et al., 2015). Indeed, and as illustrated by the case of Toronto, Canada (page 102), some of the best agricultural lands are found in areas around cities, where food production is in competition with building or other land uses. Cities are beginning to realise the importance of preserving and protecting these agricultural areas, and are starting to influence planning policy to protect or enable the use of peri-urban and rural areas for localised food production (see examples in Rosario, Argentina; Quito, Ecuador; Belo Horizonte, Brazil; Kesbewa, Sri Lanka; Monrovia, Liberia and Toronto, Canada, page 32 and beyond). In many cases, this is coupled with efforts both to enhance the access of (vulnerable) urban consumers to sufficient, healthy, and safe food as well as to improve the livelihoods of peri-urban and rural small-scale and family farmers. The urban poor are the most affected by disruptions in the food supply and increasing food prices. The rural poor may lack (secure) access to land and markets. Both groups are often also the most vulnerable to climate change and natural disasters.

⁴ This includes also non-food production such as fodder grass or cotton and includes production for both the domestic as well as for the export market.

Whilst more the localised production and sale of food may be a core interest, the wider societal, economic and environmental functions of city region food systems are often considered equally important. Food systems are still often the largest employment sector in a city and its region, encompassing not only food producers, but also food processors and manufacturers, transport, retail and catering, and service and restaurant workers. Research in East Africa indicates that as many as 80% of all jobs are affiliated with food systems, including 90% of all rural jobs and even as many as 60% of all urban jobs (CFS, 2016). The production of fresh foods – such as vegetables, fruits and certain animal products (eggs, milk) which are important for healthy diets and nutrition – is (and traditionally has been) particularly suitable in areas located close to consumers (also minimising the need for refrigerated transport and storage).

Production areas located close to cities also offer particular opportunities for food businesses: first the proximity to larger markets and clusters of potential consumers; second, the enhanced opportunity for collaboration among businesses on production, marketing and distribution; and third, the opportunity to interact closely with consumers, both in meeting an increasing demand for more transparent and ethical food systems and in providing related community, education, or environmental services (Making local food work, 2012) .

City region food systems also offer unique opportunities to enhance resource recycling and efficiency by connecting different urban flows through the management and reuse of food waste, urban organic waste and wastewater, energy, and nutrients. Several of the case studies included in this report illustrate practices and policies that cities are putting in place to address these issues. City region food systems furthermore help create and enhance spatial synergies by achieving multiple benefits from and uses of land and by using food as a medium to link different urban policy objectives. Examples include the promotion of synergies for food production, flood risk reduction, storm water management and climate-change mitigation – as illustrated by the case studies on Rosario (page 72) and Kesbewa (page 92); watershed management (see case study on Quito, page 46); or the promotion of multifunctional agriculture for education, food production, and leisure as supported by other cities (see also RUAF Foundation, 2015).

Innovations in city region food systems, involving urban and rural actors, are being developed in a variety of cities, including:

Belo Horizonte, Brazil

Since 1993, Belo Horizonte has designed and implemented a comprehensive set of food system interventions, following the city's vision that it is the duty of governments to guarantee the Right to Food and access to healthy food for all its citizens.

The government of Belo Horizonte has recognised that small family farms in the city region are an important component of a healthy, sustainable urban food system, and hence an important contributor to the welfare of urban residents in the long term. Belo Horizonte has institutionalised policies aimed at integrating the needs of rural poor producer households engaged in smallholder and family agriculture, by establishing stable markets to guarantee them a steady income in providing healthy and affordable food to poor urban consumer households. It does so by promoting direct links between rural producers and urban consumers; through institutional food purchases/direct procurement of supplies from rural producers in neighbouring municipalities; and through food security and nutrition education, increasing the demand for healthy, fresh, and safe

local food. Policies and interventions are implemented in coordination with the local, provincial, and national government.

Popular restaurant in Belo Horizonte, providing subsidised healthy meals with ingredients procured from local family farmers.

@ Prefeitura de Belo Horizonte/
Norma Duarte



Metropolitan District of Quito, Ecuador

In 2002, the Metropolitan District of Quito launched the AGRUPAR – Participatory Urban Agriculture – programme. The Quito AGRUPAR programme actively promotes local organic/ agro-ecological agricultural production in the metropolitan area for home consumption (food security and nutrition) and for sale (income generation). Commercialisation of production from urban and rural AGRUPAR farmers farming in the District mainly takes place through bio fairs. In addition, new markets have been established that offer rural organic / agro-ecological producer groups from areas surrounding the District (from the Pichincha Province) the opportunity to sell their produce to Quito’s population.

Quito has also set up a Water Protection Fund (Fondo para la Protección del Agua– FONAG) as a sustainable finance mechanism that allows for improved management and long-term protection of its surrounding watersheds. The water fund is an example of a public-private partnership that works towards the conservation of natural resources and the improvement of rural farming areas and livelihoods – all with the objective of keeping Quito’s water supply safe and clean, while benefiting both the city and surrounding rural communities. In addition to contributions from private actors, such as a beer and water bottling company, a share of 2% of all drinking water sales are contributed by Quito’s water company to the assets of FONAG. FONAG supports programmes in the fields of control and monitoring of protected areas, restoration of natural vegetation, environmental education, and outreach and agricultural projects with local communities.

By working across urban and rural parishes in the Metropolitan District (AGRUPAR), as well as linking to areas outside the District (AGRUPAR and FONAG), both programmes contribute simultaneously to more integrated and sustainable territorial development of the city region, strengthened food and nutrition security, and employment and income generation.

Rosario, Argentina

The city of Rosario in Argentina traditionally received a large part of its fruit and vegetable supply from its peri-urban horticulture greenbelt and the wider region. Local and regional agricultural production has, however, greatly diminished over the past years due to urban expansion and the conversion of agricultural land to soybean production for export. Soybean producers, as well as the remaining horticulture farmers, currently apply high levels of chemicals to their crops, with corresponding risks for environmental contamination and human safety and health. Overall, the city has seen a reduction in its local production capacity to feed its population, becoming more dependent on longer-distance food imports, while local horticulture farmers have lost their livelihoods. Concerns about food safety for human health have also increased.

Starting in 2014, the local Rosario and Provincial Santa Fe government decided to implement a strategy towards urban sustainability as well as a Climate Action Plan that builds on the protection and promotion of sustainable horticulture in the city region's peri-urban and rural agricultural areas and the direct marketing of quality produce to nearby urban markets, the latter enhancing the urban population's access to healthy foods. By promoting Good Agricultural Practices and conversion to ecological agriculture, sustainable management of natural resources is promoted and environmental contamination – and related health risks – reduced. By enhancing localised production, farmers' livelihoods are preserved and improved and the need for longer-haul (refrigerated) food transport and storage is reduced, as are related greenhouse gas (GHG) emissions.

Greater Monrovia District, Liberia

The Greater Monrovia District is confronted with the need for more regulated urban and territorial planning as well as more sustainable food systems planning. The integration of agricultural areas in land use planning and management in the District is currently being promoted by both the District and the cities and townships it includes, as well as by the national government. Other activities include: food safety analysis and training and policy coordination at the District and national level. This latter is done through a multi-stakeholder consultation and planning process engaging different local and national governments as well as other actors.

Kesbewa, Sri Lanka

Colombo city region (Sri Lanka) ranked amongst the world's fastest growing cities in 2015. Cultivable land – often located in low-lying areas – in the region, still relatively abundant around smaller cities like Kesbewa, is being abandoned or converted to residential and commercial uses, significantly altering natural water flows and drainage. This, coupled with an increase in average rainfall as well as heavy rainfall events, has resulted in recurrent flooding in the Colombo region, and related damages to infrastructure, the utility supply, and the urban economy.

The Western Province Ministry of Agriculture recognises that the conservation and development of peri-urban and rural agricultural lands contributes to sustaining urban settlements and is crucial for climate-proofing cities and increasing their resilience in terms of food supply. With the support of international organisations, from 2012-2014 a pilot project was developed in one of the fast-growing smaller cities in the region, Kesbewa Urban Council, located at 20km from Colombo. The tested management and production model offers farmers new economically profitable livelihood options, incen-

tivating them to rehabilitate their agricultural areas and to resist sale to the building industry. Results also showed that well-maintained and drained paddy areas function as buffer zones, where water is stored and drainage regulated, thus reducing the flood risk in nearby areas. Through this programme, Kesbewa Urban Council and the Western Province have linked food to other policy goals, such as climate change and disaster risk reduction, and urban and economic development.

Toronto, Canada

Toronto has a long history of coordinating different food policies and programmes, as it recognises that food can play a powerful role in promoting adequate nutrition and health, as well as building strong, viable and diverse local farm and urban communities, protecting the environment, and strengthening the economy. These include programmes and policies oriented at improving access to healthy food; urban, local and regional agriculture production; food markets; nutrition education and food skills; food business promotion; food asset mapping; and localised consumption. As Toronto realised that its food security was also dependent on preserving rural farmland in its surrounding areas, since 2012, the Toronto Food Policy Council has expanded its area of intervention to include the Greater Golden Horseshoe area surrounding the city, an area of rapid population growth and diminishing agricultural lands.

Food policy work in Toronto and the region makes food a visible part of the urban and regional system, demonstrating that food is a critical part of its infrastructure, requiring planning and coordination, as well as targeted interventions, to improve sustainability, access and equity.

In all of the above cases, which are further described on pages 32 and beyond, local and city region governments have shown how they can support the interests of the urban population, while at the same time enhancing the livelihoods of the rural population and the sustainability of rural production and resource protection.

Toronto promotes farmers' markets to better link rural and urban areas.

@ RUA Foundation/Henk Renting

More information at <http://www.dufferingrovetmarket.ca>



Food Loss and Waste Prevention, Reduction, and Management

Food loss and waste prevention, reduction and management are key components of sustainable city region food systems. Food waste is an issue of concern not only for industrialised countries but also for developing countries and countries in transition as a result of such trends as rapid urbanisation and population growth. Globally it has been estimated (FAO, 2011) that 1/3 of all food produced for human consumption is lost or wasted in supply chains at the local, national, regional and global level. Consumer level waste accounts for 22% and distribution waste accounts for 12% of these losses, making such waste of particular relevance to peri-urban and urban areas. Food loss and waste (FLW) amount to around 40% of post-harvest and processing levels in developing countries, while in industrialised countries more than 40% occurs at retail and consumer levels. FLW is a symptom of an unsustainable food system that is undermined in its capacity to provide food and nutrition security for all.

Food security and nutrition is achieved if adequate food (in terms of safety, quality, quantity and socio-cultural acceptability) is available and accessible for and effectively utilised by all individuals at all times for a healthy and active life. FLW directly impacts the availability and accessibility of safe and nutritious food for human consumption. The better management and distribution of food resources globally, regionally, nationally, and locally could be beneficial to society's least privileged (FAO, 2011; FAO, 2014; FAO/LEI 2015).

FLW is generated by various drivers that are context or stakeholder dependent – in developing, transition, and industrialised countries. Low-income countries face challenges in adequate infrastructure, gaps in technical capacity for proper storage and food handling, and access to energy and markets. Context-specific and evidence-based policies are needed in order to ensure adequate contractual practices that do not cause food loss or waste in national or international markets. Moreover, aesthetic criteria for fruit and vegetable preferences should be analysed in order to assess what measures are necessary to minimise the risk that safe and nutritious food becomes waste.

Policy makers should consider context-specific needs for adequate guidelines on the dates of minimum durability related to food quality – e.g. 'best before date', as well as food safety-related 'use by date' – in order to facilitate prevention and reduction of food loss and waste. Food safety and quality must never be compromised while implementing interventions at the level of the food supply chain or establishing priorities at the policy level, including education programmes for developing the capacity and knowledge of end consumers.

The impacts of FLW are multiple and have social, economic, and environmental dimensions. The FAO estimated in a 2015 study that current global FLW aggregates to USD 1 trillion in economic costs, around USD 700 billion in environmental costs and around USD 900 billion in social costs. For the environmental estimations, in particular, there is the need to consider that products hold different carbon intensities. For example, vegetable production in Europe is more carbon-intensive than vegetable production in Industrialised and Southeast Asia, as Europe uses more carbon-intensive means of production, such as artificially heated greenhouses. Inversely, cereal production in Asia is more carbon-intensive than cereal production in Europe due to the difference in the type of cereal grown: rice on average has higher impact factors than wheat (FAO, 2015).

At the global level, FLW has been prioritised through several processes:

The Second International Conference on Nutrition (ICN2), a high-level inclusive inter-governmental meeting on nutrition held at FAO Headquarters, in Rome, 19-21 November 2014⁵, committed world leaders to establishing national policies aimed at eradicating malnutrition and transforming food systems to make nutritious diets available to all (FAO and WHO, 2016). The main outcomes of the conference were the Rome Declaration on Nutrition and the Framework for Action:

- The ICN2 Rome Declaration on Nutrition acknowledged that *‘food loss and waste throughout the food supply chain should be reduced in order to contribute to food security, nutrition, and sustainable development.’*
- The ICN2 Framework for Action includes Recommendation 11: *‘Improve storage, preservation, transport and distribution technologies and infrastructure to reduce seasonal food insecurity, food and nutrient loss and waste.’*

In 2014 the Committee on World Food Security called on all stakeholders – States, including other relevant levels of governance, international organisations, the private sector, and civil society – to recognise food security and nutrition as central objectives of sustainable food systems and to individually and collectively address FLW to improve their sustainability, food security, and nutrition potential.

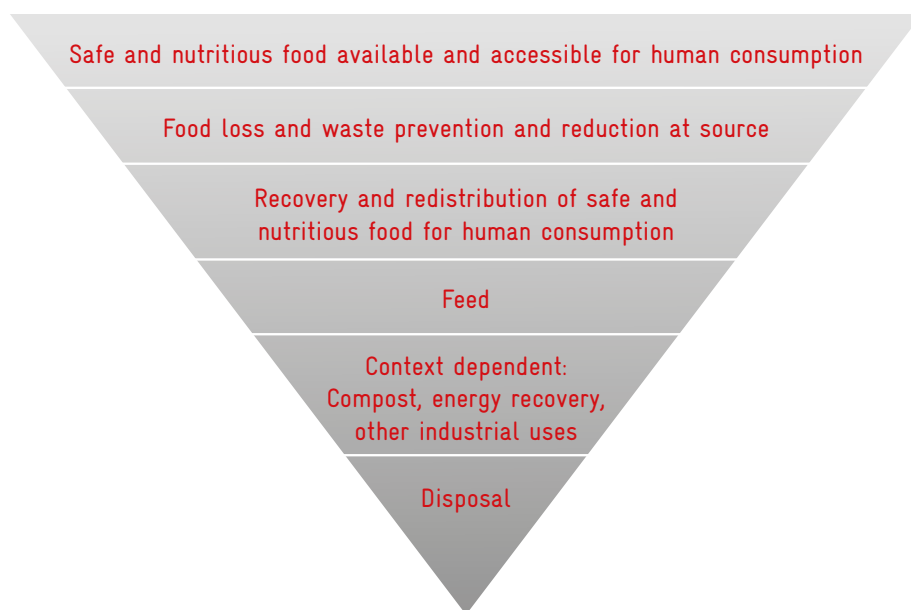
Underlying causes of and solutions to FLW can be defined at various levels (i.e. ‘micro’, ‘meso’ and ‘macro’) that facilitate the identification of potential roles of various stakeholders. CFS recommended the ‘food use-not-loss-or-waste’ hierarchy in order to support nutrition-sensitive food systems. The approach is especially endorsed for monitoring and measurement targets and should enable informed actions to prevent and reduce FLW (CFS, 2014).

Food-use-not-loss-or-waste hierarchy, adapted from CFS 41 by Bucatariu, C., 2015

most preferred



least preferred



⁵ The meeting was jointly organised by the FAO and the World Health Organisation (WHO), in cooperation with the High Level Task Force on the Global Food Security Crisis (HLTF), IFAD, IFPRI, UNESCO, UNICEF, World Bank, WFP and the WTO. ICN2 had over 2200 participants, including representatives from more than 170 governments, 150 representatives from civil society, and nearly 100 from the business community.

The importance of FLW prevention and reduction is also recognised by the SDGs, with SDG 12 *'Ensure sustainable consumption and production patterns'* having the Target 12.3 *'By 2030, halve the per capita global food waste at the retail and consumer level, and reduce FLW along production and supply chains including post-harvest losses'*.

The policy and regulatory development on FLW prevention, reduction, and management should start from defining the terminology of reference. In the case of FLW, the terminology and definitions are not yet harmonised at the local, national, and global levels. The FAO therefore published a voluntary definitional framework of food loss in 2014 after a consultation process with various relevant contributors that provides the following definitions:

Food loss is defined as 'the decrease in quantity or quality of food' and are the agricultural or fisheries products intended for human consumption that are ultimately not eaten by people or that have incurred a reduction in quality reflected in their nutritional value, economic value or food safety. An important part of food loss is '**food waste**', which refers to the discarding or alternative (non-food) use of food that was fit for human consumption – by choice or after the food has been left to spoil or expire as a result of negligence (FAO, 2014).

Recovery and redistribution of safe and nutritious food for human consumption has been highlighted as an important strategy for the prevention of food waste:

Recovery of safe and nutritious food for human consumption is to receive, with or without payment, food (processed, semi-processed or raw) which would otherwise be discarded or wasted from the agricultural, livestock, forestry and fisheries supply chains of the food system. **Redistribution** of safe and nutritious food for human consumption is to store or process and then distribute the received food pursuant to appropriate safety, quality and regulatory frameworks directly or through intermediaries, and with or without payment, to those having access to it for food intake (FAO, 2015).

Strategies for food loss and waste prevention, reduction, recovery, and redistribution are being implemented by cities and city regions around the world. This report highlights six case studies from European, Asian and American contexts, specifically: 1) Île-de-France Region, France, 2) Medellín, Colombia, 3) York Region, Ontario, Canada, 4) Curitiba, Brazil, 5) Linköping, Sweden and 6) Balangoda, Sri Lanka (see also pages 122–181 in this report).

Île-de-France, France

Île-de-France region (the region around Paris in France) concentrates the country's largest social inequalities and highest food waste rate. In response to these challenges, social supermarkets emerged in France in the 1990s. Social supermarkets are non-profit organisations that sell food and consumer products at lower prices than conventional supermarkets and that restrict access to people living below a certain income threshold.

The French Social Supermarket Network (ANDES) provides its consumers fresh fruits and vegetables through two programmes: (i) Potager de Marianne, which supplies social supermarkets with fresh fruits and vegetables likely to be discarded by local wholesalers, distributors platforms and food industries; and (ii) UNITERRES Programme, which

provides access to fresh products for the urban most vulnerable, while establishing direct partnerships and supporting local vulnerable farmers. Both programmes contribute to food and nutrition security and strengthen rural-urban linkages by facilitating food flows within the territory, promoting collaboration among various stakeholders involved at different levels and reducing food waste.

Medellín, Colombia

Redistribution of safe and nutritious food for human consumption through food banks.

@ Fundación SACIAR, 2016



The Community of Latin American and Caribbean States (CELAC) Plan for Food Security, Nutrition and Hunger Eradication includes the creation of the Regional Alliance for Reducing Food Waste and Losses. The Colombian Department for Social Prosperity of the Presidency of the Republic has recognised the importance of formulating national public policy guidelines to address prevention and reduction of food loss and food waste.

SACIAR Foundation is the first food bank in Medellín. It is involved in two main interventions targeting the urban poor and food-insecure residents:

- (i) The REAGRO programme, which is focused on the recovery and redistribution of safe and nutritious food for human consumption through food banks.
- (ii) The NUTRIAMOR® programme, which is focused on value addition for safe and nutritious food resources identified in the banana export supply chain. Resources are processed into powder and used as a supplement for young children, pregnant and breastfeeding women, and the elderly, in conditions of nutrition vulnerability.

For both programmes, SACIAR collects food from the food industry, farmers, supermarkets, and wholesale markets with the support of volunteers and a number of permanent employees. It does so through direct donations of food items or through the purchase of food using monetary donations. In addition to accepting food donations, the programme collects safe and nutritious food that is at risk of becoming waste or being discarded from rural agricultural producers and agro-industry

sectors (such as the banana chain) located in the Antioquia province that is home to Medellín. This action benefits urban (and rural) vulnerable dwellers in the Medellín Metropolitan Area and enhances their food security and nutrition. The two programmes mitigate the negative environmental impact that would occur if these foods were discarded or wasted.

York Region, Canada

The Ontario Food Collaborative (OFC) in Canada is a cross-municipal collaboration to establish a multi-stakeholder strategy for reducing food waste. York Region initiated this participatory and multi-stakeholder mechanism with the aim of reducing food waste in the Region, resulting in the approval of a strategic plan of action in 2016. Key to the plan is the implementation of a public education campaign on food waste prevention and healthy eating. The OFC brings together stakeholders to take a holistic food systems approach in supporting individuals and families to reduce food waste. The OFC actors include government (all levels), Non-Government Organisations (NGOs), food producers (farmers), food processors and manufacturers, distributors and retailers, and restaurants/food services. The OFC also fits into the York Region Food Charter framework, which promotes a system, from farm to plate, that provides access to local, affordable, and nutritious food for all. Based on five interconnected pillars, the York Region Food Charter is a guiding document for the development of coordinated food-related policies and programmes. It is important to emphasise the need to integrate food loss and waste concerns and solutions, as appropriate, into agricultural, food and other relevant policies and development programmes.

As part of their Waste Management Master Plan, the York Region has targeted a 15% reduction in avoidable food waste by 2031. OCF acknowledges the fact that this requires collaboration between government departments and other stakeholders engaged in different fields.

Curitiba, Brazil

The City of Curitiba, Brazil is implementing an innovative programme to collect solid waste directly from its citizens, enhance food and nutrition security, and improve economic and environmental development of the city region. In the Cambio Verde or Green Exchange programme, citizens can trade recyclable materials for fresh produce originating from family farms from the peri-urban and rural metropolitan areas or can buy such produce at 30% cheaper prices than in stores. Families spend less on food purchases while improving their diets and eating habits.

The programme and its partners ensure that solid and oil waste does not end up polluting the city, local farmers' livelihoods are supported, and social cohesion, including job creation, is strengthened. Families assisted by social programmes are also supported. Schools are involved in education and awareness-raising campaigns. Local family agriculture is supported and small farmers benefit from more stable demand for their agricultural products. This programme represents for producers a constant and guaranteed volume of sale that enhances producers' income and livelihoods.

The city's Environmental and Food Supply Municipal Secretariats see this programme as an efficient way of connecting different stakeholders involved in urban management and planning issues (waste disposal) with economic and social opportunities created by the food system, notably the local agricultural system.

Linköping, Sweden

Linköping Biogas AB was formed in 1995 as a result of co-operation between the City of Linköping, the local abattoir (Swedish Meats AB) and the farmers' association (Lantbrukets Ekonomi AB). It built a Linköping Waste-to-Energy (WTE) plant that uses organic waste from agriculture and slaughterhouses for the production of biogas for fuelling the city's public transport system.

Organic waste – i.e. manure from animal farms located in rural areas surrounding the city – is, together with urban wastes, such as abattoir waste and food waste from canteens and restaurants, incinerated for the production of biogas and bio-fertiliser. Aggregation of rural and urban waste production is needed to ensure sufficient waste volumes and efficiency of the biogas plant. Products are used in rural areas (bio-fertiliser) and urban areas (biogas), thus connecting rural and urban areas, enhancing agricultural sustainability and improving the environment for Linköping's citizens.

The WTE project contributes to coordinating efforts at the city region level by combining waste management activities, sustainable agriculture development, and decrease of CO₂ emissions. WTE also contributes to Sweden's national strategy of overall reduction of food waste. Prevention and reduction of food waste is included in the Swedish Waste Prevention Programme (food waste along food supply chains shall be reduced compared to 2010), the Swedish environmental policy and the Swedish Waste Management Plan (2012-2017).

Balangoda, Sri Lanka

As in other cities of Sri Lanka, solid waste management is a key problem for Balangoda Urban Council. Waste accumulations in the city caused many problems, including unpleasant odour, contamination of water bodies, and contamination of paddy fields, giving rise to epidemic diseases such as Salmonella, typhoid fever, and diarrhoea. A Balangoda compost plant was set up to process municipal solid waste into compost. The project started in 1999 as a city service to provide a solution to the solid waste problem, but converted into a business in later years. Integrated waste management in Balangoda now consists of a Municipal Solid Waste compost plant, septage treatment plant, plastic pelletiser, and an open dumping ground.

In addition, as there is increasing awareness of environmental and health risks related to the use of agro-chemical fertilisers, demand for alternative organic fertilisers is increasing. As per the majority of the compost plants in the country, the Balangoda plants are located in semi-urban or rural areas, facilitating waste re-use in agriculture, with farming areas closely located to the compost plants. The formulation and implementation of well-designed business models that generate value and allow cost-recovery, profit, and recycling could result in an important up-scaling of more efficient waste collection, separation and re-use efforts. The combination of models ranging from cost recovery for sanitation services (i.e. general cost savings for public administration) to revenue generation/profit maximisation seems to be the most sustainable. The Balangoda system operationalises rural-urban linkages through the collection of urban-food-related and other organic streams of waste and their recycling, sale and re-use as compost to rural (and peri-urban) producers.

Tools and Instruments for Sustainable City Region Food Systems to Mutually Benefit Urban and Rural Areas

All 13 cases documented describe a variety of tools and instruments available to city regions to strengthen city region food systems. Their application promotes inclusive cities with mutually beneficial linkages with rural areas, enhancing food security and nutrition and sustainable development in both rural and urban areas. They can be adapted to contexts in different cities, and are – to a certain extent – already being applied by other cities. The tools and instruments identified include (see also and for more examples Jennings et al., 2015):

Supporting small scale producers, distributors, and traders

- **Provision of technical and financial support** to urban, peri-urban and rural producers to provide healthy (often organic or agro-ecological) and safe food to consumers (Belo Horizonte, Rosario, Monrovia, Toronto, Île-de-France and Quito);
- **Food safety/quality control and labelling** (Belo Horizonte, Quito, Rosario, Monrovia);
- Promotion of **local food procurement** (Belo Horizonte, Curitiba, Toronto, Île-de-France);
- Provision of investment in and facilitation of producers' (whether rural, peri-urban or urban) **access to different types of food markets**, including those for local traders, supermarkets, hotels and restaurants, and farmers' markets (Toronto, Belo Horizonte, Quito, Île-de-France);
- Provision of **technical assistance** and food price and quality control to food producers, distributors and traders (Quito, Rosario, Belo Horizonte, Curitiba);
- Linkage of **social protection (food security and nutrition) programmes** through implementation of the above-mentioned strategies to support livelihood resilience for small-scale and family farmers within reach of urban markets; and
- Inclusion of organic or agro-ecological **production practices** in local, provincial and national agricultural policies and programmes (Quito, Rosario).

Enhancing resource efficiency and resilience

- Preservation and protection of agricultural land through zoning and integration in **land use and urban development planning**, combining regulatory instruments and financial support mechanisms (Rosario, Kesbawa, Monrovia, Toronto);

- Integration of food strategies and support for local agricultural production in city and provincial programmes for the **reduction of climate change and disaster risks** (Quito, Kesbewa, Rosario);
- Use of **urban water tariffs**/income for investment in peri-urban and rural watersheds to protect urban water quality and supply and enhance rural livelihoods (Quito);
- Provision of financial support for ‘circular economies’ including nutrient and energy recapture from urban and agricultural (food) wastes for urban energy use and agricultural production, such as through the establishment of **waste recycling plants** (Balangoda, Linköping); and
- Provision of **financial incentives for waste recycling** through the exchange of waste materials for safe and nutritious food items (Curitiba).

Protection and preservation of lower-lying areas from urbanisation is an important component of flood risk reduction strategies in Antananarivo, Madagascar.

@ RUA Foundation/Marielle Dubbeling



Supporting poor consumers:

- Setting of **price limits** through subsidies and regulations on basic food items to help guarantee poor consumers access to healthy and nutritious foods (Belo Horizonte);
- Providing **education, training, information** and awareness raising on sustainable diets and nutrition and food waste prevention, reduction, and management (Belo Horizonte, Curitiba, Quito, Toronto, York);
- **Recovering and redistributing safe and nutritious food for human consumption** (Medellín, Île-de-France)

Establishing adequate governance (policies, planning/steering instruments, financing) structures

- Establishing **mechanisms and platforms for multi-stakeholder, horizontal and vertical integration of actors and levels of government** (Belo Horizonte, Rosario, Toronto, York, Quito, Monrovia);
- In all of the above, **prioritising the inclusion of the urban and rural poor and vulnerable groups** (all cases).



Multi-stakeholder meeting in Monrovia, Liberia towards joint development of a Strategic Agenda on Food.

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Lessons Learned for the Development of Sustainable City Region Food Systems

Institutionalise city region food systems policies and programmes

Cases documented in this report show that city region food systems offer a very concrete entry point for addressing challenges and opportunities related to more sustainable and balanced urban and rural development. To effectively use these opportunities, **local, city regional, subnational, and national governments need to develop and institutionalise city region food system policies and programmes.**

This requires:

- (i) **Political will that guarantees city region food system policies and programmes an institutional home, assignation of financial resources in the form of a fixed budget, and a specialised technical team that can provide on-going support** (see the cases from Belo Horizonte, Quito, and Toronto). The Belo Horizonte experience shows that clear and strong institutionalisation of the programme, in the local (and national) government structure, reduces the risks of changes in city administration and shifts in allocation of budgets and is key to mainstreaming food in municipal policies. Securing food programmes through (local and national) legislation also makes the programmes more resilient to government changes.
- (ii) **Food system policies and programmes that are linked to and embedded in larger city (region) development objectives, staff and resources from other**

government departments and programmes on food security and nutrition, public health, planning, waste management, local economic development, climate change, and environmental management, amongst others. The Kesbewa case, for example shows that integration of support for improved forms of agricultural production and land use management in local and provincial climate change strategies is one means of ensuring continued policy support and funding for such practices.

- (iii) **Information on social, economic, and environmental food system impact indicators – for both urban and rural areas – that is collected and made available to the public domain, including the authorities and decision-makers involved.** Where impact data are available, these data principally refer to urban households and food security, while data for rural household livelihoods, preservation of rural agricultural areas, improvement of ecosystem conditions and services, and effects on sales of rural land are still often lacking.
- (iv) **Inclusive and multi-stakeholder governance arrangements** and the establishment of effective structures in which cities, regions, and other levels of government can work constructively together to reinforce food systems and through which citizens can play a stronger role in policy development processes.

The latter also calls for international (donor) support (in addition to city and national efforts) to provide technical and financial assistance, and funding of research projects, for impact data collection on food system policies and programmes at the city region level across urban and rural areas.

Provide national and legal frameworks embedding city region food systems in broader legislation

Local and (sub)national governments and governance systems will also need to:

- (i) **Include the ‘Right to Food’ in (sub)national legislation and acknowledge the need to guarantee urban food and nutrition security (in addition to rural food and nutrition security);**⁷
- (ii) **Regulate urban expansion on agricultural land, by preserving and protecting agricultural land from (un-planned) urban expansion and regulate natural resources in order to safeguard food and ecosystem services;** and
- (iii) **Design policies, regulations and strategies that promote the prevention, reduction, and management of food waste and facilitate the recovery and redistribution of safe and nutritious food for human consumption.** Prevention and reduction of food waste can be supported through integrally targeted capacity development along food supply chains, education and awareness raising, funding, and legal support.

⁷ In the GFFA Communiqué 2016 ‘How to feed our cities – agriculture and rural areas in an era of urbanisation’, 65 agricultural ministers *‘are concerned that the national and international debate on urbanisation is not paying sufficient attention to food security’* and call for *‘urban food security to be made a priority on the global agenda’*.

Strengthen cooperation and coordination across horizontal and vertical government levels

The city regions documented in this report have acknowledged that the city region food system does not coincide with the municipal level. In several cases (Toronto, Rosario, York, Quito), food policies and programmes have shifted over time from food planning at the neighbourhood-city level to the city region level (or more specifically, the city region level has been added). Implementation of city region nutrition-sensitive food system and food waste prevention, reduction, and management strategies across urban and rural areas needs to integrate various administrative levels and stakeholders to coordinate implementation (see also Communitas, 2016).

This calls for the establishment of institutional mechanisms or platforms to enhance dialogue and coordination, impacts, and efficiency gains at four different levels across:

- (i) **Various departments and programmes internal to city governments and governance systems** ('breaking down institutional silos'). As illustrated by the case studies, key government actors include authorities that are responsible for: agriculture, health, social and economic development, markets, planning, transport, and climate change;
- (ii) **Urban and rural local governance systems** in a given (functional) city region that promote cross-jurisdictional dialogue and collaboration among urban and rural authorities that are not generally used to engaging in joint policy and planning;
- (iii) **Multi- or vertical levels of government** that link local city region food system programmes to the wider (sub)national policy framework on agriculture, food and nutrition security, and urban development. This will enable more efficient and effective resource management and facilitate linkages among various government and donor support programmes (which may now be separated); and
- (iv) **Different types of stakeholders** (including research, civil society, private sector, and governments) ensuring real community participation and mobilising public-private-civil sector support.

Coordination platforms amongst governments and governance actors at the vertical and horizontal level should be identified and supported in areas where they tend to be limited to information sharing and lack joint planning, implementation, and financing. The Metropolitan District of Quito, Greater Monrovia District, York Region, the Rosario Metropolitan Area and the Toronto Greater Golden Horseshoe Alliance are among the cases that have linked urban and rural authorities and created networks to support joint food (waste) policy and planning. However, except for York Region, concrete coordination amongst urban and rural authorities to share ownership and responsibility is still (very) weak or fragmented. In Quito and Monrovia, however, it is considered that this is also due to weak technical, human, and resource capacities in rural governments (parishes or townships) that would require additional capacity building, empowerment, and financial resources.

In addition and in almost all of the cases, the involvement of subnational (provincial, county) governments is vital to addressing food systems, agriculture, food waste, and

land use planning across several jurisdictions (outside municipal boundaries) and to ensuring the aggregation of rural and urban food production needed to offer consumers a diversified and sufficient safe and nutritious supply of produce. They also play a crucial role in making available (additional) human and financial resources needed for programme implementation, for developing provincial level policies and programmes that accompany city-level strategies, and for supporting the scaling out of experiences to other areas.

In this context it is also important to note that almost all the cases documented in this report describe examples of capital and larger cities intervening in their rural areas or in the food value and waste chains. Notwithstanding these successes, however, the largest share of urban expansion worldwide is occurring in small and medium-sized urban areas and secondary cities (CFS, 2016), which also have the best opportunities to still preserve agricultural lands, but which often lack the required financial resources and expertise.

To support them in their efforts, **national governments and international support organisations need to focus specific capacity building and budget support on smaller urban, rural, and sub-national authorities, to enable them to take on more responsibilities in this regard and to increase their institutional and financial capacities, as well as to allow them to participate in cross-jurisdictional and territorial development and planning in an inclusive and meaningful manner.**

Design specific programmes and policies

The case studies provide examples of strategies, tools, and instruments available to local, subnational, and national governments to:

- (i) **Promote urban, peri-urban and rural agricultural production** to improve agricultural livelihoods, ensure a safe and nutritious urban food supply, optimise local production capacity to reduce dependence on distant supply sources, and increase resilience against shocks, by providing training, technical and financial assistance and (market) organisation;
- (ii) **Protect ecosystems through land use planning, specifically protecting agricultural lands from (unplanned) urban growth and watersheds from unsustainable urban expansion**, while securing user rights for farmers and maintaining important services such as local production, urban water quality and supply, and flood retention (or other reduced climate risks);
- (iii) Seek to secure an affordable, safe and nutritious food supply for the most vulnerable urban and rural populations **through food distribution, recovery and redistribution of safe and nutritious food for human consumption, food price regulation, and social protection programmes;**
- (iv) **Support short supply chains by strengthening direct relations between producers and consumers and by providing producers access to different local market outlets**, coupled with investment in processing and distribution infrastructure;
- (v) **Combine production and marketing support for rural producers with consumer education and awareness.** Citizens aware of their food's provenance, quality, and safety will be enabled to shift to more responsible consumption habits that

will increase the demand for healthier food and local products. Awareness of food loss and waste should be raised through targeted events and campaigns, identifying focal points such as educational institutions, community markets, company shops, and other solidarity or circular economy initiatives.

- (vi) **Develop institutional procurement policies**, favouring local procurement;
- (vii) **Promote organic and agro-ecological production practices** among urban, peri-urban and rural farmers, **coupled with safety and quality control and labelling**; and
- (viii) **Develop sustainable food systems that are inclusive of (food) waste prevention, reduction and management – facilitating resource (re)use and recovery.**⁸



Promoting short supply chains in Accra, Ghana.

@ RUF Foundation

⁸ Several countries around the world have initiated processes that target food loss and food waste measurement for prevention, reduction, and sustainable management. Local authorities should explore the potential to be informed and liaise with national stakeholders to deliver the SDG Target 12.3. In December 2015 the Technical Platform on the Measurement and Reduction of Food Loss and Waste (<http://www.fao.org/platform-food-loss-waste>) was launched by FAO Nutrition and Food Systems Division and IFPR. The Global Initiative on Food Loss and Waste Reduction (SAVE FOOD) developed a methodology that identifies food loss hot spots and supports informed decision making on sustainable solutions (<http://www.fao.org/3/a-az568e.pdf>).

Conclusions

Urbanisation trends, increasing vulnerability to food price hikes and climate impacts, changes in consumption patterns and the related increase in diet-related health problems – all call for increasing attention to providing the world’s growing urban population with adequate, safe, balanced, and affordable food. Urban growth is also directly related to increased demand for natural resources (land and water) that provide vital food and ecosystem services. In this context, sustainable urbanisation, food and nutrition security, environmental and natural resource management – including the preservation of ecosystems – rural development and agricultural production, and distribution and marketing have become intrinsically linked.

There is increasing understanding and acknowledgement that a city region approach should be applied, to reposition urban areas as part of a wider functional region. This will help to achieve a better understanding as well as planning of the continuum of space between urban and rural areas. There are clear benefits to integrated planning across urban and rural spheres for the protection of ecosystem services, especially water and watersheds.

Improved urban-rural linkages can also ensure that food production occurs close to and within cities and towns, as well as in rural areas located favourably near inputs and markets, ensuring both improved food and nutrition security for the urban and rural vulnerable population, as well as enhanced livelihoods for all actors involved in the food supply chains.

The case studies and lessons learned documented in this publication illustrate that city region food systems indeed play an important role in addressing food and nutrition security and ecosystem services in urban and linked rural areas and in establishing and developing functional and mutually reinforcing territorial linkages across rural, peri-urban and urban areas.

City region food systems provide concrete strategies and entry-points for linking and addressing both SDG 2 (end hunger, achieve food security and improved nutrition and promote sustainable agriculture) and SDG 11 (make cities and human settlements inclusive, safe, resilient and sustainable) – specifically Target 11a⁹, as well as SDG 12 (ensure sustainable consumption and production patterns) – specifically Targets 12.2, 12.3 and 12.7.¹⁰

As stated by Forster et al. (2015): *‘Until interdependence between SDG 2 and 11 (and SDG 12) is acknowledged as part of the implementation agenda for the SDGs, balanced urban and rural development may not occur as coherently or not at all in places where urban expansion is greatest and this balance is most needed’.*

9 Target 11.a: Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.

10 Target 12.2: By 2030, achieve the sustainable management and efficient use of natural resources; Target 12.3: By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses; Target 12.7: Promote public procurement practices that are sustainable, in accordance with national policies and priorities.

City region food systems are vital to this implementation agenda and specifically the New Urban Agenda in three key ways. First – and as illustrated by the case studies – the benefits of city region food systems are multiple and stretch far beyond the food system to key policy areas of concern to the New Urban Agenda, including local economic development and urban governance, spatial and economic planning, public health, and ecosystem protection. Second, the development of city region food systems can generate positive political support for wider urban-rural linkages through coalition building centred on food. And thirdly, city region food systems merit attention in their own right, given the importance of addressing more sustainable urban food systems and food waste prevention, reduction, and management in a context of increasing urban growth, diet-related and non-communicable diseases, and vulnerability to food price hikes and climate change (Forster, 2016).

The implementation of the New Urban Agenda (NUA) should thus support the development of sustainable city region food systems among the recommended and supported implementation actions for more sustainable development and integrated urban and rural territorial planning and management. In order to do so, the role of local and subnational governments should be enhanced in this area through subsidiarity, institutional capacity building, and support.

In order for local and (sub)national governments and city region nutrition-sensitive food systems to play an effective role in shaping sustainable urban and rural territories, the NUA should encourage planning instruments and governance mechanisms addressing **cross-sectoral integration, as well as improving horizontal and vertical government collaboration, while ensuring direct multi-stakeholder participation and governance** from urban and rural consumers and producers, civil society, research organisations, and the local private sector in the design, implementation, and monitoring of city region food policies and programmes. Facilitating national policies and legal frameworks, as well as supporting structures and development cooperation, are needed to **ensure the inclusion of city region food systems policies and programmes in institutional structures and budgets, in land use planning and protection, in city development plans and regulations and in operationalising the ‘Right to Food’ and ‘Right to the City’**.

City regions have a large variety of strategies, tools, and instruments available to facilitate sustainable development of their city region nutrition-sensitive food systems. These include:

Support for small-scale producers through, amongst others, promotion of (improved agro-ecological practices in) and provision of technical and marketing support to urban, peri-urban and rural producers, short supply chains, and local procurement policies.

Support for vulnerable urban and rural consumers that can be facilitated through food procurement, price regulation, recovery and redistribution of safe and nutritious food for human consumption, social support programmes, education, and life-long learning programmes.

Sustainable resource management and recycling, requiring zoning and preservation of agricultural land areas and watersheds and improved (food) waste management.

The cases documented in this report provide valuable experiences and lessons that may accelerate the development of similar initiatives in other city regions around the world, wishing to apply, to customise, and to up-scale similar practices.

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01_BELO HORIZONTE, BRAZIL

Rural Food Supply for Vulnerable Urban Groups

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Summary

In 1993, the Municipality of Belo Horizonte established a Secretariat for Food Policy and Supply (Secretaria Municipal de Abastecimento–SMAB, later in 2011 renamed the SMASAN–Secretaria Municipal Adjunta de Segurança Alimentar e Nutricional), with the objective of developing an integrated urban policy for food security and coordinating all food policies and programmes towards achieving the city's overall goal: increasing the Right to Food and access to healthy food for all its citizens. It was the city's vision that it is the duty of governments to guarantee this right.

The effect that food policies and programmes developed by the Municipal Government of Belo Horizonte have (had), go beyond city limits, impacting also surrounding areas and other municipalities in the State of Minas Gerais, where Belo Horizonte is located. This occurs through three main channels:

1. Through the promotion of direct links between rural producers and urban consumers ('Straight from the Farm programme' and the 'Country Store Programme' as well as conventional and organic markets);
2. Through institutional food purchase/direct procurement of supply from rural producers in neighbouring municipalities for various SMASAN food programmes; and
3. Through food security and nutrition education.

The government of Belo Horizonte has recognised that small family farms in the city region are an important component of a healthy, sustainable urban food system, and hence an important contributor to the welfare of urban residents in the long term. Throughout the years, the local government has shown how it can support the interests of the urban population, while at the same time enhancing the livelihoods of the rural population and the sustainability of rural production.

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Introduction

The Municipality of Belo Horizonte, capital of Minas Gerais State and Brazil's sixth largest city, is home to about 2.5 million inhabitants. While the city itself is 100% urban, it forms the core of the Belo Horizonte Metropolitan Region, made up of 33 municipalities and comprising urban and rural areas with a total population of more than 5.7 million. This makes the Belo Horizonte Metropolitan Region Brazil's third most populous urban agglomeration after São Paulo and Rio de Janeiro.

Throughout the 1980s, Brazil was hit by high levels of inflation that negatively impacted the economic access of poor families to food. In the early 1990s it was estimated that 38% of the population in the Belo Horizonte region lived below the poverty line. By 1995, close to 20% of the children aged 0 to 3 showed some degree of malnutrition. Studies in the late nineties showed that less than 60% of Brazilians consumed vegetables and less than 45% consumed fruits on a regular basis. This was explained by the fact that fresh fruits and vegetables are mainly sold by large supermarkets. Both higher prices and the lack of physical accessibility to these supermarkets (which generally do not have outlets in low-income areas) contribute to low consumption by lower income groups. This compounded the shift towards more industrialised products in the diets of urban Brazilians.

At the same time, in the 1980s a new National Constitution was elaborated and a Health System set up that recognised the Universal Right to Health. However, the issues of Food Security and the Right to Food were not yet included within this system. This led to wider discussions and popular movements on the issue of food insecurity and malnutrition (such as the Citizens Action Against Hunger, Misery and For Life, founded by the sociologist Herbert da Souza), motivating the Government of Belo Horizonte – under the leadership of the Mayor Patrus Ananias – to form a Municipal Secretary for Food Supply, Secretaria Municipal de Abastecimento–SMAB, in 1993.

SMAB was set up with the objective of unifying the different food policies in the municipality and developing new innovative food programmes that would combat hunger in the city. The government saw it as a government responsibility to ensure food security for its entire population, and specifically for low-income groups. Actions developed at that time included the distribution of food baskets and enriched flour to low-income households and individuals at risk (including pregnant and nursing women, babies and children, and the elderly), the offering of school meals in public schools, the establishment of popular restaurants offering nutritious meals at low prices, and education on food consumption to promote healthy eating habits.

In 2005, SMAB was turned into the Municipal Sub-Secretariat for Food Supply – Secretaria Municipal Adjunta de Abastecimento (SMAAB); and in 2011 it was renamed the Municipal Sub-Secretariat for Food Security and Nutrition – Secretaria Municipal Adjunta de Segurança Alimentar e Nutricional (SMASAN). This was intended to represent a broader vision of food security and nutrition, considering different aspects such as access to food, food quality, and the valorisation of adequate consumption habits in relation to the citizen's quality of life.

Today, SMASAN has a staff of 180, including 30 nutritionists, and a budget of 27.2 million USD per year. SMASAN's budget is less than 2% of the total city budget and 59% of the budget is spent directly on food procurement. Today, SMASAN implements

a comprehensive set of programmes, including free food distributions to low-income groups, school meals in municipal schools, subsidised food sales of basic food items, the regulation of prices in food markets, and support for agricultural production in both surrounding rural areas and within the city itself. These will be further described below.

Description of concrete activities implemented

The overall Municipal Belo Horizonte Food and Nutrition Security Programme

The municipal Belo Horizonte food security programme encompasses a wide variety of complementary lines of action, targeting specific stakeholders and beneficiaries.

The first line of action encompasses policies geared towards assisting poor families and individuals at risk in supplementing their food consumption needs. These are not emergency response programmes, but rather permanent initiatives whose progress and impacts are carefully monitored by the city and civil society groups. They include subsidised food sales, food and nutrition assistance, and education on food consumption.

The second group of actions is directed at the private food trade sector. Through partnerships with private food suppliers, SMASAN has been able to bring food to areas in the city previously neglected by commercial outlets. It also has adopted policies to regulate food prices, to control quality of basic food staples, fruits and vegetables supplied under the programme, and to provide regular public price information on key food items.

A third line of action includes supportive measures to increase food production and supply by providing technical and financial incentives to small producers, creating direct links between producers and consumers, generating jobs and income (including professional qualifications), and promoting urban agriculture (Rocha and Aranha, 2003).

Specific programmes implemented under these action lines include amongst others:

- a. **Popular restaurants.** These offer every citizen a nutritionally balanced meal at an affordable price. The programme is implemented in partnership with the National Ministry for Social Development. In 2015, over 2.4 million meals were served, at an average price discount of 60%. SMASAN nutritionists design the menus to provide 20 different meal choices, typically including rice, meat, beans, vegetables, salad, and fresh fruit (or juice). The majority of customers range from low-income households and homeless people to university students and retirees. Restaurants are located in downtown areas, near the city's inter-municipal bus terminal and a subway station, close to an area with a concentration of hospital and low-income suburbs – one of them concentrating the highest levels of poverty indicators in the city.
- b. **School feeding programme.** In partnership with the National Ministry of Education and the School Feeding Council (including teachers and parents) amongst others, the programme serves over 250 municipal schools and childhood education units throughout the city. The National Ministry of Education transfers funds directly to States and Municipalities responsible for implementation of the programme. By law however, federal funding can only cover the costs of food. Municipal funding thus

has to be leveraged for infrastructure (from cooking to kitchen utensils) and personnel (from school cooks to nutritionists). In 2015, over 360,000 meals were offered in Belo Horizonte each day. Since 2011, at least 30% of the food in meals is bought directly from family farms in nearby rural areas.

- c. **Food Banks.** These distribute food remains from farmers' markets and grocery stores all around the city to charitable organisations and social service agencies. This programme helps reduce food waste and provides additional access to food for vulnerable populations not covered by other food programmes. The food banks also receive donations from the food industry. Most of the food received is fresh produce. In 2013, the food banks received 1260 kg of food per day. Food banks then select, clean and vacuum-freeze perishable foods for distribution. The programme is developed in partnership with, amongst others, the Municipal Department for Urban Sanitation, businesses, and civil society.
- d. **Support for urban agriculture.** This promotes community involvement and the use of agro-ecological, sustainable production methods. The four programmes in operation involve the production of vegetables and herbs in communal spaces (community gardens), school gardens, the planting of fruit trees in communal and school areas, and the teaching of techniques for planting vegetables and herbs in small spaces using bottles, wooden boxes, etc. The programme provides garden materials, training, and assistance. In 2012, 126 school gardens and 48 community gardens were set up and over 1000 people trained.
- e. **The Abastecer (Supply) programme.** This allows licensed local traders to sell fruit and vegetables in designated areas, on the condition that they offer at least 20 basic food items (including fresh fruits and vegetables produced to a large extent by regional farmers, oil, and basic staples) at fixed, reduced prices, generally 20-50% below the market price. Prices of other products are not regulated, allowing operators a small profit. The quality of food sold is checked and technical assistance to commercial operators provided by SMASAN. SMASAN also provides information on product display, safe storage, and handling. In 2015, there were 21 licensed traders, and approximately 4.1 million individuals benefitted from this programme. Abastecer licensees also commit to selling the selected food items at discounted prices from vans in the city's low-income, peripheral areas, often neglected by other commercial outlets, in exchange for being allowed to also operate in more profitable, city-owned locations.
- f. **Food security and nutrition education/job and income creation.** In partnership with the Municipal Secretariats of Health, Education and Social Policies, SMASAN offers workshops on healthy diets (including the consumption of traditional and non-processed foods), safe manipulation and storage of foods, and cooking. SMASAN also develops manuals, folders, and posters for communicating information and lessons, and posts information on the city's website. In partnership with the private sector, SMASAN also offers training for professional qualification in food-related areas, such as baking and pastry-making skills.

One of the shops participating in the Abastecer programme.

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Norma Duarte



Next to these more 'urban' production, marketing, and consumption programmes, the Municipality also promotes **direct links between rural producers and urban consumers** by means of the following strategies that will each be described below:

1. Facilitating direct marketing from rural producers to urban consumers through the Straight from the Farm programme and the Country Store Programme; conventional and organic markets; and
2. Institutional food purchase/direct procurement of supplies from rural producers in neighbouring municipalities for other SMASAN food programmes.

Facilitating direct marketing from rural producers to urban consumers

This strategy involves the implementation of three specific programmes, including the Straight from the farm programme (Direto da Roça), The Country Store programme (Armazém da Roça) and farmers' markets. The strategy is implemented in partnership with EMATER/Minas Gerais, the State technical assistance and rural extension programme.

Under the **Straight from the Farm Programme**, rural producers, selected through a public process, are assigned fixed sales points throughout the city (often in conjunction with the Abastecer programme). Licences are obtained through public bidding, during which farmers submit documents in order to prove their involvement in farming activities. Sales points are selected by SMASAN and are strategically located in different neighbourhoods of Belo Horizonte to increase access by low-income consumers to a variety of fresh leafy vegetables, fruits and other crops. As for all the other programmes, quality is closely regulated by SMASAN. Produce sold is about 30% cheaper than in other outlets. All products are produced using ecologically sustainable technologies.

Relevant to the continuity of the farmers' involvement in the Straight from the Farm programme is the availability of transport (which is a challenge for farmers and vendors not having private transport) and the economic viability of their commercial activities and venues. In the event that the farmer does not succeed in having sufficient sales,

SMASAN will evaluate other potential marketing outlets. For this reason, the number of sales points varies throughout the years. In 2012, there were 30 sales points involving 25 producers. In 2013, there were 33 sales points with 22 producers participating in the programme. In 2014, there were 30 sales points for 20 producers and in 2015, 22 sales points were used by 20 producers.

Even so, the programme is considered to be a successful entrepreneurial project. Farmers sell their products at a fair price, which guarantees them a satisfactory profit and, consequently, better living conditions. The consumers, on the other hand, benefit from access to healthy products at affordable prices. In the last few years, there has been increased demand for the expansion of the project to other districts in the Metropolitan Region. In 2015, the Straight from the farm programme sold about six hundred tonnes of food, generating 2.75 million Brazilian Real (R\$) of profits.

Farmers sell either their own produce or that of a cooperative. The quality of produce is controlled through laboratory tests and on-farm visits by SMASAN staff. The city also provides technicians and engineers, who advise and instruct farmers on good agricultural practices and organic production. The SMASAN staff include agronomists and agricultural engineers, and can also call on support from the Minas Gerais state agricultural extension service. Another national programme, PRONAF – the National Programme for Strengthening Family Agriculture, administered by the Ministry of Agrarian Development, provides crop insurance, technical assistance and agricultural credit to family farms. This will help farmers to improve their production and organisation in order to maintain reliable supplies of consistent quality, and thus (potentially) better respond to increased urban demand as in Belo Horizonte.



Straight from the Farm marketplace.

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The **Country General Store (Armazém da Roça)** is an action of the Multi-year Government Action Plan (PPAG) and is being restructured in order to become a SMASAN programme. It aims to support income-generating activities in rural areas. The stores are either permanent or mobile outlets set up by the municipality at specific events. The purpose is to commercialise crafts and homemade products from small producers from the countryside.

The Municipality also supports the operation of **conventional farmers' markets and organic markets** in the city. In 2015 there were 60 conventional farmers' markets with 114 sellers and 12 organic markets that benefitted 5 small producers from 2 surrounding rural areas. For this programme, SMASAN provides urban market space and logistical support. The fairs sell vegetables, fruits, eggs and grains, amongst other products. Organic producers have a certificate of organic production that is recognised by the National Ministry of Agriculture and Supply.

Institutional food purchases

Governments are important buyers of food. The Belo Horizonte municipal government provides support and incentives for family agriculture in the metropolitan region's rural areas through public procurement of food from smallholder family farmers for its school meals programme and popular restaurants. Meals served at the schools and restaurants offer a variety of diverse and nutritious foods, preparing, where possible, recipes typical of the region and using locally-grown products. They also minimise the use of industrially processed foods in favour of fresh fruit, vegetables, eggs, chicken and meat that can be to a large extent supplied by small farmers in the region. In 2011, 400 tonnes of food were procured. Belo Horizonte City Hall conducts the direct purchase from, currently, 120 registered farmers from 19 municipalities in the State of Minas Gerais.

Through the National Food Procurement Programme (Programa da Aquisicao de Alimentos– PAA), created in 2003, the municipality of Belo Horizonte receives funds to purchase crops and milk from small-scale farmers to help build government food stocks (and regulate prices) and to be used in food programmes. Through the PAA, SMASAN can increase supplies purchased from small rural farmers in the city region area for its Popular Restaurants and School Meals programmes. In 2015, 19 farmers from 7 surrounding municipalities in the Belo Horizonte metropolitan area participated in the PAA programme.

All SMASAN programmes are thus financed by different sources of funding, including:

- GEAA–The Agency for Coordination of Food Assistance Programmes (Gerência de Coordenação dos Programas de Assistência Alimentar), which receives funding from the Fund for Educational Development/The National Programme of School Feeding (FNDE/PNAE) and the Municipal Treasury;
- GPAP–The Agency for Coordination of Popular Food Programmes (Gerência de Coordenação dos Programas de Alimentação Popular), which receives funds from the Municipal Treasury and its own collections;
- GAPCO–The Agency for Support for the Production and Commercialisation of Food (Gerência de Apoio à Produção e Comercialização de Alimentos), which receives funds from the Municipal Treasury and funds from the National Food Procurement Programme (PAA-Programa de Aquisição de Alimentos);
- GESAN–The Agency of the Centre of Reference for Food Security and Nutrition (Gerência do Centro de Referência de Segurança Alimentar e Nutricional), which receives funds from the Municipal Treasury; and
- GEASA–The Agency for Support of the Food Supply (Gerência de Apoio ao Sistema de Abastecimento), which funds markets and Abastecer programmes through licensing and concession of public spaces paid for by the market and store operators.

Stakeholder analysis

As described above, the various food programmes complement each other and are developed and implemented through **inter-sectoral partnerships at the local government level**, involving different government departments such as the Municipality of Belo Horizonte, the Municipal Secretariat for Social Policies, SMASAN, the Municipal Department for Urban Sanitation and the Secretariats for Health and Education amongst others, as well as organised civil society and universities and farmers.

SMASAN's programmes are guided by a **Multi-Stakeholder Council for Food Security**, (Conselho Municipal de Seguranca Alimentar e Nutricional–COMUSAN-BH), that was created in 2003 by Decree no 11.341. The COMUSAN-BH is composed of 32 members involving both urban and rural actors (or actors with mandates in urban and rural areas), including 11 municipal, state and federal government representatives, 10 labour unions representatives from the food sector and 11 representatives from food producers and distributors, consumer groups, and NGOs.

The Abastecer and Straight from the Farm programmes build on clear **public-private partnerships**, where SMASAN allows private commercial operators and rural producers (through Syndicates of Rural Workers, Community Associations and Cooperatives) the use of public spaces, in exchange for price and quality control of specific food products. The private food sector also collaborates in the collection and donation of leftovers to food banks and in the provision of entrepreneurial training to participants in the job- and income-creation programme.

Civil society and NGOs collaborate in the urban agriculture and food education programmes, in food distribution programmes (in collaboration with the food banks) and in monitoring food and nutrition assistance activities. Researchers of the **Federal University of Minas Gerais** monitor the results of the Abastecer and market programmes.

Technical staff from the technical and agricultural assistance **State Agency EMATER**–Minas Gerais help provide training, technical assistance, funding and supervision to rural producers. Together with the EMATER local offices, associations of rural workers, community associations and cooperatives, SMASAN develops actions in the areas of residence (in surrounding municipalities) of the participants of the Straight from the Farm, Organic Markets, and National Food Procurement Programmes.

With regards to **partnerships with the Federal/National government**, the Belo Horizonte programmes are currently set within the National Zero Hunger (Fome Zero) strategy, launched in 2001, that aims at enhancing food security, strengthening family agriculture and promoting partnerships with civil society and the private sector. The National Programme includes many programmes that were already 'tested out' in Belo Horizonte. At the same time, The Belo Horizonte programmes have been strengthened by programmes offered in the federal strategy. For example, improvements in the School Meals programme were made possible by an increase in national funding. The National Food Procurement Programme–PAA helped SMASAN to consolidate its initiatives to support food production by small-scale farmers and increase its institutional purchases for its School Meals and Popular Restaurants programmes. The construction of food banks became a reality when the Zero Hunger programme introduced this as part of its strategy.

Level of collaboration and coordination between local/sub-national governments at a city region level

In order to sustain its rural farmer support programmes, Belo Horizonte has already been fomenting the development of a green belt around the city and promoting negotiations with mayors of surrounding towns and neighbouring regions so that they do the same. By supporting the production of foods in surrounding areas and by stimulating cooperative work, SMASAN enhances its range of action in other municipalities in the metropolitan city region. Production of specific local products in each specific rural area is promoted, while the city provides an easily accessible market, especially for perishable goods.

Notwithstanding the above, no formal interaction exists with other municipalities in the region in the actual implementation of activities, such as training of local farmers, education and distribution programmes. Real metropolitan governance systems are still weak. This coordination is still channelled through the State Minas Gerais EMATER agency. Initiatives to increase such municipal collaboration exist, but still await their operationalisation.

Description of results and analysis of impacts

The various food security programmes have increased the accessibility of quality fresh fruit and vegetables and nutritious meals for urban (poor) consumers and currently reaches over 1 million people daily, close to 40% of the population.

Popular restaurant.

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Norma Duarte



The Belo Horizonte food programme has created various channels for affordable access to healthy foods that are generally not available to urban poor consumers through conventional market outlets. Nowadays in Belo Horizonte, the commercialisation of fresh fruits and vegetables through 'alternative outlets' surpasses the commercialisation through supermarkets.

As a result of this comprehensive food policy and programme, the consumption of fruits and vegetables is higher in Belo Horizonte than in other major cities in Brazil, with about 40% of the adult population consuming fruits and vegetables five or more days a week (compared to a national average of 32%).

The Straight from the Farm programme, the farmers' markets and local procurement programmes all address rural-urban linkages and relations by directly supporting local rural producers and connecting them to urban consumers. The programme has thus benefitted small rural producers in the metropolitan region and state, to the extent that small farms dominate the production of fresh food and vegetables. However, small producers must have more direct control over the commercialisation of their goods (excluding or limiting the role of intermediaries) if they are to benefit from increasing demand for their products. In this way, the incomes of small farmers can be increased, while still offering high quality products to consumers at lower prices.

By eliminating the intermediaries who normally operate in bringing the produce of small rural producers to urban markets, SMASAN manages to increase incomes of small farmers and still offer high-quality products to urban consumers at lower prices. Local producers get better prices for their products and consumers have better access to healthy food for a price below market value. This approach pursues the overarching goal of ensuring rural producers' livelihoods and rural social sustainability, encouraging local small-scale farmers to remain in the countryside and thereby reducing rural-urban migration to Belo Horizonte's lower-income and informal settlement areas.

More indirectly, the promotion of higher consumption of fruits and vegetables in general, and in particular fruits and vegetables typical for the region through the various urban programmes described above, not only improves the health of urban citizens, but also creates a greater market for small producers from the city region.

Support for rural producers in improving their production systems (training and technical assistance in organic production, organic certification), as well as the promotion of more sustainable forms of agriculture and natural resource management, also promotes the production of environmentally friendly and healthy food for urban consumers.

Policy makers and academics describe these effects as a 'four-way win for food sovereignty':

1. Poverty reduction – incomes of the frequently poor small farmers close to the city rise, while more people can buy the food they need. By facilitating direct marketing (without the intervention of intermediaries) incomes of farmers can be increased, while still offering consumers high-quality products at lower prices;
2. Rural sustainability – farmers can stay on their land instead of migrating to the overcrowded city with its high unemployment and poverty rates;
3. Healthy nutrition – (organic) family agriculture increases the availability of fresh and healthy food for all citizens; and
4. Price stability – increased local production reduces disturbances caused by volatile world market prices.

SMASAN's work, however, is not done. While the consumption of fruits and vegetables has increased and is higher than in other Brazilian cities, it remains quite low. The percentage of the overweight and obese population is also increasing (as throughout the country). Belo Horizonte continues to reflect high socio-economic inequalities, evidencing the need for SMASAN to continue its work in future.

Analysis of the enabling national, regional and municipal governance structure

The impact of the Belo Horizonte food security programme could not have been achieved without strong political will and champions (e.g. the then Mayor Patrus Ananias). Possibly the greatest factor of success of the Belo Horizonte food security programme is the mainstreaming of food security in public policy, similar to other, more 'traditional' policies such as health and education. The creation of SMAB as a separate administrative structure with its own budget was necessary to centralise the planning, coordination, and implementation of all food policies in the city and to shift from more temporary and emergency programmes to regular and permanent policies. .

The fact that most of SMASAN's programmes are implemented in partnerships is one of the factors behind its success and cost-effectiveness.

The continuation of the programme from 1993 to the present has been enhanced – as described above – by the support of the national Zero Hunger strategy and policy framework. In 2006 the National Law on Food and Nutrition Security was enacted. For the first time it institutionalised the Right to Food as a matter of public policy and an obligation of the state, providing a further key framework for the development of the local Belo Horizonte programme. Article 1 establishes: *'definitions, principles, guidelines, objectives and composition of the National System for Food and Nutrition Security–SISAM, through which the State, with participation of organised civil society, will formulate and implement policies, plans, programmes and actions towards ensuring the human right to adequate food'* (World Future Council, 2011).

Lessons learned and potential for replication

The Belo Horizonte food security programme illustrates that **city region food systems with an urban and rural focus** – that benefit both urban consumers as well as rural producers – **can be created and maintained by local government action**. The implementation of a (comprehensive) city region food system programme requires strong political will, leadership, and a champion (preferably the Mayor of the city). It is based on an understanding that the Right to Food and Food Security for urban vulnerable groups cannot be solved by the private sector/market and civil society initiatives alone, but is a government responsibility requiring strong government intervention and support. The government commitment to social justice and equitable access to food for all provides the underlying motivation for taking on such support and responsibility.

The clear and strong institutionalisation of the programme, in the local government structure through SMASAN and the minds of the people, reduces the risks of changes in city administration and shifts in allocation of budgets and is key to mainstreaming food in municipal policies. Securing the Right to Food through (local and national) legislation also makes the SMASAN programmes more resilient to government changes.

The success of the programmes linking rural producers directly to urban consumers (Straight from the Farm; the Country Store; farmers' markets) **can be attributed to the following four factors:**

1. **Accessible competitive prices (through food price setting and subsidised food sales);**
2. **High-quality products;**
3. **Convenience and physical accessibility by locating food outlets in favourable locations in all areas of the city; and**
4. **Combining production and marketing support for rural producers.** In addition to the development of markets where producers can directly offer their produce (farmers markets, producer kiosks), small-to-medium farmers in rural areas surrounding urban centres (areas in the city region) also require support and organisation to improve their production, for example in applying more organic production techniques and (cooperative) marketing.

SMASAN has a highly competent, skilled and politically committed team of municipal staff. Their preoccupation with and focus on high quality (in terms of food quality and nutritional content of meals for example; but also in terms of clean and attractive product displays in the Straight from the Farm and Abastecer stores) and good service are key to the success of the programme. Marketing support for rural producers is combined with training and technical production assistance, helping to resolve organisational constraints, as well as improving the limited information and knowledge amongst small-scale farmers.

The implementation of a variety of interlinked strategies and programmes **that address food security in the entire chain from production to consumption** – by improving food access, supply, quality, consumption and production, and food waste reduction and re-use – **ensures the development of a comprehensive food and nutrition security**

programme that both benefits urban consumers and enhances sustainability of nearby rural areas. As demonstrated in Belo Horizonte, an improved supply of fresh food at accessible prices may be achieved by food price control, offering food at subsidised prices, directly linking rural producers (in the metropolitan area) to urban consumers, supporting local procurement from rural farmers, increasing urban demand for local fresh and quality products through food and nutrition education, and providing direct support to rural producers (enhancing rural farmers' livelihoods).

Although impact data are monitored for urban areas and for the urban population (e.g. access to food), and even disaggregated for different areas in the city, more comprehensive impact data are lacking regarding the benefits for rural producers and rural areas (rural farmers livelihoods, preservation of agricultural lands). **This calls for city and national efforts and international support to provide technical and financial assistance, and funding of research projects, for impact data collection on food system policy and programmes at city region level across urban and rural areas.**

The National Zero Hunger Programme has adopted many programmes that were initially 'tested out' in cities like Belo Horizonte. However, **the success factors that set apart the Belo Horizonte food security programme also, to a certain extent, limit its wider replication,** specifically beyond Brazil. It is hard to imagine where an equally comprehensive and alternative city region food system, based on a clear government vision of social responsibility, could be developed without such strong political intervention (at the local and national level) or be reproduced using market interventions alone.

However, other cities could start from their on-going urban agriculture programmes, school meals and food education programmes, community kitchen programmes (in a way similar to Belo's popular restaurants), food banks, and/or rural agriculture support programmes to build similar (components of) urban food security programmes. Government and institutional procurement can also set minimum percentages (and quality standards) for procurement from small-scale farmers in the city region.

One such example of potential for replication is the cooperation between Belo Horizonte and the City of Windhoek, in Namibia, facilitated by the World Future Council. Since 1999, Belo Horizonte has received two delegations from Windhoek for technical visits and workshops and signed an agreement for cooperation, institutional collaboration and exchange of good practices. Inspired by Belo's experiences, Windhoek has taken up the promotion of community gardens and the establishment of a food bank.

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02_QUITO, ECUADOR

Protecting Rural Areas for Ecosystem Services and Sustainable Food Systems

Henk Renting¹, Marta Echavarría², Femke Hoekstra and Marielle Dubbeling³

Summary

Urban water users are frequently unaware of their water sources. As urban growth and development expand, water consumption is increasing, placing stress on the sustainable management of these sources. At the same time, bodies governing (protected) watershed areas may lack clear management objectives and resources. As a result, water resources are being depleted and quality is deteriorating in many countries.

Quito's Water Protection Fund (Fondo para la Protección del Agua-FONAG) is a sustainable finance mechanism that allows for improved management and long-term

protection of its surrounding watersheds. The water fund is an example of a public-private partnership that works towards conservation of natural resources and the improvement of rural farming areas and livelihoods. The aim is to keep Quito's water supply safe and clean, while benefiting both the city and surrounding rural communities. Quito's experience shows that water utilities can go beyond traditional engineering solutions and apply innovative governance, financing and management arrangements with upstream farming communities. The Quito water fund has already served as a model for numerous other water funds in the region.



View of the Quito watershed

@ Distrito Metropolitano de Quito

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Introduction

The Metropolitan District of Quito, the capital city of Ecuador, is currently home to around 2.5 million people, representing 15.5% of the total national population (INEC, 2015). It encompasses the city of Quito and the surrounding urban and rural municipalities. In recent decades, the District has undergone a strong process of urbanisation, with increasing demands on water and other services. About 80% of the fresh water supply for the District of Quito comes from three surrounding and protected areas: Antisana Ecological Reserve, Cayambe-Coca and Cotopaxi National Parks, and their buffer zones. However, a variety of activities potentially threaten the availability of this clean water supply.



Green line: working area of FONAG

@ http://www.pnuma.org/agua-miaac/Fonag_Ecuador.php

Drinking water for Quito is provided by the Public Metropolitan Water and Sanitation Company (EPMAPS in its Spanish abbreviation), which supplies water to about 99.5% of Quito's urban population and 98.5% of the Metropolitan district (EPMAPS, 2016).

In the year 2000, the city's water consumption was expected to increase 50% by 2025, as a result of population and industrial growth, thereby increasing pressure on water resources. In addition to urban and rural households, water users include rural farmers using water for irrigation, large-scale agriculture plantations in the Quito valley and hydropower stations. Water bills fail to recover distribution and operational costs, let alone to provide resources for the broader protection and management of watersheds.

Although a large percentage of Quito's watersheds are formally protected for conservation as part of the National Protected Area System, they face a number of potential threats. Farming communities in these areas use the land for crop production and dairy grazing (Echavarría, 2002). Available productive land is diminishing, among other reasons due to urban sprawl and soil erosion, forcing families to move up in the watershed towards natural valuable ecosystems – a mixture of forest and high altitude grasslands – that are important for the integrity and natural renewal of the watershed. Overgrazing and burning, as well as development projects (e.g. installation of an oil pipeline and of hydropower plants) also affect the sensitive ecosystems, which are the key hydrologic regulators of the system. These land use changes result in the diminishing provision of water services downstream.

Watershed protection is intrinsically linked to the sustainability of local farming and the future of the food system in Quito and its surroundings. On the one hand, agriculture is an important water-user and the prospects for farm households critically depend on the future availability of sufficient and clean water. On the other hand, agricultural activities are an important factor influencing the management of water and soils in catchment areas and, depending on the modes of production, can either reinforce or undermine the sustainable management of watersheds.

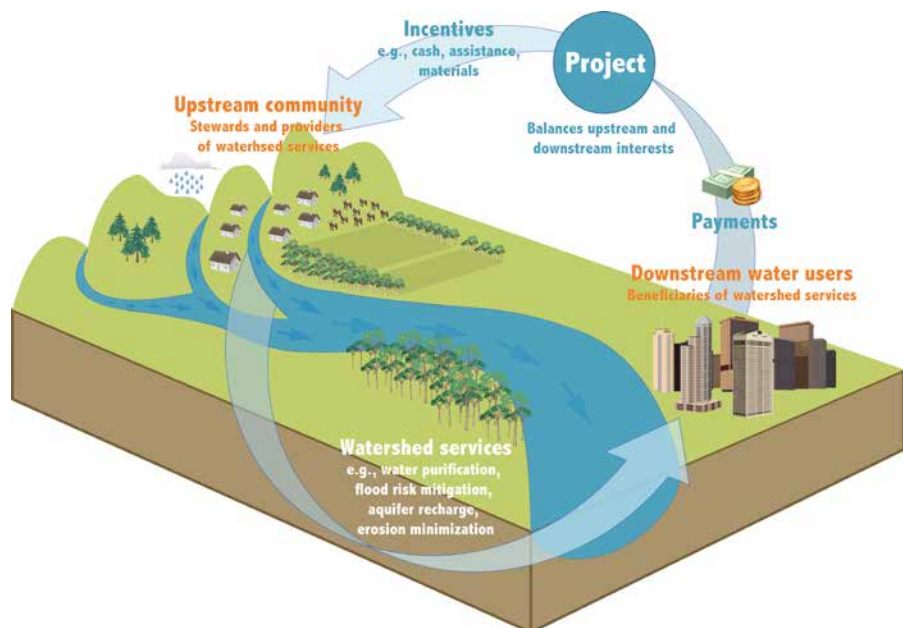
The multiple facets and complexity of these problems were long unaddressed, neither by the municipal authorities of Quito, nor by the Ministry of Environment and the Ecuadorian Park Service, due to a lack of resources. Instead of tackling the root cause of the problem, namely the overexploitation of its watersheds, the municipality tried to improve the provision of clean water through improvements in infrastructure, without achieving the desired results.

In response to this situation, the Antisana Foundation, with support from the United States Agency for International Development (USAID) and the NGO The Nature Conservancy (TNC), developed in 1997 the idea of a new independent water fund dedicated to financing watershed protection around Quito and aimed at complementing other conservation measures.

In 2000, Quito’s water protection fund Fondo para la Protección del Agua–FONAG was established as a sustainable finance mechanism for improved management and long-term protection of its surrounding watersheds. With the creation of a financing mechanism for watershed protection, based on urban water tariffs, the citizens of Quito were directly linked to their water source, to the ecosystem services provided by the watersheds, and to the role played by upstream farming communities in their management. This mechanism is based on the principle that the watersheds surrounding Quito (or other urban centres) provide critical water services to local (urban and rural) inhabitants and that beneficiaries should pay for the continued provision of these services. The Quito municipality has evolved to understand the conservation of the watershed, in addition to the construction of infrastructure, as a means of providing clean water to its citizens.

Watershed services model connecting urban water users with upstream communities.

@ <http://www.watershedconnect.com/pages/primer>



Description of concrete activities implemented

Establishment of the fund

In early 2000, TNC and its initial key partners, the Municipality of Quito, through the Mayor's office, and the Public Metropolitan Water and Sanitation Company (then known as EMAAP-Q; currently called the EMAPS) established the first Water Protection Fund in Quito, FONAG, with two primary goals: 1) to provide a clean and regular water supply for the nearly two million people living in Quito; and 2) to provide financing for existing protected areas critical for the city's water-related services.

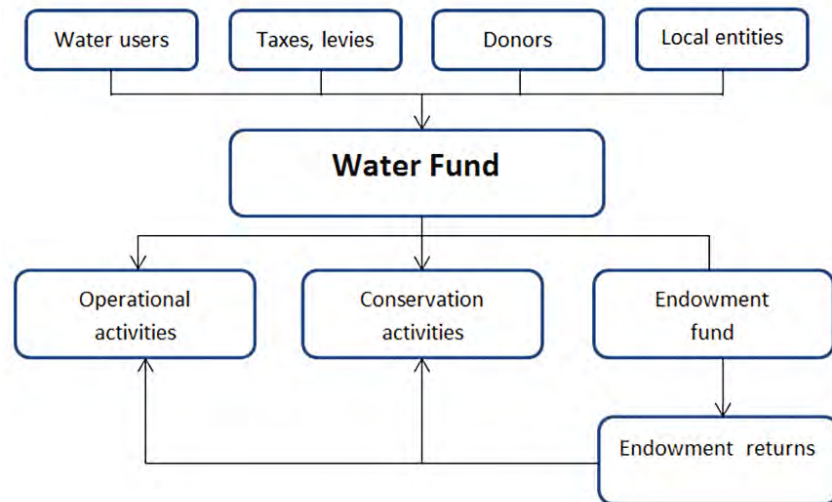
Since then, FONAG has developed into a well-established investment fund with a lifespan of 80 years, providing a sustainable finance mechanism for the protection and rehabilitation of the catchment areas that supply water to Quito. The water fund is an example of a public-private partnership that works towards the conservation of natural resources and of rural farming areas and farming livelihoods. It brings together government agencies such as the EMAPS, civil actors such as the TNC and Antisana Foundation, as well as private actors such as a beer and water bottling company, around the common goal of generating funds for watershed protection and promoting a new water culture.

As a trust fund, FONAG can receive money from government, private, and non-government organisations. The relative share of different contributions has evolved over time. FONAG was established in January 2000 with USD 21,000 in capital from Quito's Metropolitan Water Company EPMAPS (USD 20,000) and TNC (USD 1,000). Later, additional members were included in the fund: Quito's Electrical Company (EEQ) in 2001; the National Beer Company (Cervecería Nacional) in 2003; the Swiss Agency for Development and Cooperation (SDC or COSUDE in Spanish) in 2005, which in 2010 transferred its participation to CAMAREN, an organisation for capacity building in the management of renewable resources; and the water bottling company Tesalia Springs in 2007.

Today, the main source of funds comes from water users in the city, both private households and industries, who pay the city a flat rate fee for water use. In April 2007, the Metropolitan District of Quito issued Metropolitan Ordinance 199 (now Ordinance 213), determining that a 2% share of all drinking water sales should be contributed by EPMAPS to the assets of FONAG. It also established that funds should be destined for investment in the protection of water sources and in actions to achieve a new water culture that will contribute to integrated water resource management. It is considered that this flat rate charge on water sales does not affect the fairness of access to water for lower-income households, since drinking water tariffs are generally designed on a progressive scale.

EPMAPS thereby remains by far the largest contributor to the water fund, with a contribution of USD 2.2 million annually. FONAG's 2012 budget foresaw 2.5 USD million in revenues and 3.2 USD million in expenses. Today, FONAG has a capital of around 12 USD million. Currently, FONAG's capital is such that it can operate with its own resources as a stable source of funding, complemented and leveraged by other resources from private and public, national and international entities, when available.

For the first four years FONAG mainly accumulated funds, existing only as a financial entity. In its fifth year, the fund started organising activities in upstream communities



Structure of FONAG's contributions, returns and activities

@ The Nature Conservancy (TNC), 2011

along Quito's watersheds, using its revenues, together with funds from other organizations including USAID, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), and the Municipality of Quito.

FONAG's 2012 budget foresaw USD 2.5 million in revenues and USD 3.2 million in expenses. Today, FONAG has a capital of around USD 12 million. Currently, FONAG's capital is such that it can operate with its own resources as a stable source of funding, complemented and leveraged by other resources from private and public, national and international entities, when available.

The continuity and sustainability of the fund is guaranteed in several ways. First of all, the trust fund was created under the financial law regulating capital markets, thus providing a stable legal framework. Secondly, contributions to FONAG go to a fund that is managed by a financial entity which creates an endowment, providing on-going financial returns while keeping the core endowment intact for future funding. FONAG thus finances its activities not with the accumulated capital itself, but primarily with the financial returns (interest) from the capital, thereby ensuring the long-term availability of funding. Over time new decisions have allowed use of some of the capital as the fund grows. A board governs the management of the fund, and the financial entity in charge of the fund also ensures that the resources are well managed.

Description of conservation activities

Watershed conservation following a watershed services model requires support for rural farming communities to improve the sustainability of their production practices, complementing other conservation measures. In this way, integrated water management, through conservation and resource management practices, benefits both urban and rural communities.

In line with this approach, investments from FONAG go primarily to activities that protect and enhance the quality and quantity of water for Quito. FONAG targets areas

Functioning of water funds

Each water fund has its own set of objectives and goals, but, in general, water funds invest in the conservation of watersheds in order to accomplish the following:

- improve or maintain water quality and water quantity for downstream users;
- maintain regular flows of water throughout the year;
- maintain or enhance natural ecosystem biodiversity, both freshwater and terrestrial; and
- improve or maintain human well-being and quality of life for upstream communities.

Using watershed conservation as a common objective, water funds create:

- a multi-institutional governing body bringing together public and private partners;
- opportunities to avoid costs of water treatment by investing in nature instead of infrastructure; and
- sustainable financing for long-term conservation efforts.

These goals and the mechanisms by which they are achieved will vary and can be more explicit depending on the situation, but they are the general framework for water fund operation (Goldman et al., 2010).

of critical importance to the conservation of Quito's water supply in direct coordination with local recipient communities, to jointly assess the situation and identify areas that are of mutual interest in terms of conservation or socioeconomic development or both. Capacity is strengthened within beneficiary communities to organise and discuss potential projects, local leaders are identified, and village groups are encouraged to present proposals to FONAG.

The organisation strives to be community focused and driven and relies on the identification of willing local partners within villages. Programmes supported include:

- Control and monitoring of protected areas;
- Restoration of natural vegetation;
- Environmental education and outreach;
- Training in watershed management;
- Productive projects with local communities;
- A hydrological monitoring program.

The water fund dedicates the majority of its funding to long-term programmes and a small share to specific short-term projects. FONAG occasionally contracts outside organisations to implement activities and has encouraged other organisations to also work in the area towards similar aims (TNC, 2012).

An example of a long-term programme includes an innovative park guard system that was established jointly with the Ministry of Environment, to train community members as park rangers and strengthen their role in the protection of the area. Initially the programme focused on water protection and monitoring activities. Over time it became evident that the leadership of this programme could also support local community development in other ways, including improvements in nutrition and productive activities. This became the case in the community of Cuyuja, in the buffer zone of the Antisana Reserve, where organic production was re-introduced in community gardens, benefiting 40 families with fruits, vegetables, and small animals, such as guinea pigs. This not only reduced the environmental impacts of modern, industrial agriculture, but also improved nutrition and empowered the community to

launch new ventures. An example is the now-thriving commercial business run by a group of women who started a small company for medicinal plants.

Together with education authorities at the municipal level, FONAG has developed a large-scale environmental educational programme to teach children about their water sources and their responsibility to protect them. Based on modern Geographic Information Systems (GIS), FONAG now also utilises a hydro and meteorological programme to bring together all available data, monitor programme results and improve understanding of water challenges.

Stakeholder analysis

FONAG largely designs, directs and executes its programmes and projects with the support of its permanent staff. FONAG is managed by a Board of Directors and supervised by a Technical Secretariat that reviews its financial performance and ensures project implementation. Critically, FONAG seeks broad stakeholder participation and continuous financial contributions. This is important, as the functioning of FONAG depends upon available funding. Anyone who contributes financially to the fund can become a member of the Board.

It is important to recognise the important role played by Quito's government leadership over the past years. Quito's mayors – Roque Sevilla (1998-2000), Paco Moncayo (2000-2009), Andres Vallejo (2009), Augusto Barrera (2009-2014) and Mauricio Rodas (2014-present) – have all supported and maintained the Quito water protection fund throughout the years. Mayor Paco Moncayo was especially important in supporting the creation of the required legal framework for FONAG, by endorsing an ordinance stipulating the channelling of 2% of municipal water sales to the water protection fund.

Beyond political support, the establishment of a public-private partnership was paramount. This ensured the support of the two leading public partners, EPMAPS and the public electricity company EEQ, as well as several private water users (such as the National Beer Company and the water bottling company Tesalia Springs). Incentives for participation in the water protection fund varied. The main incentive for EPMAPS, and for large water users such as the National Beer Company and Tesalia Springs, was to avoid or reduce future costs for water treatment and supply, functions essentially provided by the conserved ecosystems. For TNC and the Antisana Foundation, the incentive was to ensure long-term financing for the conservation of protected areas.

The constant support of local NGOs (with working experience in the watershed communities) and also international cooperation (expanding FONAG's financial base and complementing resources for programme implementation) were crucial to the establishment of FONAG and played a key role during the initial years for the implementation of activities.

Level of collaboration and coordination among local/sub-national governments at a city region level

Instead of a government-to-government collaboration at the city region level, FONAG should be seen rather as a vehicle that connects urban water users and upstream rural communities. Nonetheless, FONAG considers as ‘allies’ and strategic partners the local municipalities of Quito, Mejía, Rumiñahui, Cayambe and Pedro Moncayo.

FONAG has supported the establishment of a watershed council for the governance of the Guayllabamba watershed, to set up an effective forum for regional and local governments and civil society to interact and discuss the problems facing management of the different river basins and to develop joint activities on the ground. The watershed council process engages a large number of government entities, such as the Secretaries of Education, Environment and Planning of the Metropolitan District of Quito, the Department of Education of the Provinces of Pichincha and Napo; and the National Ministry of the Environment, the Coordinating Ministry of Strategic Sectors, the National Secretaries of Planning and Development (SENPLADES) and Water (SENA-GUA), the National Institute of Meteorology and Water (INAMHI) and the National Institute of Irrigation (INAR), illustrating the variety and complexity of actors involved in integrated watershed management. At the same time, this forum offers the opportunity to address issues of interest to rural communities that are often ignored and that need empowerment and support to engage in this multi-stakeholder process. Due to political changes and controversies, however, this coordination platform has been halted for the time being.

Description of results and analysis of impacts

The ability to show results has been crucial for maintaining support for FONAG. According to the most recent independent review, FONAG has had the following successes:

- It has helped conserve the watersheds that provide 80% of the water upon which the citizens of Quito depend;
- It has intervened in conservation and improved the use of 500,000 hectares of land;
- It has involved 30,500 children in Environmental Education Programs;
- It revegetated close to 600 hectares of land per year in the period 2006-2010;
- It has reforested 2,033 hectares with over 2,000,000 native trees;
- It has hired, trained, and employed 11 community park guards to help conserve protected areas; and
- It has engaged over 200 families in community development projects in rural basins.

From November 2010 to January 2012, The Nature Conservancy undertook a study to measure the ecological and socioeconomic impacts of the water fund. Ecologically, the key focus of the water fund is on protecting sensitive grassland areas from fire and cattle grazing as well as restoring degraded grassland and nearby forests. All three of the conservation sample sites had greater plant species richness than the control sites. Two of the three conservation sites also had an equal or greater number of plant species than the reference site. Based on several indicators, water quality in river segments managed by the water fund was found to be, on average, slightly higher than in matched control

segments of nearby rivers, but there were few significant differences. The richness of aquatic invertebrate species and number of rare species were significantly greater in the water fund river segments than in the control segments. While the aquatic and water-quality assessments show some positive ecological differences between water fund river segments and controls, they also highlighted the need for a more robust design for monitoring and measuring the effects of water fund activities on water quality and quantity.

Productive projects with the community

@ Distrito Metropolitano de Quito



Regarding socioeconomic results of the assessment, especially with regard to food production and security, there is little doubt that water fund activities have generated benefits for local people and rural farmers.. Interviews with key people in four water fund communities highlighted a range of perceived socioeconomic benefits from water fund projects, including improved farming practices, reduced household expenses, and healthier diets. This is a priority for the fund, which cannot thrive if the communities it supports are not thriving.

Catskills Water Fund in New York City

FONAG was created based on the example of New York's water fund. New York, through the Water-shed Agricultural Council, supports peri-urban and rural dairy farmers in adapting to climate change, helping to prevent the loss of farming in the watershed and the resulting adverse water-quality effects as well as the need for costly and carbon emissions-intensive mechanical filtration. After 5 years, the New York water fund and programme had achieved the following results:

- There was a 75 to 80% reduction in farm-to-water pollution loading;
- The pristine quality of the city's drinking water was restored without spending billions on advanced water treatment;
- Clean water was generated at an affordable price. The programme more than paid for itself through cost savings and helped stabilise water and sewer rates, which benefited low-income households;
- The fact that watershed conservation could be folded into consumers' bills created a sustainable pool of conservation financing, far more stable than many of today's popular NGO-led watershed funds; and
- The programme helped increase urbanites' support for additional watershed protection strategies, such as the restoration of stream corridors and the purchase and stewardship of city- and state-owned lands (Moss, 2015).

Lessons learned and potential for replication

Urban water tariffs should not only reflect service costs (operation and maintenance of water utilities), but also costs for the management and conservation of watersheds. In order to guarantee willingness to pay, consumer awareness and transparent monitoring and information on results and impacts is crucial. FONAG publishes a monthly e-bulletin on its activities and projects and contributes to a radio show on environmental conservation.

A percentage of urban water tariffs can be contributed to a water fund that uses a multi-institutional governing board and a trust fund financial structure to establish a long-term, sustainable source of funding and a decision-making entity to protect or restore watersheds surrounding urban areas, in order to provide a regular supply of clean water to downstream users. Such water funds can help preserve natural resources and increase sustainability of rural land use and stewardship by strengthening urban support for rural communities, producing environmentally-friendly food and ecological services.

The support of leading decision-makers (for example city mayors) is vital for the implementation of new and innovative mechanisms for watershed conservation, such as FONAG. Supportive legislation which opens the way by providing a legal framework and political support, as described above, strongly enables the success of such efforts.

In addition, **the promotion of broad-based public-private partnerships is key to the feasibility of an endowment (water) fund.** On the one hand, sufficient funding should be available to establish a large enough endowment, which can generate adequate annual returns. On the other hand, a situation in which one or two water users control the Fund's revenue stream should be avoided, because it gives these institutions a dominant role in the Fund's governance, which could affect investment and management decisions.

Long-term investments in water-monitoring regimes that generate time-series evidence of water quality and quantity benefits are required. These benefits are the very reason the Quito municipal water company provides funding to the water fund, and the long-term political stability of the water fund could be undermined without such evidence.

The FONAG experience is relevant for a wide range of urban contexts in the region and thus has considerable potential for replication. Kingston, Jamaica; Medellin and Bogota, Colombia; and Caracas, Venezuela are just some of the region's major cities that also depend on their surrounding watersheds for their water resources. While each fund has its specific characteristics, it is important to highlight the importance of engaging agricultural users and ensuring results that benefit the agricultural productivity of the corresponding watersheds. In the East Cauca Valley, Colombia for example, these include sugarcane producers and the regional environmental authority. In Bogota, Colombia, or Cuenca in Ecuador, specific funds engage upstream agricultural communities in watershed protection.

However, **water funds are essentially local funding mechanisms and have to be driven by local needs and visions. Cities can therefore be a good scale to work from so that the process is organic and driven from the bottom up.**

A critical prerequisite for FONAG has been the generation of willingness to pay amongst specific beneficiaries in early stages of the establishment of the Fund. However, where payments are not destined for the protection of a particular watershed, but go to a regional or national fund, water users are less likely to be willing to contribute. There are therefore risks associated with scaling up the FONAG model to the national level, as national funds are more likely to be bureaucratic, involve higher transaction costs and be far removed from local realities

International cooperation can help contribute to the funding base of such funds, as provided by USAID, GIZ and SDC in the case of Quito. International development cooperation can help to mainstream these kinds of innovative financial mechanisms, encouraging the incorporation of conservation in water tariffs throughout the world and the recognition of the value of support for more sustainable forms of (agricultural) management practices in particular. These can contribute not only to environmental goals but also to social goals, such as good nutrition and health.

Within the framework of the Habitat III agenda on sustainable urban development, the FONAG model offers an interesting option **not only to enhance the sustainability of a city's water supply, but also to strengthen its regional agri-food system.** Quito, together with over 115 other cities around the world, is now a signatory of the Milan Urban Food Policy Pact, which recognises and underlines the role of city governments in food policies. The strong nexus between water and food is also recognised as part of its action framework, which calls upon cities to commit to: *'apply[ing] an ecosystem approach to guide holistic and integrated land use planning and management in collaboration with both urban and rural authorities and other natural resource managers by combining landscape features, for example with risk-minimising strategies to enhance opportunities for agro-ecological production, conservation of biodiversity and farmland, climate change adaptation, tourism, leisure and other ecosystem services.'*

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03_QUITO, ECUADOR

A Metropolitan Agriculture Programme for the Promotion of Integrated Territorial Planning

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Summary

The Metropolitan District of Quito (DMQ in Spanish), Ecuador, was established in 1988 in order to control, plan and manage Quito's urban growth and the spatial planning of rural and urban areas in a more integrated manner and to allow for improved and flexible coordination with surrounding municipalities, the State, social organisations, and the private sector.

In 2002, the DMQ launched the AGRUPAR (Agricultura Urbana Participativa) – Participatory Urban Agriculture – programme in order to promote organic urban and rural agricultural production and marketing at the level of the metropolitan region as a strategy for food security and local economic development. While the DMQ government recognised that the challenge of providing food security to its population had become more and more an urban one, it also realised that this required providing support to the remaining and potential new agricultural producers within the city region as well as strengthening inter-linkages be-

tween the metropolitan area and surrounding rural areas as hubs for food production and food markets.

The Quito AGRUPAR programme actively promotes local ecological agricultural production in the metropolitan area for home consumption (food security) and for sale (income generation). Commercialisation of production from urban and rural AGRUPAR farmers mainly takes place through bio fairs located in different areas of the District. In addition, new organic/ecological markets have been established that provide organic/ecological producer groups from areas surrounding the DMQ the opportunity to sell their produce to Quito's population.

By working across urban and rural parishes in the DMQ, as well as linking to areas outside the DMQ, AGRUPAR contributes simultaneously to more integrated territorial development of the city region, strengthened food security, and employment and income generation.

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Introduction

Quito, the capital city of Ecuador, is currently home to about 2.5 million people, representing 15.5% of the total national population and 86.9% of the population of the Pichincha province in which it is located. In Quito, poverty – expressed as non-satisfied basic needs – affects almost 30% of the population, while extreme poverty reaches 7%, with almost 30% of the children below the age of 5 suffering from chronic malnutrition. The city has an urban unemployment rate of 5% and an underemployment rate of 40%.

Since the late 1980s, Quito's urban and industrial growth has been characterised by low-density extension and dispersion into the peri-urban and rural valleys surrounding the city. Its urban population doubled between 1980 and 2000, and current projections are that the city's population will grow from the current 2.5 million to more than 2.8 million by 2022. The urban demand for food will only increase, while urban food security may be challenged by a lack of food access and potential supply problems. Already, many families are resorting to small-scale food production on Quito's hillsides, open spaces, and remaining agricultural land areas to feed their families. In 2010, 88% of Quito's population lived in urban areas, while 22% lived in areas that were still considered to have a rural character (Plan de Desarrollo y Ordenamiento territorial del Distrito Metropolitano de Quito 2015 – 2025).

In response to the need for more integrated urban and rural planning and territorial development, the Metropolitan District of Quito (DMQ–Distrito Metropolitano de Quito) was established in 1988 as *'a new form of territorial organisation, local administration and participation and organisation of the community'* (Alcaldía Metropolitana de Quito, 2014). Today, DMQ comprises an area of 44.6% of the surface of the province of Pichincha. The DMQ is divided into 8 Zonal Administrations (Administraciones Zonales) covering an area of over 423,055 hectares. Each Zonal Administration is managed by an Administrator who falls under the direct authority of the Mayor of the DMQ. The 8 Zonal Administrations in turn are made up of 65 parishes (parroquias): 32 urban parishes that form the city of Quito, and 33 rural and sub-urban parishes.



Educational garden
Carlos Ponce Martinez.

@ AGRUPAR, 2015

In 2002, the DMQ started to develop actions to support urban and peri-urban agriculture under the umbrella of the AGRUPAR (Agricultura Urbana Participativa – Participatory Urban Agriculture) programme as an integrated strategy to reduce food insecurity, improve income and employment generation, supply healthy food to the population, promote recycling of waste materials, improve biodiversity, increase resilience, and improve social cohesion. To date, AGRUPAR is active in 87% of the urban parishes and 82% of the rural parishes of the Metropolitan District.

Description of concrete activities implemented

In April 2000, Quito hosted a meeting of local government representatives from nine cities in Latin America and the Caribbean. The meeting, supported by the UN Habitat/UNDP Urban Management Programme, resulted in the Quito Declaration, calling on cities to support urban and peri-urban agriculture as a means of reducing poverty, food insecurity, and environmental degradation. Notwithstanding the large presence of urban agriculture in Quito, the practice was unrecognised in municipal regulations and not considered in the city's or country's (agricultural) support programmes.

Following the meeting, a pilot programme was developed in El Panecillo neighbourhood, co-funded by the municipality and the UN Urban Management Programme. Activities were developed in support of household-based food production, organic waste recycling and the establishment of a community plant nursery. A micro-credit scheme for urban producers was also developed. Lessons learned from the El Panecillo project were used to develop a metropolitan programme aimed at enhancing the food security of Quito's urban, peri-urban and rural population.

In 2002, AGRUPAR was set up under the auspices of Mayor Paco Moncayo Gallegos and managed by the city's Directorate of Sustainable Human Development. In 2005, the municipality transferred AGRUPAR to the Corporación de Promoción Económica CONQUITO (Economic Promotion Corporation), created in 2003 to promote economic development in the metropolitan region. No legal changes were required for its setup; however, the inclusion of AGRUPAR within first the Directorate of Sustainable Human Development, and later CONQUITO, was key to assigning the programme an annual budget from other projects related to, for example, capacity-building or enterprise development. Since 2010, AGRUPAR has had its own programme budget within the annual operational plan of CONQUITO.

Today, AGRUPAR brings together more than 12,000 urban and peri-urban farmers and 380 community-based organisations. Project participants include rural migrants who have come to the city, while many others are underemployed workers. 86% of the participants are women. The average income of households joining the project is around USD 350 a month, well below the minimum needed to feed a household, which is set at USD 600/month. Most participants have only completed primary school.

AGRUPAR production should meet Ecuador's standards for organic agriculture, which requires the use of production technologies that enhance biodiversity, biological cycles and soil health, prohibit the use of GMOs, and control pests without chemicals. Training, technical and financial support is provided to AGRUPAR urban and peri-urban farmers and entrepreneurs by different municipal departments, universities, NGOs and the private sector.

AGRUPAR develops four specific lines of action:

1. **Support for urban, community and institutional gardening for home consumption** and the sale of leftovers. Specially targeted are female-headed households, the elderly, children and youth, social and rehabilitation centres, migrants and educative units, amongst others. Over 16,000 people have been trained in ecological production methods in the past years. Training is also provided in management skills, nutrition, food processing, and marketing. The AGRUPAR programme also provides producers with seeds and seedlings, poultry, guinea pigs and bees, inputs, and equipment. By January 2016, the city had supported 286 demonstration/community gardens, 650 family gardens and 142 gardens in schools and other institutions, as well as 314 small livestock production units (chickens and guinea pigs). More than 90% of the gardens are less than 500 sq. meters in size, and little over half are less than 100 sq. meters. Where there is insufficient space, AGRUPAR promotes vertical farming techniques such as growing plants in containers. The costs of establishing a basic 100 sq. meter garden for organic production is around USD 80, including tools, seeds, fertiliser, access to water, and fencing.
2. **Support for market-oriented local production in the DMQ region.** This strategy fits within two of CONQUITO's projects: employment training and small business development. Once urban or peri-urban food producers achieve household food security, AGRUPAR encourages them to form microenterprises in horticulture, animal husbandry, food processing and the production of organic inputs, and trains them in business planning, marketing, and accounting. The microenterprises are not only engaged in the production of vegetables, fruits, small animals, fish and ornamental plants, but also in the processing of jams, cookies, yogurt and cheese, drinks, and traditional snacks. To date, around 100 microenterprises have been set up. The microenterprises not only sell their products directly to consumers, but also supply products such as certified organic chilli and tomato paste to local food processing companies, or free-range chicken meat to restaurants. Producers that lack the capital to invest in such microenterprises have been supported through grass-roots investment societies, where each member contributes between USD 10 to 20 in start-up capital.



Microenterprise
producing seedlings.

@ AGRUPAR 2015

3. **Food supply and distribution.** Annual food production by AGRUPAR farmers is estimated at 400 tonnes/year. Over 25% is sold through AGRUPAR's organic produce markets – or bio fairs – that have become sources of healthy food, including organic vegetables (such as radishes, lettuce, carrots, and beetroot), herbs, meat and eggs, pickled produce, and jams for Quito residents. Direct sale of AGRUPAR produce through the bio fairs encourages fair prices and creates a high level of trust between producers and their customers. Producers get to know the people who buy their produce, while consumers see 'where their money goes' and how it benefits farming families.

To help producers meet food quality and safety standards, AGRUPAR has introduced improved processing technologies and the use of containers, packaging, and labels. In addition to the bio-fairs, networks of farmers have also been formed to deliver organic produce baskets directly to producers and to hotels/restaurants selling traditional food.

The city now has 14 one-day bio fairs, open weekly between Thursday and Sunday. The fairs are only open to producers participating in the AGRUPAR programme once they have followed a programme of training in organic production. In this way they serve as the main marketing channel for AGRUPAR and AGRUPAR can ensure origin and quality of (organic) production. The AGRUPAR project is registered as a producer and marketer of organic produce at the national level and shares the cost of product certification with producers. To ensure the widest possible availability and consumption of organic food, bio fairs are located in low-income neighbourhoods and peri-urban zones, as well as in better-off parts of the city.

Since 2015, AGRUPAR has also been extending its sphere of influence beyond the DMQ area by offering rural producers from surrounding areas marketing opportunities in the city. In collaboration with the District Agency of Commerce, existing food markets are being renovated or new markets (such as the Mercado La Floresta) are being established in strategic locations in the city, where rural organic/ecological producer organisations from the Pichincha Province and areas located outside the influence of the DMQ, as well as AGRUPAR producers, can meet and directly sell their produce to the consumer. Market control in such markets falls under the responsibility of the District Agency of Commerce and not of AGRUPAR.

Aggregation of rural (from inside and outside the DMQ) and urban production is the key to offering consumers a diversified and sufficient supply of produce. Rural production allows increased diversity of supply, adding to the horticulture produce from AGRUPAR's urban gardens other products which require larger growing areas, such as pork, trout, honey, eggs, grains, and beans.

4. **Promotion of food consumption, healthy diets and nutrition** through the AGRUPAR bio fairs and organic food markets and education. The DMQ's annual contribution to the AGRUPAR project – USD 360,000 in 2016, reaching 0.2% of the 2016 budget of the DMQ – meets the cost of training, technical advice and logistics. It also covers part of the costs of seeds, inputs, and equipment, and the supply of animals to participating producers, with producers also contributing their own means. While local government funding remains the main source of funding, around 25-33% of the investment in productive infrastructure – such as greenhouses and small sheds for animal husbandry – is contributed by the participating farmers. Participants also pay a symbolic price of USD 0.50 per training session and USD 1.00 for a technical assistance visit, with pensioners, children, people with disabilities, and vulnerable groups exempted from such payments.

Stakeholder analysis

Since 2005, AGRUPAR has been implemented by the Metropolitan Economic Development Agency CONQUITO, falling under the Secretary of Productivity and Competitiveness of the Municipality of the Metropolitan District of Quito. CONQUITO's board of directors comprises the DMQ municipality, universities, chambers of commerce, a representative of the Provincial Pichincha government, the national Ministry of Industry and Productivity–MIPRO, international cooperation represented by UNDP, and business associations. This governance model and the building of public/private partnerships covers the strategic needs of the Economic Programme, secures its institutional and technical legitimacy, and strengthens its intervention inside and outside the District. It also offers specific opportunities for the AGRUPAR programme. In the future it is hoped that investment in AGRUPAR gardens can be supported from a carbon emission compensation scheme carried out by Quito's private sector.

Communities can always solicit support from AGRUPAR. Joining AGRUPAR usually requires the formation of a small group of a minimum of four people, who apply for assistance and training in establishing a garden. They need to have enough space, access to water, and a commitment to working in the garden. Interested individuals/families can also join one of the AGRUPAR training courses. By contributing their own time and resources, producers show high levels of commitment to the programme. Their ideas for new activities are taken into account by AGRUPAR (the reason why the programme started to support livestock production, for example) and producers are directly involved in the management of the bio fairs.

As indicated above, AGRUPAR is financed by the DMQ and with contributions from participating producers. In addition, funding is generated through participation in national or international programmes (such as IDB Fomin, FAO, Taiwan cooperation) and donations (reaching a maximum of USD 3000/year).

International cooperation has played an important role in the start-up and expansion of the programme and its international projection. For example the IDB FOMIN programme provided significant assistance in financing technical staff (agronomist and veterinary staff); providing training in food processing, business planning, and gender; and establishing a socio-economic baseline and evaluation of the programme. The international NGO Triple Salto, since 2003, has organised the exchange of youth from the USA, UK, and Australia, and finances the construction of greenhouses in low-income schools and for female-headed producer households participating in the AGRUPAR programme. Through international cooperation, AGRUPAR has received (co)funding for food system infrastructure, such as production infrastructure, drip irrigation, food hubs, markets, and processing plants (one such processing plant is being funded solely by the Republic of Taiwan).

From 2008 to 2012, AGRUPAR exchanged experiences with other Latin American cities and specifically the garden programme PRO HUERTA from Argentina. Over the years, the AGRUPAR programme has been documented in various reports and journals by the Canadian IDRC, Japanese JICA, UN FAO, and RUAF, contributing to its international visibility.

The participation of academia promotes studies and support for field activities. AGRUPAR has, for example, worked closely with a research centre to identify and disseminate

potato varieties that are well adapted to urban growing conditions and contain high levels of zinc and iron. University social programmes also allow a large number of students to support AGRUPAR training programmes and the implementation of productive infrastructure (greenhouses, drip irrigation), and to participate in socio-economic and nutrition studies and evaluations.

CONQUITO integrates its actions with other municipal entities, such as: Health, Territory – Habitat and Housing, Environment, Culture, Social Inclusion and the District Agency of Commerce, Fundación Patronato Municipal San José and the Fundación de Museos de la Ciudad.

Through such collaboration, AGRUPAR's expertise has, for example, been used to help establish school gardens in support of the municipality's programme for 'Healthy Schools'. In more recent years, and with the topic of healthy food consumption and healthy lifestyles emerging as a new area of political interest, CONQUITO and the Secretary of Health are including healthy food promotion in the health education programme and outreach stations 'Health by Step' (Salud al Paso) and through the promotion of responsible consumption.

The Fundación Patronato Municipal San José manages Child Development Centres for children from 1-3 years of age and is reaching out to AGRUPAR to establish nutrition gardens in their centres to support the healthy food consumption training provided to the children's parents and caretakers. The collaboration with the Museos de la Ciudad has helped integrate the cultivation of food and medicinal plants with awareness-raising on sustainable consumption in public social meeting spaces.

In collaboration with the Secretary of Environment, a new project on 'Farms Adapted to Climate Change' is being set up in the DMQ's rural parishes, seeking to develop and promote new climate-smart production technologies that can be easily adopted by local farmers.

The private sector may start to play a more important role in future. New market opportunities may arise with 'Ecuador's inclusive business movement', which encourages the larger private sector to link with small-scale suppliers, such as farmers' organisations, provided their produce meets quality standards, is delivered on time, and is accompanied by an invoice. This may offer AGRUPAR farmers new possibilities to directly supply supermarkets and specialised outlets (hotels and restaurants). Such commercialisation was unsuccessful in the past, however, as prices paid to producers were lower than prices that could be obtained at the bio fairs.

CONQUITO has also established links with the National Government through its Ministries of Agriculture; Social Inclusion; Justice; Industry and Productivity; and Health and Education. From 2010-2012, the Ministry of Agriculture partnered with AGRUPAR in implementing the national nutrition strategy in areas with high levels of child malnutrition in Quito. Collaboration with the Ministry of Justice allows AGRUPAR to intervene in institutional detention and rehabilitation centres. Under the auspices of the Ministry of Social Inclusion, Industry and Productivity, urban producers were certified for their working expertise, recognising their contribution and thus providing an incentive for their further development. School gardens and food and cooking education have been set up in 142 schools in collaboration with the Ministry of Health and Education.



Children's garden, North Quito.

@ AGRUPAR, 2105

Level of collaboration and coordination between local/sub-national governments at a city region level

The DMQ coordinates its different programmes with the various urban and rural Parish governments/Boards that make up the Metropolitan area. AGRUPAR coordinates its activities as much as possible with the Presidents of the Parish Boards. Parish Boards can also request direct support from CONQUITO. The level of coordination varies among parishes. Parish Boards do not directly financially support AGRUPAR, but have, for example, invited farmers for meetings or training in their premises. In other cases, the Parish Board allows for the use of their central square/park for the marketing of AGRUPAR products.

The Zonal Administrations that make up the DMQ contribute complementary resources at their level to AGRUPAR. Coordination between the DMQ government, the Zonal Administrations, and the urban and rural parishes principally takes place at the level of the Municipality of the DMQ, formed by its Mayor and a Council that is made up of 15 councillors representing the urban areas of the DMQ as well as six councillors representing the DMQ's rural areas and parishes. The new National Constitution of 2008 transferred to the Metropolitan District of Quito all competences of a regional or cantonal government. Amongst its principal duties the Metropolitan Council is responsible for urban development of the city and the planning of urban and rural areas, public service supply, transport and use of public assets, approval of laws and regulations, budget approval, and tax management. Each councillor also presides over a specific commission, such as for example the Commission on Land Use, on Territorial Planning, on Strategic Planning, or on Development of the parishes.

A representative of the Provincial Government may sit on the Council and forms part of CONQUITO's board, in order to ensure that local and provincial planning processes and development plans are aligned. However, and as a result of differences in political orientation between the DMQ and provincial government, no operational and programmatic coordination is currently taking place between these two levels of government.

Description of results and analysis of impacts

Training course for Urban Farmers in the Garden La Factoria CONQUITO, Chimbacalle, south central Quito.

@ AGRUPAR, 2015



By 2015, AGRUPAR had achieved the following results in each of its programmatic areas:

- **Support for urban, community, and institutional gardening for home consumption and the sale of leftovers.** To date, over 2,500 urban gardens covering about 24 hectares have been supported by AGRUPAR. Project surveys estimate that about 47% of the produce is sold, with the rest being used for home consumption. Production has helped strengthen food security and diversification of the diets of the 12,000 involved urban farmers and their families. In addition, and on average, producer families earn USD 55/month from product sales and save another USD 72/month on food purchases. Total savings are 2.5 times the value of the governments' human development voucher, which provides USD 50 a month to vulnerable households.

Among the environmental benefits of the gardens are organic waste recycling and biodiversity. In the gardens, 12.5 kg organic waste is recycled each week, equalling 0.65 tonnes of waste per family per year. Some 50 edible plant species are maintained in Quito's urban gardens. The increased availability of fresh produce also means less need to transport it from rural areas, which generates fuel savings and reduces air pollution.

- **Support for market-oriented local production.** Half of the project participants generate revenue from their activities as well as part- or full-time employment. Around 100 micro-enterprises have been set up. 17% of the involved commercial producers earn (a supplementary) 300 USD/month from food production – close to the 354 USD minimum wage level for Ecuador. Thanks to the high profitability of the sale of organic vegetables, the producers have built up savings that they invest in greenhouses, irrigation systems, and livestock.
- **Food supply and distribution.** Over 400,000 kilos of food is produced in the urban and peri-urban agriculture gardens and farms, of which over 25% is sold at bio fairs. In 2015, the bio fairs of Quito sold more than 141 tonnes of ecological produce (valued at almost USD 260,000).

Nearly 170,000 consumers have attended these markets in the past years. By using new production techniques (greenhouses, drip irrigation) and crop rotation, local food production is no longer seasonal, but maintained throughout the course of the year.

- **Promotion of food consumption, healthy diets and nutrition** through the producer and organic food markets and education. Surveys have identified increased dietary diversity among consumers. In future, AGRUPAR could be further strengthened by linking it to the ‘Responsible consumers’ initiative in Ecuador that tries to mobilise 250,000 citizens in the country (5% of the population) to form a grass-roots counter-response to ‘modern’ food and to play a larger role in the transformation towards a sustainable and equitable city region food system in Ecuador. For many families this implies investing in locally, ecologically produced food and provides new opportunities for localised production systems.



Basket of organic produce.

@ AGRUPAR, 2015

The improvement in access to and local availability of (organic) food for vulnerable groups (both producer and consumer families) is considered the main impact of the programme. Increase in income and improved relations within the family as well as among participating families are other important impacts, as is the conversion of abandoned and waste spaces to productive land. Especially pensioners, the elderly, people with disabilities, and people without formal education have been able to generate new forms of livelihoods and social relations through the AGRUPAR programme. It is expected that with decreasing national economic resources – resulting from low petrol prices, with petrol being the main income source for the country – and the consequent loss of employment in the public and private sector, demand for support from AGRUPAR will only increase. AGRUPAR has already reached out to new target groups, such as workshops for employment seekers and increased partnerships with research institutes to support nutrition interventions.

The examples provided earlier of AGRUPAR’s collaboration with other strategic programmes (health, education, and environment) have given outreach and legitimacy to the programme. AGRUPAR’s policy influence has also led to the recognition of the role of urban and peri-urban food production in the DMQ’s climate change adaptation and mitigation strategies. The Department of Environment of the DMQ has been strongly involved in establishing indicators for measuring and reducing environmental impacts, including for example carbon and water footprints. Climate change mitigation and adaptation has been incorporated as one of the key sustainability indicators in the Development Plan of the city, and urban and peri-urban agriculture is highlighted as one of the relevant carbon compensation mechanisms and included as an ‘Indicator of a Sustainable City’. The AGRUPAR programme already promotes specific production techniques to adapt to a changing climate, including small greenhouses, drip irrigation, rainwater harvesting, and reforestation, amongst others.

Analysis of the enabling global, regional, national and municipal governance structure

The establishment of the Metropolitan District of Quito in 1988 operationalised the concept of a city region and provided a common governance and planning structure for the integrated territorial management of both urban and surrounding rural areas. The formalisation of this new level of government (in between a local government on the one hand and a provincial government on the other) helped to overcome any potential jurisdictional conflicts and coordination barriers between urban and rural municipalities, which approach each other's boundaries in contexts of rapid urban expansion and conflicting demands on rural land use.

The Metropolitan District of Quito has an explicit policy objective to improve the livelihood conditions of both its urban and rural inhabitants in different aspects. According to the most recent Strategic Development Plan 2015-2025, this requires addressing problems related to food insecurity, obesity, diet-related diseases, nutrition, and health. It also addresses the importance of environmental and waste management, and calls for the need to create income and employment opportunities through support for local productive value chains, sustainable agriculture, and local economic development in both rural and urban territories of the District.

AGRUPAR's contribution to more integrated spatial planning of rural and urban areas also complies with other strategic objectives as set out in the 2015-2025 DMQ's strategic development plan:

- To protect and consolidate the Environmental Structure of the DMQ by regulating rural land use, and by protecting and promoting natural areas and ecological corridors;
- To regulate sustainable urban and rural development that controls urban sprawl and promotes more urban densification; and
- To put in place new management for (the protection of) open public and green spaces (2015-2025 Plan Estratégico Metropolitano de Desarrollo y de Ordenamiento Territorial del Distrito Metropolitano de Quito, 2014).

It is for this reason that the DMQ allocates an annual budget for project implementation to AGRUPAR based on its annual operational planning. At the national level, and according to the normative framework on food for Ecuador, CONQUITO and the AGRUPAR programme are aligned with:

- **The National Plan for Good Living (Plan Nacional del Buen Vivir)** and its specific objective: 11. d) To promote the production of healthy and culturally appropriate food products oriented at the internal market, by means of integral support programmes that strengthen the capacity and diversity of small and medium urban and rural farm households, farming, indigenous, mountainous and afro-Ecuadorian communities.
- **The Food Sovereignty Law (Ley de Soberanía Alimentaria)** and its article: Art. 14. Promotion of ecological and organic production, through support mechanisms, training programmes, special credit lines and marketing mechanisms, oriented at the internal and export market.

Several key challenges still remain, however, in order to expand the area covered by the project. So far, the concept of urban and peri-urban agriculture (or metropolitan agriculture) is still not explicitly recognised/mentioned in DMQs land use plans. This constrains, for example, the development of an affirmative policy and legal framework to allow farming households access to and use of open and vacant spaces for urban agriculture, without requiring previous legalisation by its users. Since an estimated 30% of urban Quito is vacant land, development of agriculture in the urban parishes will also require a review of its cadastre to identify municipal areas that could be allocated for agricultural use, and measures put in place to extend the concession of urban space to producers. A draft ordinance on urban and peri-urban agriculture is currently being developed that seeks to tackle this gap.

As mentioned earlier, a second challenge still remains with regards to the promotion of stronger linkages between the DMQ and Pichincha Province, and the inclusion of organic producer groups located in the Province in the organic markets (such as the La Floresta market) that are being promoted. It has also been difficult thus far to include the practice in provincial legislation and operational programmes.

Lessons learned and potential for replication

By working at the level of the entire DMQ and across urban and rural parishes, AGRUPAR contributes to sustainable territorial planning and management and the protection and rehabilitation of (remaining) rural and agricultural areas in the city region. It does so in an integrated territorial perspective that also defines areas for nature conservation and protection, and plans for a more compact city and efficient food distribution systems, which are all competences of the DMQ municipality.

By integrating both urban and rural parishes in AGRUPAR's work, as well as by expanding AGRUPAR's intervention to rural areas outside the DMQ, **the programme has contributed to the development of a more sustainable city regional food system that both supports the livelihoods of urban and rural agricultural producers as well as enhances the access of the (low-income) urban and rural population to**



AGRUPAR promotes gardening in both more densely built up as well as in more open areas (right: Valle de los Chillos, east of Quito).

@ AGRUPAR, 2105

organic and healthy food. AGRUPAR has helped to demonstrate the role that local urban and rural producers can play in maintaining Quito's food sovereignty.

The establishment of programmes like AGRUPAR requires:

1. **Political will that guarantees the programme an institutional home, a fixed budget and a specialised technical team;**
2. **That urban and peri-urban agriculture be linked to larger city (region) development objectives and plans such as food security, economic development, environmental management, and climate resilience.** A principal mistake is to limit an urban agriculture programme to the creation of gardens only. As the AGRUPAR coordinator states: 'gardens are the means, not the end'; and
3. **The above also requires that information on social, economic and environmental impact indicators is collected and permanently made available to the authorities and decision-makers.**

AGRUPAR could well serve as a model for similar programmes in other cities, and form the basis for a national policy and programme on local production. CONQUITO already maintains relations with other Economic Development Agencies in other cities in the country. CONQUITO has been sharing information and has offered advisory services to other local governments. However, the lack of funding and technical staff capacity has so far limited uptake by other cities, which still often prioritise infrastructure investments over the development of agricultural production and marketing programmes. In addition to further awareness raising and the sharing of results impact data, policy and financial support from the provincial and national level is also essential to allow for such replication. In Ecuador, as in many other countries, agricultural development programmes still focus only on rural areas. It is difficult for urban and peri-urban farmers in the DMQ to register their associations, which, for example, restricts their access to land, since municipal land is granted only to legally recognised entities. There are no specialised agricultural services to provide them with technical advice or credit, nor are they included in national programmes for input supply and the regularisation of land tenure.

Upscaling of the programme to the national level would thus require (1) the recognition of urban and peri-urban agriculture as a legitimate model of agriculture in addition to rural agriculture; (2) the recognition of urban and peri-urban producers so that they can register their associations and benefit – as do their rural counterparts – from agricultural support and public procurement programmes; and (3) the inclusion and recognition of (the importance of) urban and peri-urban agriculture in the Organic Law on Food Sovereignty. The law, adopted in 2009, establishes the legal obligation of the State to ensure that individuals, communities, and peoples achieve food self-sufficiency. Inclusion of urban and peri-urban agriculture will contribute to promoting a stronger localised production base oriented at a local market.

The further integration of rural producers from the Province, who are not directly linked to AGRUPAR, requires a National normative framework for the support of agro-ecological producers, to comply with a common set of quality standards. AGRUPAR has been invited by AGROCALIDAD – the National Authority for Control of Organic and Agro-ecological Food – to jointly define a normative and regulatory framework for corresponding production principles and quality control. Participatory Guarantee Schemes are now being set up as a possible such mechanism. AGRUPAR also continues to actively par-

ticipate in lobbying for a national framework that would regulate agro-ecological production in the country (the Normative Framework for Support to Agro-ecological Production in Ecuador) as well as for the development of a National Regulation of Good Agricultural Practices in Vegetable Production, in the same way it supported the establishment of a General Normative framework for the Promotion and Regulation of Organic, Ecological and Biological Production in Ecuador (2013). This will again require further programmatic coordination between the DMQ's urban and peri-urban agriculture programme and the rural agriculture programmes managed by the provincial and national government.

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04_ROSARIO, ARGENTINA

Operationalising Urban-Rural Linkages through the Preservation and Improved Use of Peri-Urban Agricultural Land

Marielle Dubbeling¹ and Raul Horacio Terrile²

Summary

The city of Rosario in Argentina has traditionally received a large part of its fruit and vegetable supply from its peri-urban horticulture greenbelt and the wider region. Local and regional agricultural production has, however, greatly diminished over the past years due to urban expansion and conversion of agricultural land to soybean production for export. Soybean producers as well as remaining horticulture farmers currently produce their crops by applying high levels of chemicals with corresponding risks for environmental contamination and human safety. Overall, the city has seen a reduction in its local production capacity to feed its population, becoming more dependent on longer-distance food imports, while horticulture farmers have lost their livelihoods. Human health concerns for food safety have also increased.

In 2014, the local Rosario and Provincial Santa Fe government decided to implement a strategy towards urban sustainability as well as a Climate Action Plan that builds on the protection and promotion of sustainable horticulture in the city region's peri-urban and rural agricultural areas, and the direct marketing of quality produce to nearby urban markets – the latter enhancing the urban population's access to healthy foods. By promoting Good Agricultural Practices and conversion to ecological agriculture, sustainable management of natural resources is promoted and environmental contamination – and related health risks – reduced. The enhancement of localised production preserves and improves farmers' livelihoods while reducing the need for longer-haul (refrigerated) food transport and storage, as well as related greenhouse gas (GHG) emissions.

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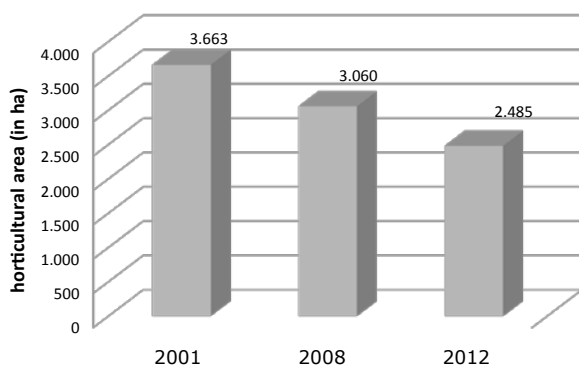
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Introduction

The Greater Rosario Region in Santa Fe Province, Argentina, consisting of the city of Rosario and 20 surrounding municipalities, is home to about 1.5 million inhabitants. As with many cities, the food provisioning system for the city is made up of different food flows and production locations, some found in the Rosario urban area (urban gardens), its peri-urban areas located in the Greater Rosario Region (the horticulture greenbelt), and rural areas in the Province, with other food items coming from more distant locations in the country or from international sources.

In the past, horticulture production from Rosario's greenbelt used to supply most of the fruits and vegetables to the city, including potatoes, tomatoes, lettuce, onions, carrots, squash/pumpkin, and different varieties of fruits. However, urbanisation of agricultural land as well as shifts from horticulture production to soy production for export have largely diminished the local agricultural production area and capacity over the past years.

A 2014 urban food systems scenario study, coordinated by the RUAF Foundation–The Netherlands, local research partners, and the Municipality, and funded by the Climate Development Knowledge Network–CDKN UK, revealed that fresh produce now travels on average between 300 km and 1000 km to reach the city. The study highlighted, for example, the fact that only 10% of the total volume of lettuce annually transported to the Greater Rosario region – some 40,000 tonnes per year – originates in the urban and peri-urban production region, with distant production regions contributing ca. 90% of this supply. Assuming similar production practices in local and distant production regions, the study also calculated that 95% of the city's CO₂ emissions related to vegetable transportation and refrigeration could be reduced if the six most common vegetables were produced in Rosario's urban and peri-urban area. This would require an additional 600 hectares of land for production, which would, in principle, be available.



Loss of horticulture area (in hectares) in the Rosario greenbelt from 2001 (3663 ha) to 2012 (2485 ha).

@ Censo 2012 Cinturon horticola Rosario



Reduction of the horticulture area (in hectares) in the Rosario greenbelt from 1960–2015.

@ Censo 2015 Cinturón horticola Rosario

A production survey showed that current local production is mainly provided by small-scale family farmers who cultivate smaller areas of land and generally apply large amounts of agrochemicals. Most do not benefit from technical assistance and are advised only by vendors of agrochemicals. Research and laboratory analysis showed high levels of product (bacterial and chemical) contamination and lack of protection for agricultural workers, especially when applying pesticides. Producers also indicate increasing competition from imported products from other regions and low-quality production. At the same time, the Rosario population shows increasing consumer consciousness and demand for quality and healthy food products.

As part of its urban sustainability and Climate Action Plan, the Municipality of Rosario, in collaboration with the Province of Santa Fe, decided in 2014 to develop a programme aimed at ensuring sustainable food production (free from chemical and biological contaminants) that would improve the quality of life of producers and their families, as well as agricultural workers and consumers, while preserving the environment.

The programme involves the following activities, which will be further described below:

- Promotion of Good Agricultural Practices and conversion to ecological production;
- Substitution of imported agricultural produce with local and region production;
- Promotion of short food chains and direct marketing.

The programme is also anchored in existing legal and normative frameworks, such as local Ordinance No 8871/11, which regulates a pesticide-spraying free zone of 100 meters (later increased to 500 meters) from the urban limit of Rosario. At the Provincial and National level the programme is aligned with existing programmes of support for vulnerable family farmers and the promotion of ecological production in peri-urban areas in the country.

Description of concrete activities implemented

In April 2014, the Municipality and its Secretariat for Production and Local Development launched a local programme 'Production and marketing of vegetables produced with good agricultural practices', for the conversion to and improvement of ecological horticulture production in the peri-urban region of Rosario as well as the promotion of localised consumption of quality and healthy foods.

The programme was initiated by the Municipal Secretariat (Director Roberto Llanes, in 2015 replaced by Raul Terrile) as part of its Food Programme and the Family Agroindustry programme of the Ministry of Production of Santa Fe Province (Sergio Casado – then Director of Territorial Development, Pedro Pavicich, Secretary of Support Services, and Alejandro Marengo, current Director of Territorial Development in the Ministry).

In August 2014, and as one of the first steps and the basis for the programme, the Municipality doubled (from 400 ha to 800 ha) the protected area for peri-urban agriculture in its city development plan, by decision of the Mayor Mónica Fein.

'We see the importance of preserving and expanding areas for local food production. The municipality has included a new land use category in our urban development plan being 'land used for primary production'. We have currently doubled the peri-urban agricultural protection zone from 400-800 ha%' – Mónica Fein, Mayor, Rosario (August 2014)



Rosario's peri-urban greenbelt.

@ Municipality of Rosario

In its direct work with involved horticulture producers, the programme promotes the development of demonstration models of Good Agricultural Practices and conversion to ecological agriculture. Technical Municipal and Province staff provide training and technical support – through regular support visits – to the peri-urban farmers in production and marketing. The programme also provides financial support (low-interest credit) to farmers for the purchase of new equipment and materials.

In addition, new marketing channels for ecological produce have been sought to ensure producers sufficient income and future perspectives. The city signed an agreement with the Association of Gastronomic Hotels in Rosario (Asociación Empresaria Hotelero

Gastronómica de Rosario – AEHGAR) to promote direct marketing of peri-urban/rural horticulture products in the associated hotels and restaurants (in 2014, two 5-star hotels and three restaurants participated in the programme). This not only allows for more stability and an increase in rural producer incomes, it also increases the urban population's access to healthy foods.

The hotels and restaurants can show their consumers that the products display a 'Product of My Area' (Producto de Mi Tierra) logo, a quality label provided by the Government of the Province of Santa Fe. The logo aims to characterise the products by their location of production, tradition and excellence, to support their distinctive place in the market and their recognition by consumers. Producers receive a 20% top-up on the price for their 'cleaner' products, produced with ecological production practices.



Product logo and quality label.

@ Municipality of Rosario

Food distribution and logistics (linking supply and demand) were organised by the Food Programme of the Municipality of Rosario. The programme experimented with 3 different strategies for product transport:

- a. First, a private distributor with a refrigerated van was contracted to collect the fresh produce in the morning from the farmers and deliver it to each of restaurants/hotels. The buyers assumed transport costs, which were set at a fixed price (independent of the volume of merchandise).
- b. In a later stage an existing distributor, who was already engaged in supplying products to the restaurants and hotels, was contracted in order to complement transport of conventional produce with organic products. This had the advantage that restaurants had to deal with only one distributor for both types of products. The disadvantage, however, was that conventional and organic products were mixed and were not always easily distinguishable and that transport took place in non-refrigerated vans.
- c. A third strategy involves direct delivery by one of the producers who owns a van.

With the change of government in 2015, the programme was temporarily halted. However, new targets are set for 2016 and have been validated at a 'Sustainability Forum' (Mesa de Sustentabilidad) in which members of all Municipal Secretaries participate with the aim of coordinating all activities that have to do with sustainability. Plans are to expand marketing from hotels and restaurants to vegetable shops and the sale of vegetable boxes to consumers and institutions. Training will be provided to wholesale markets (there are 2 in Rosario) to apply safe food-handling practices and control systems for food quality. The programme also proposes to establish a new permanent market for organic produce where peri-urban producers – who fulfil the quality requirements – can sell their products directly to consumers.

The programme is financed by the Municipality and the Provincial Ministry of Production, in the latter case from a special fund that was set up to help producers in climate emergencies. Costs for the first year reached 700,000 Argentinian Pesos (currently ca. 42,000 euros), financed by the Province. The municipality contributed with technical staff, transport, and communication facilities. The associated hotels and restaurants covered costs of food transport and products.



Organic vegetable box.

@ Municipality of Rosario

Stakeholder analysis

As mentioned, the programme is implemented by the Secretariat for Production and Local Development of the Rosario Municipality in coordination with the Programme for Family Agroindustry of the Ministry of Production of Santa Fe Province.

The Province of Santa Fe, through its Ministry of Production, is a key partner in the programme. It provides financial support (subsidies and low-interest credit) to farmers to buy and upgrade inputs, infrastructure, and equipment. It provides technical assistance through an agronomic engineer and has donated infrastructure/equipment for the proper cleaning, storage, and transport of vegetables. It ensures quality control and provides product labels. It has also engaged in a public communication campaign to inform hotels/restaurants and their clients on the organic and high-quality products offered. Its participation is also crucial in ensuring policy uptake into different provincial ordinances and programmes supporting and regulating agricultural and ecological production.

Activities are coordinated among different Municipal Secretaries. For example, the Municipal Secretary of Planning is helping to define the costs and next steps for the renovation of an old railway building and its conversion into a permanent organic market. Other municipal agencies include the Rosario Food Institute (Instituto del Alimento de Rosario), associated with the Municipal Secretary of Health, which is responsible for product quality control.

The civil society association, the Agency for Development of the Rosario Region (Agencia para el Desarrollo Región Rosario–ADERR) is responsible for funding management. ADERR includes more than 70 public and private entities. Its Directorate is integrated by representatives of municipalities and communities in the Rosario Region, public and private universities, private sector and cooperatives and technical organisations.

Technical and research partners include the National University of Rosario (Universidad Nacional de Rosario), the College of Agronomic Engineers (Colegio de Ingenieros Agrónomos), the National Service for Agrofood safety and quality (Servicio Nacional

de Sanidad y Calidad Agroalimentaria–SENASA), the National Technical Agronomic Institute (INTA) and others, all involved in training and technical assistance in Good Agricultural Practices and monitoring of programme activities. The National Prohuerta programme specifically supports the transition to ecological production. In future, the intention is to involve these organisations in professional and student-training programmes on the transition to ecological/organic production.

Technical supervision of producer's compliance with Good Agricultural Practices.

@ Municipality of Rosario



Other programme partners include the **private sector**, amongst which the Asociación Empresaria Hotelero Gastronómica de Rosario–AEHGAR, which buys the products and promotes the project among a wider group of their associates and the horticulture producers from the Rosario Greater Region. Participation of the hotels and restaurants is crucial for guaranteeing and expanding market outlets for ecological producers.

Level of collaboration and coordination between local/sub-national governments at a city region level

Activities implemented in the Rosario Metropolitan Area, made up of 20 localities, are coordinated through the Metropolitan Coordination Unit (ECOM–Ente de Coordinación Metropolitana), in which all localities are represented. Nearly half of the localities make up the horticulture green belt of Rosario and are directly targeted by the programme. Coordination through ECOM is extremely important for enabling agreement on joint actions for the entire Metropolitan Area. ECOM is currently developing territorial development plans, taking into account such coordinated actions.

In 2014/2015, monthly coordination meetings were organised with the municipalities and communities involved, aimed at the development of similar activities in support of local production and marketing. In the particular case of the Municipality of Soldini, an agreement was signed between the Secretariats of Production of both Soldini and Rosario. Together with the National Secretary for Family Agriculture and the ProHuerta programme, a local institutional Forum for the promotion of agro-ecology was formed (MILPA–Mesa interinstitucional local de promoción agroecológica), intended to promote conversion to ecological production practices by Soldini producers.

Further linkages are being sought between Rosario Metropolitan Areas and other surrounding localities in the Province that produce products other than those currently found in the Metropolitan Region. These include, for example, potatoes, carrots, and onions, which are in large demand by the hotels and restaurants.

Description of results and analysis of impacts

In the past year (2014-2015) the local production and marketing programme has achieved the following:

- Four horticulture producers have converted 50 has. of production to ecological production and are directly marketing their produce to hotels and restaurants in Rosario. The aim for 2016 is to reach a total of 20 producers in the ‘no-spraying zone’ in an area of 100 meters from the city limits (see below) plus 20% of all producers located in the protected greenbelt area.
- Three hotels and four restaurants are selling products with the ‘Products from My Area’ label and are running information campaigns on these products for their consumers.
- The programmes ‘Good Agricultural Practices’ and ‘Conversion to ecological production’ have been included in the Rosario Environmental Plan (Plan Ambiental Rosario), as have policies directed at mitigating climate change through the Sustainable Rosario Programme (Programa Rosario Sustentable), that promote the participation of all municipal areas in actions directed at reducing, moderating or mitigating climate change.
- An extended protected horticulture area was included in the city development plan in 2014.
- Livelihood conditions for associated producers have improved (reduced health risks from agrochemical use, access to social benefits, political recognition as family producers who can benefit from local and provincial support programmes). At the start of the programme several producers did not have any formal recognition due to lack of land ownership through formal contracts. Through the programme they have been registered with the Secretary for Family Agriculture–RENAF, allowing them to receive social and pension support.
- Production conditions for involved producers (upgraded infrastructure/equipment) have improved, allowing for improved production and financial profitability.
- Farmer incomes have increased as producers receive a 20% top-up on their products compared to prices for conventional produce.
- The quality of products has improved and consumer risks have decreased, through the control of production practices (application of safe and clean production, storage, processing, and transport practices).

Analysis of the enabling national, regional and municipal governance structure

The 'local production and marketing programme' is currently anchored in the following institutional and legal frameworks:

- Municipal Ordinance 9144/13, which regulates the use of urban land and has established a protected agriculture and fruit production zone of 800 hectares in the protected area surrounding the City for the promotion of fruit, horticulture, nursery, and animal production designated for consumption in the city region;
- Municipal Ordinance No 8871/11, which regulates the use of chemical pesticides and herbicides, establishing a no-use zone of 100 meters, and an area of 500 meters for controlled use, from the urban limit. It promotes ecological and organic forms of farming and the conversion of conventional to ecological forms of production;
- Province of Santa Fe Law 11.273, which regulates the use of agrochemicals. The Law also establishes protection areas around cities. A review of the Law is currently being debated to install peri-urban areas free of chemical spraying for 200 meters around urban areas and to promote ecological production practices; and
- At the national level: the National Programme Pro Huerta INTA/MDSN supports ecological production in peri-urban areas around Argentinian cities. The Secretary of Family Agriculture, National Ministry of Agriculture, also has a specific programme for the promotion of ecological agricultural production.

Lessons learned and potential for replication

Support and involvement of the Province of Santa Fe has been crucial for programme implementation, enlarging the financial and human resource base needed and anchoring the programme in Provincial policies that promote reconversion of production systems (good agricultural practices and the transition to ecological farming) **and regional food systems.** Their quality guarantee is also vital to increasing consumer demand for differentiated products.

Provincial support is also important in order to **expand the programme beyond the metropolitan region in order to serve hotels and restaurants with products currently not grown in the Rosario horticulture belt.** The current involved producers from the Greater Rosario Region can only offer a more limited supply.

Once the system is in place and producer-consumer relations are established on a basis of trust, it is hoped that the programme can continue to function without further government support. The programme has been most successful in those cases where producers and restaurants/hotels had direct contacts, so that the restaurants/hotels could get to know the producers and establish trust, and the producers could understand consumer demands and requirements.

At the same time, the expansion of market outlets, by increasing the number of associated hotels and restaurants, or opening new organic product markets, is

important for ensuring sufficient volumes of demand to sustain local ecological production. This also helps to increase new customer segments (such as, for example, national and international tourists), in turn increasing consumer demand for such products.

Support for (improved) localised/regional production systems needs to combine production and marketing support with consumer education and awareness. Once citizens are made aware of where their food comes from and the quality of the food they consume, more responsible consumption habits will increase demand for more healthy and local products.

A city regional food system focus allows the operationalisation of urban-rural linkages in areas such as integrated territorial and land-use planning (balancing urban expansion and preservation of agricultural areas) and investments in both the rural and urban sides of food value chains. As indicated above, building government support at the local and provincial level, as well as engaging private sector and consumer support, are key in this respect.

The Rosario local production and marketing programme can be replicated and adapted to other locations. This would require political will and policy support for local food value chains. Programme replication by the Municipality of Soldini is a first example of such wider replication within the country.

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05_GREATER MONROVIA DISTRICT, LIBERIA

Integrating Urban and Agricultural Development in Metropolitan Planning

René van Veenhuizen¹

Summary

Greater Monrovia District, Liberia (considered to be the future Greater Monrovia Metropolitan Area), is being confronted with the need for more regulated urban and territorial planning as well as more sustainable food systems planning. Integration of agricultural areas in urban land use planning and management in the District is currently being promoted by both the District and the cities and townships it includes, as well as by the national government. This is done through a multi-stakeholder consultation and planning process engaging different local and national governments as well as other actors.

Agricultural land use is considered, taking into account linkages to resource recycling, new forms of land use management, planning and territorial development models. This provides an opportunity to better understand the interconnectedness of the food system to other policies, such as waste management, land use planning, governance, and resilience.

Particular attention has also been paid to strengthening urban-rural linkages to the rapidly developing outskirts of neighbouring districts, and within corridors along the main roads to Monrovia from the municipalities of Gbarnga and Tubmanburg, located just outside the Greater Monrovia District.



Agriculture in Monrovia.

@ Welthungerhilfe/
Jens Grossmann

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Introduction

Liberia has one of the worst food deficits in the world. Extreme poverty affects over 50% of the rural population and 30% of the urban population. Well over 60% of the Liberians are estimated to be food insecure, while 13% are unable to meet nutritional requirements.

The total population of Liberia is estimated at 4.3 million (World Bank statistics in *Building Markets*, 2016) with an annual average growth rate of 2.4%. Almost 50% live in rapidly growing urban areas, with a majority of the urban population living in the Greater Monrovia District. This District stretches over 20,000 ha and includes the city of Monrovia, the city of Paynesville, and various Townships, such as Barnesville, Caldwell, Congo Town, Dixville, Gardnerville, Garglor, Johnsonville, New Georgia, Virginia, and West Point, with several contested boundaries and mandates.

The District is facing several challenges, such as high levels of rural-to-urban migration and resulting urban sprawl, land ownership issues, waste management and protection of the main swampland, limited employment opportunities, high levels of crime, and local revenue collection capacity. There is increasing demand for more integrated and regulated urban development of Greater Monrovia, requiring enhanced collaboration between national and local actors and among the various localities in the Greater Monrovia District, especially with regard to land and waste management, as well as food system planning (as expressed in several meetings on urban development, such as the Greater Monrovia multi-stakeholder platforms on urban and peri-urban agriculture and the August 2015 conference organised by RUAFA, Monrovia City Corporation, and Welthungerhilfe, with UN-Habitat). In addition, the rapid development of smaller cities located around and on the main roads leading to the Greater Monrovia District, such as Gbarnga, Tubmanburg, and Buchanan, is increasingly the subject of discussion and planning.

Food system planning has become a more evident subject on these agendas, especially during and after the recent outbreak of the Ebola Virus Disease (EVD). The EVD crisis had a negative impact on food availability, especially on formal markets, and showed the vulnerability of the urban poor in particular to rising food prices, given their high dependency on imported food, on the one hand, and their limited access to regular sources of income, on the other. The Ebola outbreak also hampered local production, although recent studies show that food-producing households, or those that live close to urban farming areas, were less affected.

Urban and peri-urban agriculture has been practiced for quite some time in Monrovia and other Liberian cities by urban and peri-urban households growing crops such as cassava and vegetables. Lack of access to land is mentioned as a major constraint limiting further engagement in food production. Cultivation takes place on privately-owned backyards (in built-up areas), in open spaces in the city (upland and lowland (swampland), government-owned, and privately-owned land) or in the peri-urban areas of Paynesville and in the townships of Greater Monrovia (this is similar to other smaller cities in Liberia, such as Gbarnga and Tubmanburg). Commonly there is no formal arrangement for the use of these (peri)urban areas. Land used for farming belongs either to government institutions, individuals, families, or traditional authorities.

For the past several years, the Government of Liberia and some major donor agencies and NGOs have been promoting urban agriculture. Amongst these programmes and starting in 2009, the RUA Foundation, Welthungerhilfe (WHH) and CARE-Netherlands, with various other stakeholders – including local and national governments, NGOs, universities and urban producer organisations – have implemented EU-funded UPA projects that cover Greater Monrovia and the transport corridors between Monrovia District and 2 smaller neighbouring cities, Gbarnga and Tubmanburg. Following a

process of multi-stakeholder policy formulation and action planning, urban and peri-urban agriculture has been incorporated in the Cities' agendas and as part of the national framework for Urban Development (Ministry of Internal Affairs-MIA, supported by UN-Habitat) and the Ministry of Agriculture.

Integration of agricultural areas in urban land use planning and management in the District (as well as in other cities in the country) is a concrete strategy under development in Liberia and is being applied towards strengthening rural-urban linkages in the area.



Different forms of urban and peri-urban agriculture in Monrovia.

@ RUA Foundation

Description of concrete activities implemented

A process of multi-stakeholder engagement, awareness raising, information gathering, and policy development was facilitated by the RUA Foundation from 2009-2015. A Multi-Stakeholder Forum (MSF) was formed at the level of the Greater Monrovia District, recognising the need for collaboration among the Districts' various cities and townships and also anticipating the development of the Metropolitan Area of Greater Monrovia. MSF stakeholders represent over 25 institutions, including authorities of cities, townships and Ministries, as well as other public agencies such as the Environmental Protection Agency (EPA) and Lands Commission, NGOs, the University of Liberia, farmers' organisations, and international organisations, as well as representatives of the media. Similar MSFs have been organised in Tubmanburg and Gbarnga.

Activities proposed in these forums and implemented in different areas so far include the following:

Urban agriculture as part of land use mapping

A GIS database on urban (agricultural) land use was developed in partnership with the Monrovia City Corporation (MCC) and the Liberian Institute of GIS (LISGIS), in collaboration with the Ministry of Agriculture, the Lands Commission and UN-Habitat. For this purpose, relevant urban and peri-urban agriculture typologies were developed and agreed upon with UN-Habitat and LISGIS (based on a national urban survey). This land use mapping supported MCC with the inclusion of urban and peri-urban agriculture in its urban planning system, while at the same time the Ministry of Agriculture, the Farmers Union Network of Liberia (FUN), and the NGOs Welthungerhilfe and CHAP were trained to similarly include this in their data systems and link these to the MCC and LISGIS datasets. This will facilitate access to information on land availability and use for land-owners, farmers, and local authorities, and will enhance the provision of services to farmers and entrepreneurs at the city and township level. A similar national dataset is still under development, and its use very much depends on availability of funds.



Mapping of urban and peri-urban agriculture sites in Monrovia.

@ RUA Foundation

Policy influencing and uptake

- A Monrovia City Strategic Agenda on urban and peri-urban agriculture and work planning for the years 2013-2015 (based on this agenda) was developed, and, together with similar agendas for towns like Gbarnga and Tubmanburg, formed the basis for the development of a national agenda for 2015 and beyond.
- The Multi-Stakeholder Forum of Greater Monrovia provided a platform for urban farmers and their organisations to discuss and negotiate improved services for urban farmers with the Ministry of Agriculture, MCC, townships, and other actors. It also provided a platform for MCC, MIA and the townships to discuss future development of the Greater Monrovia District into a Metropolitan Area, as current planning policies are out-dated and a proper policy framework to guide this development is missing.
- In collaboration with UN-Habitat and the Ministry of Internal Affairs, inputs were provided to the National Urban Policy and Planning System, which were discussed at a National Conference on Urban Planning in August, 2015. UN-Habitat has reported on the area of urban and peri-urban agriculture in the cities now being surveyed, and the intention is to use the urban and peri-urban agriculture typologies discussed for the Greater Monrovia system in other cities in the country as well.

Training and extension

- A complementary study on the food safety of urban food production in Greater Monrovia and Tubmanburg has been implemented, focusing on the use of contaminated water and land. Based on the study, awareness has been built among MSF and other actors, and training provided to 100 representatives of over 30 farmer groups and selected key institutions on risk reduction at farm and market levels. This participatory study assisted the Ministry of Health (MoH) in operationalising its National Food Safety Guidelines (published in 2011). The Guidelines articulate the need for improvement of food safety and seek to clarify the roles and responsibilities of the ministries and agencies involved in food safety activities in the country, which will allow for the further implementation of Risk Reduction Measures.
- Research has been done on the re-use and recycling of urban organic wastes and the design of innovations. Coordination has been sought with other existing programmes, such as the MCC-executed FISH project (Fostering Innovative Sanitation and Hygiene). The focus was on building (public) toilets, and collecting and treating faecal sludge (FS) for safe and productive re-use as fertiliser. However due to the Ebola Crisis, further activities such as training on co-composting and piloting of techniques of urine separation and the use of urine and compost with selected farmer groups could not be implemented by MCC.

The EVD crisis in 2014 largely affected further institutionalisation and implementation of the City Strategic Agenda and various action plans, but also emphasised the need to improve resilience by promoting local food production and informal food markets. Since 2015, new momentum has been created with MCC and other key actors to further implement the plans and coordinate development of the Metropolitan Area of Greater Monrovia as part of the development of a National Urban Policy.

Stakeholder analysis

Key stakeholders, with regard to their mandates and roles in influencing the development of urban and peri-urban agriculture in Greater Monrovia, Gbarnga and Tubmanburg, include Monrovia City Corporation (MCC), the Ministry of Agriculture (MoA), the Ministry of Internal Affairs (MIA), the authorities of other cities and Townships in Greater Monrovia, the University of Liberia, and the Farmer Organisations (Farmer Union Network of Liberia – FUN – and the Urban Farmer section – FLUPFA), as well as NGOs such as WHH (Welthungerhilfe), ACF (Action Contre la Faim), CARE, FED (Farmer Enterprise Development, USAID), CHAP, Mary's Meals, etc. Other national authorities such as the Environmental Protection Agency (EPA), Ministry of Health (MoH), Ministry of Public Works (MPW), and the Lands Commission (LC) have participated to various degrees in the Greater Monrovia Multi-Stakeholder Forum meetings and in various other related activities.

Participation of the Ministry of Health (MoH), for example, was key, as MoH developed the National Food Safety Guidelines, which required close collaboration with MoA, and the city and township authorities, while with support from the National Standard Lab (NSL, Ministry of Commerce), soil, water and plant tissue sampling and testing for contamination was implemented.

International cooperation played an important role in facilitating the multi-stakeholder process and (co)financing land use mapping, food safety studies and training. The participation of EU- and USAID-funded programmes, as well as FAO and UN-Habitat, was particularly important in information-sharing and in, for instance, on-going lobbying for the inclusion of urban and peri-urban agriculture in the National Urban Policy, in which MCC took a leading role in 2015.



Developing a Strategic Agenda on urban and peri-urban agriculture.

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Level of collaboration and coordination between local/sub-national governments at a city region level

The City of Monrovia has a separate status (directly responsible to the president), while other cities and the Townships of Greater Monrovia District fall under the jurisdiction of the Ministry of Internal Affairs (MIA). Both MCC and MIA administer the development of Greater Monrovia District as a Metropolitan Area. But the body that de facto governs and stimulates further development is the Monrovia City Corporation.

Decentralisation is high on the agenda but is dependent on donor support (such as through urban planning and development provided by UN-Habitat). Continued coordination between cities and townships at the level of the District is still quite weak as governance and (food) planning capacity of the townships needs to be strengthened. This requires for instance, the development of new ordinances that will allow for more integration and joint management (MIA and Monrovia City Corporation are taking the lead); decentralised Township programmes, e.g. around (farmer) support centres (initiated by the University of Liberia, the Farmers Union, MoA, and MIA, with selected Townships); support for small (informal) markets for local produce; and food safety control (MoH and MoA).

Description of results and analysis of impacts

The multi-stakeholder planning and action process has contributed to increased awareness and capacity amongst all organisations involved of the role and potential of urban and peri-urban agriculture in sustainable city region development and their own roles in its development (for example related to policy development, urban land use mapping, food safety, and providing services to urban farmers). For example, there is now increased attention towards safe urban agriculture and food in various value chains, and the safe and productive use of wastes in urban agriculture; the role of savings and loans groups is recognised, as is the importance of small-scale entrepreneurs in production and marketing and in the informal market. MCC is now leading a national process on urban development that includes urban agriculture. Capacity is being built for staff, students, food safety organisations, and other involved institutions.

A GIS-based urban land use mapping system for urban agriculture has been developed to assist Monrovia City in including urban and peri-urban agriculture in its urban planning system. At the city level and at the township level this will facilitate access to land use and negotiations among landowners, farmers, and local authorities. Nonetheless, municipal ordinances and land use zoning need to be further formulated to support its implementation.

Several new organic fertilisers have been introduced (including manure bags, compost tea, and recycled urban organic wastes), and awareness among farmers of nutrients and food safety has increased. MCC is now developing its waste management projects, such as FISH, taking into account potential linkages to urban and peri-urban production and as part of the district's urban development.

Other results, as identified in a 2015 external programme evaluation, include:

- Among producer families: significantly healthier children, better food intake and enhanced resilience during the EVD-crisis. Some 3,615 direct beneficiaries have been reached;
- The Ministry of Agriculture launched a national programme on urban and peri-urban agriculture in 2011;
- The University of Liberia has included urban agriculture in its extension curriculum, starting in 2016; and
- A further positive outcome is the up-scaling of urban and peri-urban agriculture to the national level. A national urban policy narrative is being approved, with the City Corporations of Monrovia and Tubmanburg strongly advocating for attention to urban and peri-urban agriculture.

Analysis of the enabling global, regional, national and municipal governance structure

The National Urban Policy initiative has agreed that a joint multi-stakeholder forum on urban agriculture will continue to be held annually under the aegis of the Monrovia City Corporation and the Ministry of Agriculture as an institutionalised mechanism to bring different urban and rural stakeholders together to discuss urban issues and monitor and evaluate progress made towards the implementation of the agreed agenda in the following areas:

- Awareness-raising of the impact of climate change on urban agriculture;
- Support for Local Governments (focus on townships);
- Support for slum dwellers through employment generation;
- Development of urban land use mapping and database;
- Development of a decentralised market information system and stimulation of (in) formal markets;
- Linking of food and agriculture to waste management initiatives (compost production); and
- Access to finance and agricultural loans for urban farmers.

Lessons learned and potential for replication

Urban and peri-urban agriculture can contribute to increased city resilience and reduced dependency on food imports. The Welthungerhilfe and ACF 'Rapid Food and Livelihoods Security Assessment' published in December 2014 highlights the effect of the Ebola Virus Disease (EVD) on the urban and peri-urban poor, showing a negative impact on the availability of food, and therefore food security, due to the restriction in the flow of people and commodities, the reduction in size or closing of (formal) markets, the high dependency on food imports, and the lack of proper access when these imports come to a halt. However, this study, as well as the 2014 Evaluation report, showed that the impact on food security was less severe for those households that produced some products themselves or had access to these products through informal markets.

The focus on food has provided different stakeholders such as MCC, MIA and the cities and townships in the area, a very concrete and common entry-point to discuss the future development of the Greater Monrovia District into a Metropolitan Area. However, although the attention to (urban) food and agriculture has created such a momentum and starting point, it cannot cover broader policy and legislation development for all relevant sectors.

To enhance local food systems, city regional development policies should be based on guidelines and models of expansion that take into account the need to reserve peri-urban and rural areas for greening and agricultural purposes. This gives the city and its surrounding townships the opportunity to reduce dependency on food imports and to feed a larger part of the population with local fresh products.

It also necessary to design urban development plans that impose specific rules for the utilisation of land, banning unauthorised structures and creating areas for agricultural production. Adequate legislation and the leasing of plots and gardens through a contract recognised and correctly registered by the municipality, are measures which would guarantee the rights of current and future farmers, vegetable growers, and livestock producers. Support by LISGIS, collaboration with (and access to information of) international programmes and strengthened linkages to the work of the Lands Commission are required.

Work at the city region scale requires commitment, involvement and coordination between different localities and governments in the City Region as well as with higher-level governments in as far as these influence city regional development. **This may, however, call for specific strengthening of governance and planning competences of certain actors** (such as the MIA at the national level on the one hand, but especially also the Townships at a decentralised level in the Greater Monrovia District).

In addition, there need to be linkages to the wider national policy framework of agriculture, food security and urban development, in order to increase efficiency and effectiveness and to tap into various (now separated) donor support programmes. The development of the National Urban Policy is a good example of building such linkages.

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06_KESBEWA, SRI LANKA

Rehabilitation of Productive Flood Zones in Urban and Rural Areas as a Disaster Risk Reduction and Food Security Strategy

Marielle Dubbeling¹

Summary

The Colombo city region (Sri Lanka) ranked amongst the world's fastest growing cities in 2015. Cultivable land in the region, often located in low-lying areas, is being abandoned or converted to residential and commercial uses, significantly altering natural water flows and drainage. This, coupled with an increase in average rainfall as well as heavy rainfall events, has resulted in recurrent flooding in the Colombo region, and related damage to infrastructure, utility supply, and the urban economy.

The Western Province Ministry of Agriculture recognises that the conservation and development of peri-urban and rural agricultural lands contribute to sustaining urban settlements and are crucial for climate-proofing cities and increasing their resilience in terms of food supply. With the support of international organisations, from 2012-2014

a pilot project was developed in one of the fast-growing smaller cities in the region, Kesbewa Urban Council, located 20 km from Colombo. The new management and production model that was tested offers farmers new economically profitable livelihood options, incentivising them to rehabilitate their agricultural areas and to resist sale to the building industry. Results also showed that well-maintained and drained paddy areas function as buffer zones, where water is stored and drainage regulated, thus reducing the flood risk in nearby areas.

Through this programme, Kesbewa Urban Council and the Western Province have linked food to other policy goals such as climate change, disaster risk reduction, and urban and economic development.

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Introduction

Kesbewa Urban Council (KUC) is located at 20 km from Sri Lanka's capital city Colombo in the country's Western Province. The Western Province is the most urbanised province in the country. With nearly six million people (2012), the Western Province is home to about 25% of the national population – yet it occupies only 5% of the country's land area. With recent population growth, the Colombo Metropolitan Region was ranked as one of the fastest growing urban areas in 2015.

Population growth tends to concentrate in smaller cities close to Colombo, like Kesbewa Urban Council, that have become attractive residential areas for commuters. Historically, Kesbewa was an agricultural area endowed with the excess water resources of the bordering Bolgoda Lake. A relatively large area of paddy lands (rice-fields) can still be found in its lower-lying zones. In 2012, Kesbewa was home to about 245,000 inhabitants (latest available official census), with 60% of its area used for residential purposes and related amenities.

In the traditional land-use system in Sri Lanka, low-lying lands were kept free from construction for drainage of rainwater and/or were used for paddy (rice) cultivation. Rapid urbanisation has, however, brought about large-scale conversions of agricultural land to non-agricultural uses. This trend is mostly visible in the Western Province, because of rapid urban expansion, but also due to the fact that paddy cultivation in this part of the country is less profitable compared to the northern part of the country, where labour costs are lower. The opening up of other urban livelihood opportunities (industrial growth, commercial expansion) is an additional driver for the abandonment of agriculture.



Low-lying agricultural areas in Kesbewa Urban Council are facing rapid urbanisation.

@ Kesbewa Urban Council, 2012

Urban growth, however, contributes to various (environmental) problems. Ever-increasing vehicle traffic and commercial industries cause higher environmental and air pollution. Cultivable land, often located in low-lying areas, is being abandoned or converted to residential and commercial uses, significantly altering the natural water flow and drainage in the area. This, coupled with (erratic) increases in rainfall, has resulted in recurrent flood-related disasters in Colombo and surrounding areas over the past years. Furthermore, and as a result of projected climate change and the decrease in vegetation/

green areas, a significant increase in extreme hot-temperature days is predicted for the area, with projected severe impacts on energy demands for cooling and on heat-related illnesses. According to a climate vulnerability assessment implemented by the National Ministry of Environment in 2011, agriculture, urban, and housing sectors will increasingly be affected by floods, rising sea levels, and rising temperatures.

In addition and as a result of land use changes, the Western Province must increasingly rely for its food supply on other provinces. Large amounts of food are brought into the city from distant production centres and sold in wholesale and retail markets. The import of food from other areas of the country is threatened by social unrest (such as the past Tamil war in the North of the country, the main rice-producing area) and negative climate impacts on both agricultural production and transport.

Since 2005, the Western Province has been promoting home gardening and (peri)urban agriculture as part of the country's policy to achieve food sovereignty for the country and promote domestic food production. However, this was never done from a climate-change perspective.

The Western Province Ministry of Agriculture, Agrarian Development, Minor Irrigation, Industries and Environment, under the leadership of the then Minister Udaya Gammanpila and the Secretary ST Kodikara, realised that well-maintained and drained paddy areas function as buffer zones, where water is stored and drainage regulated, thus reducing the flood risk in nearby areas. The Ministry also realised the importance of maintaining local food production, to reduce the Province's vulnerability to disruptions in the food supply and enhance livelihood opportunities for its producers.

In response, and supported by an international corporation project, the Agriculture Ministry of the Western Provincial Council of Sri Lanka, Kesbewa Urban Council, and other local and provincial actors started a pilot project in 2012 to promote the productive rehabilitation of low-lying flood zones and wetlands through the application of new land use production and management models.

Meanwhile, a new Western Region Megapolis Planning Project (WRMPP) of the recently (January 2016) established Ministry of Megapolis and Western Development foresees large-scale urban development of the entire Western Province into a new Western Region Megapolis. Such development would require integrated (spatial) planning that looks at urban development, natural resource management, climate resilience, and economic and agricultural development from an integral perspective. The aforementioned pilot project, its subsequent replication and policy uptake provide one example of potential new land use models that may be promoted in such a larger city region.

Description of concrete activities implemented



In 2012, the Ministry of Agriculture, Western Province, other government partners such as Agrarian Services, and the Kesbewa Urban Council, supported by international partners UN Habitat and RUAF Foundation, the local NGO Janathakshan, the University of Moratuwa, and producers groups designed a pilot project to rehabilitate 17 hectares of paddy fields in peri-urban Kesbewa.

Left: Where paddy lands are abandoned, nearby houses are regularly flooded.

Right: Rehabilitated paddy areas with vegetables growing on raised bunds.

@ Janathakshan

Project design was based on prior research, namely:

- Vulnerability mapping to identify which areas in the city were most vulnerable to projected climate disasters (specifically flooding) and could benefit from the rehabilitation of paddy areas and low-lying zones for agriculture production. This led to the selection of intervention areas with the highest flood risks;
- Land use mapping to identify land ownership, land use history and current use of the different identified vulnerable areas. This helped design initial project interventions related to the cleaning of abandoned agricultural areas and the rehabilitation of clogged drainage channels;
- Food flow mapping to map sources and transport distances for different food items most consumed by the Kesbewa population and to identify which imported foods could best be produced locally. The food flow mapping identified five vegetable varieties (such as gourd, cucumber, eggplant, okra, chilli, and capsicum) and two fruit varieties that can be locally grown in Kesbewa, but are at present imported from distant locations. As these products are in high demand, their production was proposed to be integrated in the new production model;
- A policy scan to identify the present status of, and potentials and obstacles for, inclusion of improved paddy land use in city development and zoning strategies as well as in provincial and national agricultural and climate change policies and programmes; and
- A feasibility scan to analyse (the economic) feasibility of the proposed model. The feasibility scan recommended the productive rehabilitation of abandoned paddy lands with more salt-resistant and local varieties of paddy (which fetch good market prices), alongside the cultivation of the selected vegetables in raised bunds, in order to replace food imports and provide farmers with additional income.

Following project design, 'cultivation meetings' with farmer groups were organised by staff from the NGO Janathakshan, as well as agricultural officers from the Provincial Ministry of Agriculture and the Kesbewa Urban Council, to discuss with the farmers involved the problems they are currently facing, the proposed project, and its potential positive impact on their livelihoods and the environment. Further awareness was raised by students of the Piliyandala Central College, who took on a research project for their agriculture studies to promote the cultivation of vegetables on raised expanded bunds and by discussing the proposed project with agricultural staff engaged in the traditional paddy cultivation programme and the abandoned paddy land rehabilitation programme.

Based on these meetings, farmer groups committed to project implementation. With financial and technical support from the Ministry of Agriculture's Irrigation Department, the farmer organisations started by cleaning two drainage channels to facilitate water flow and reduce waterlogging in the paddy fields. Secondly, the land was cleared of bush vegetation and made ready for cultivation.



Left: Rehabilitated drainage channel.



Right: Land being made ready for farming.

@ Janathakshan

Agrarian officers attached to the Western Ministry of Agriculture, Kesbewa Urban Council and Kesbewa Agrarian Development Centre, and technical staff from Janathakshan provided farmers with technical assistance and training during project implementation. The farmers were trained, for example, in seed selection, fertiliser management, and cultivation planning. The Ministry also provided farmers with traditional paddy seeds. Exchange visits were organised by the NGO to the southern part of Sri Lanka, to show farmers and technical officers other successful programmes of rehabilitated and re-cultivated abandoned paddy fields.

Farmers were also connected to business, service, and market suppliers. In particular, contacts were established with the Department of Agriculture and the National Federation of Conservation of Traditional Seeds and Farming Resources (a collective of traditional farmers) for farmers to access saline-resistant traditional paddy seeds and traditional farming advice.

The project also trained the Agriculture Instructors attached to the Colombo District Agriculture Department, as well as Agriculture Instructors attached to the Kesbewa Agrarian Development Centre, in traditional farming methods, in order to ensure staff capacity for continuation of the programme.

In the period from 2013-2014, fifty (50) farming households, from four locations, were engaged in the pilot programme. Altogether 43 acres (17.4 ha) of paddy fields have been put into cultivation, including 13 acres (5.2 ha) of abandoned fields, all located in medium- to high-risk flood zones.

In 2014, the 'rehabilitated paddy model' was transferred to another area in the Colombo city region and taken up by additional groups of farmers.

Parallel to project implementation, a continuous process of policy exchange and uptake was facilitated by the project. Policy lobbying and uptake was promoted at three levels of government:

- At the level of the Kesbewa Urban Council, to zone and preserve agricultural areas in the city development and zoning plan;
- At the level of the Western Province Ministry of Agriculture, to include promotion of new production and management models of peri-urban/rural agricultural areas in their Climate Change Adaptation Plan; and
- At the national level, to include activities in the 'Paddy Act', regulated by the Department of Agrarian Services, Ministry of Agriculture, that previously only allowed for paddy cultivation (and no other crops or land uses) in assigned areas.

Related activities included the organisation of regular meetings with government officials, the sharing of project documents and organisation of field visits, organisation of policy seminars, and support for policy revision and drafting of new policy proposals.

Stakeholder analysis

A key role was played by the Western Province Ministry of Agriculture, Agrarian Development, Minor Irrigation, Industries and Environment, and the Agrarian Services in providing leadership, technical staff, and assistance and funding to the programme. Land and drainage channel clearing was done by the farmer organisations, but with financial and technical assistance from the Western Provincial Ministry of Agriculture. The Western Province Ministry of Agriculture also assisted the farmers technically, covering staff time of their agricultural officers and extension staff, and provided traditional paddy seeds. Co-funding for project implementation was assigned from various programmes and departments, such as the Department of Agrarian Services, Ministry of Agriculture–Western Province.

Other local government staff involved in training and technical support included agricultural officers of the Colombo District Agriculture Department and the Kesbewa Agrarian Development Centre.

The University of Moratuwa and the NGO Janathakshan led the different research studies that provided the basis for project design.

Students engaged in project monitoring.

@ Janathakshan



As regional land use planning and management should be optimised with local land use planning, the project also supported revision of the Kesbewa Urban Development Plan, implemented in consultation with the Kesbewa Urban Council, the Divisional Secretariat, and the Urban Development Authority. Different local government departments from the Kesbewa Urban Council such as agriculture, environment, economic development, and tourism were associated with the revision of this Development Plan.

Two international support organisations, UN Habitat and RUAF Foundation (both through its International Secretariat in the Netherlands as well as through its regional partner the International Water Management Institute), provided legitimacy to the project as well as technical and methodological advice. They also specifically helped to facilitate project uptake at various levels of government.

Private sector and community involvement was principally oriented at the engagement of targeted farmer organisations and the provision of relevant input supply and services.

Level of collaboration and coordination between local/ sub-national governments at a city region level

Collaboration and coordination was limited among the Western Province Ministry of Agriculture, local agricultural district officers (Kesbewa and Colombo), and the Kesbewa Urban Council (vertical coordination). There was no horizontal collaboration between Kesbewa, Colombo and other municipalities or urban councils in the region. This is also partly due to the traditionally important role played by the Province in managing its area and coordinating activities in various localities. Local governments collaborate through Provincial programmes.

One such example is the new Western Region Megapolis Planning Project (WRMPP) of the recently established Ministry of Megapolis and Western Development that foresees large-scale urban development of the entire Western Province into a new Western Region Megapolis. Issues of interest and support for integrated approaches to the preservation and rehabilitation of agricultural production in peri-urban areas, for

reasons of food security and natural resource management/ecosystem services, have been raised with the WRMPP Director. Together with the Ministry of Agriculture, this new Ministry of Megapolis and Western Development would be responsible for up-scaling the Kesbewa land use model to the scale of the entire Province.

Description of results and analysis of impacts

The incomes of the farmers involved in the pilot programme increased considerably when compared to paddy farmers not involved in the project. One kilogram of conventional paddy (rice) is generally bought at 28 Sri Lankan Rupees, earning the farmer around Rs. 28,000 per acre (close to Rs. 70,000 per hectare) per season (with average production of 1000 kg of paddy per acre). The traditional salt-resistant varieties of paddy promoted by the project provided the farmers an average price of Rs. 40–50 per kilogram of paddy depending on the quality, thus bringing their total earnings to between Rs. 40,000 and 50,000 per acre per season (Rs. 99,000–124,000 per hectare). In addition, the farmers received an average income of Rs. 12,500–15,000 through the sale of vegetables produced in the paddy fields.

Pilot project results thus showed potential income increases (40% or more) for paddy producers, as long as costs for large initial investments (drainage and land clearing) are borne by other parties. It was thus recommended that such support be included in future local and provincial agricultural development programmes.

With regards to policy uptake, the 2012-2013 Kesbewa Urban Development Plan already proposed to develop agriculture in the environmental protection zones around the Bolgoda Lake and low-lying areas, bringing economic benefits while facilitating ecotourism and botanical research. Based on project results, specific models for land use design and management could now be included.

At the provincial level, urban, peri-urban and local agriculture are now considered as one of the climate change adaptation strategies for the province. The current Climate Change Adaptation Plan 2015-2018 of the Western Province of Sri Lanka (Ministry of Agriculture, 2014) now specifically includes action lines regarding the expansion of urban and peri-urban agriculture and agroforestry, the management of paddy lands as a flood risk reduction strategy, and the reduction of food miles by promoting localised production.

At the national level, the Paddy Act, regulated by the Department of Agrarian Services, Ministry of Agriculture, previously only allowed for paddy cultivation in assigned areas. Revision of the Act and of prescribed land use for low-lying urban and peri-urban rice fields now promotes and allows for the new production model – integrated paddy for short-term economic crops.

Analysis of the enabling global, regional, national and municipal governance structure

The local and provincial governments in the Western Province have a long trajectory of collaboration. The Ministry of Agriculture, for example, had an extensive extension programme in place, with agriculture instructors already living and working at the level of different localities. This ensured not only the provision of technical assistance, but also local knowledge of and contacts in the area. The provincial Urban Development Authority (Ministry of Megapolis and Western Region Development–Western Province), in turn, is in charge of preparing development for local areas with a view to promoting integrated planning and the implementation of economic social and physical development of these areas.

Inclusion of the pilot project in the operational plans and budgets of the Provincial Ministry of Agriculture was crucial for project implementation and follow-up, as external project funding was limited to two cropping cycles only. This could be done relatively easily as the Provincial Ministry already had a larger history of and existing programmes for support for urban and peri-urban and provincial agriculture.

Lessons learned and potential for replication

Climate change impacts on cities are increasing. **Sustainable management of peri-urban and rural agricultural lands contributes to sustaining urban settlements by providing vital food and ecosystem services.** Improving cities' climate resilience requires the development of new land use management and production models and protection of urban and rural flood zones.

Such new land use production and management models should contribute to both climate-change adaptation and disaster-risk reduction, while also bringing important benefits to the involved producers at the same time, incentivising them to better manage their agricultural areas and to resist sale to the building industry.

The involvement of subnational (provincial) governments is key to addressing agriculture and land-use planning at a larger scale (outside municipal boundaries). Provincial governments can also play an important role in mobilising additional financing; in facilitating upscaling to other cities in the region (as happened in Western Province), as well as in developing subnational plans that are needed to accompany city-level strategies (such as the provincial climate change policy in Sri Lanka).

Investments in agriculture in areas surrounding cities have proven to be a suitable approach for more integrated water management and flood risk reduction. **Integration of support for improved forms of agriculture production and land use management in local and provincial climate change strategies is one strategy to ensure continued policy support and funding for such practices.**

Project practices have been replicated in other areas in the Western Province. **Further up-scaling would require (1) providing funding for large-scale initial land clearing investments and (b) increasing wider awareness among current paddy farmers.**

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07_TORONTO, CANADA

Integrated Food Planning across Urban and Rural Areas

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Summary

Food can play a powerful role in promoting health, as well as building strong and diverse communities, protecting the environment and strengthening the economy. But there is rising concern about the role that our current food system plays in a range of current problems – hunger, obesity, chronic disease, food safety scares, the viability of local farm communities, environmental pollution, and more. To address these problems, many cities, including Toronto, are coordinating a strategic approach to food.

Toronto, Canada has a long history of food policy and programmes. These includes programmes and policies oriented at improving access to healthy food; urban, local and regional agriculture production; food markets, nutrition

education and food skills, food business promotion, food asset mapping, and localised consumption. As Toronto began to realise that its food security was also dependent on preserving rural farmland in surrounding areas, since 2012 the Toronto Food Policy Council has expanded its area of intervention to include the Greater Golden Horseshoe area surrounding the city – an area of rapid population growth and diminishing agricultural lands.

Food policy work in Toronto and the region makes food a visible part of the urban and regional system, emphasising that food is a critical part of its infrastructure that requires planning and coordination, as well as intentional interventions to improve sustainability, access and equity.

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Introduction

Toronto's food system reveals the pressures of multiple demands and conflicting needs common to most city regions. The current population in Canada is over 35 million, of whom more than 80% live in urban areas, with a large percentage in the Ontario Province and Greater Golden Horseshoe area, home to the City of Toronto.

The City of Toronto was home to about 2.8 million people and the Toronto Census Metropolitan Area (CMA) to 6.1 million in 2014. The CMA refers to the municipalities considered by Statistics Canada *'to have a high degree of integration with the City of Toronto, as measured by commuting flows derived from census place of work data'*. The Toronto CMA is slightly smaller than the Greater Toronto Area (defined as the central city of Toronto and the four regional municipalities that surround it: Durham, Halton, Peel, and York) and is comprised of the City of Toronto plus 23 other municipalities.

Food insecurity is a significant challenge in Toronto and in surrounding areas. Across Canada, food insecurity was assessed at over 12% in 2011. Hunger disproportionately affects children and marginalised groups, reaching over 50% of children in some remote and First Nations communities. Despite the estimated 7 billion that CAD Toronto shoppers spend annually on food (City of Toronto, 2010), the benefits are not distributed equitably. The City of Toronto's Neighbourhood Equity Index shows some communities dropping below the average and facing challenges in accessing healthy food, or – in some food deserts – any food at all. The Cultivating Food Connections study for Toronto also shows that expenditures are not going to local farmers or local economies. The average journey for food from farm to table was estimated at 4497 kilometres in 2015.

Toronto's City Region is embedded in a rapidly urbanising and suburbanising area and contains one of the highest population densities in North America, rich with agricultural lands (some of the best in Canada). The rural-urban area known as the Greater Golden Horseshoe stretches in a curve around the western side of Lake Ontario, with the city of Toronto occupying the northern side of the horseshoe. The Golden Horseshoe jurisdiction includes the four regional municipalities of Halton, Peel, York, and Durham, as well as the Cities of Toronto and Hamilton.

The Greater Golden Horseshoe is an area of high potential food production as well as rapid population growth, creating a mix of legitimate demands that are difficult to reconcile, such as the demand for housing and residential infrastructure (water systems, sewage, transportation) versus the preservation of prime agricultural lands.

Toronto is also home to a wide diversity of ethnic groups, languages and communities, both established and newcomer, creating vibrant and complex markets for food. In addition to intricate networks of distributors, markets and direct-to-consumer schemes, Toronto houses the Ontario Food Terminal, a large aggregation hub for local and imported food with over 5000 registered business buyers.

Since the 1990s Toronto has been a world leader in the development of food policies and strategies that address food security, peri-urban agricultural and ecological systems, the relation between urban growth and food production needs, and local food markets. Community groups and supportive civil servants convinced the City Council that the organisation of the existing food and agriculture system was associated with health

risks for Toronto residents. These health problems had emerged in the 1980s and were associated with three general phenomena: increased levels of hunger and poverty; concerns about declining food quality in a centralised and oligopolistic food economy; and environmental degradation. Canada's traditional view of these problems had centred on four premises:

1. That the food system provides, almost de facto, nourishing food, and that all food system actors are interested primarily in nourishing the population;
2. That food is inexpensive for consumers;
3. That hunger is a problem largely of insufficient income, and that the structure of the food system is not itself part of the problem; and
4. That the food system is capable of addressing any problems of environmental degradation without significantly redesigning its structure or activities.

Proponents for the creation of the Toronto Food Policy Council felt strongly that these were false premises, and that existing institutional activities at the federal, provincial and municipal levels either ignored or were inadequate to address underlying realities. Proponents wanted the municipality to take a fundamentally different approach so that long-lasting solutions could be found.

Today, Toronto's Public Health division aims to reduce health inequities and improve the health of the population. A priority area of action is to promote healthy food system change, including: food access, food retail environments, and food literacy.

Over the past years, a large selection of Toronto's food policy and strategies has been implemented at different levels: including at the household and institutional level (composting programmes, rooftop farms, backyard gardens), farm level (farm support programmes), neighbourhood level (green infrastructure, food retail and marketing), and city level (green infrastructure, food distribution, composting). More recently, in 2012, the Toronto Food Policy Council participated in the planning and development undertaken by the Greater Golden Horseshoe Food and Farming Alliance (GGHFFA), expanding its area of intervention to include the most rapidly growing urban population areas in Canada, and the most important agricultural lands that surround the growing municipalities. An important characteristic of the GGHFFA is that it bridges 'camps' that are sometimes understood as divergent, such as 'rural' vs 'urban' and 'conventional' vs 'sustainable'. Long-term food security for Toronto means the need to preserve farmland in and near the city, which means that it is necessary to take into account the true cost of urban sprawl on Canada's prime agricultural lands.

Description of concrete activities implemented

The City of Toronto has a wide variety of food system policies and programmes, which attempt to link its food, energy and climate plans and optimise different scales of planning. Examples of such policies and programmes include: FoodShare, Increasing Access to Healthy Food, Toronto Agriculture Programme, Live Green Local Food Promotion, Golden Horseshoe Food and Farming Alliance Asset Mapping Project, and the Greenbelt Local Food Investment Fund.

FoodShare

FoodShare in Toronto has been a leader in the development of sustainable solutions to food insecurity. In the mid-1980s a coalition hosted by the then Mayor of Toronto Art Eggleton led a process that created FoodShare, with a mandate to coordinate emergency food distribution activities and focus on long-term solutions to hunger and food poverty. A small grant was provided by the City to assist with these coordination efforts. From these modest beginnings, FoodShare eventually became a leader in solutions to the root causes of hunger (poverty, social inequity, commodification of food, etc.).

FoodShare launched the first Good Food Box programme, a weekly box scheme with local and seasonal products, in 1994 after receiving another grant from the City of Toronto. The programme has since been replicated in many places. FoodShare also established Good Food Markets and Mobile Markets in urban areas with limited access to fresh, healthy and culturally appropriate food, supports student nutrition programmes, created a commercial kitchen that provides training for urban youth facing employment challenges, and implemented a robust warehouse operation that accesses food from the Ontario Food Terminal and local farmers to supply the various programmes. FoodShare is the City of Toronto's key partner in non-profit fresh fruit and vegetable delivery, with the goal of increasing access to healthy food. The City has provided office/warehouse space and funding over the years of this partnership. Partners and funders include the Toronto Public Health department, the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) and the national Canadian government. The FoodShare hub has distributed more than 2 million pounds of vegetables and fruits to Toronto families and organisations, including schools and day care facilities.



Mobile food market.

@ Toronto Food Policy Council

Increasing Access to Healthy Food – Toronto Food Strategy

The Toronto Food Strategy team is a small unit within the Strategic Support Directorate of Toronto Public Health focused on achieving the strategic priorities outlined in the 2010 Report 'Cultivating Food Connections: Toward a Healthy and Sustainable Food System for Toronto'. The development of the food strategy was led by Toronto Public Health and championed by the Toronto Food Policy Council. A cross-sectoral steering committee guided the development of the report. When the Board of Health endorsed the report, a small staff team was created to implement the strategy. This team is funded through the Toronto Public Health budget, and projects often receive external funding through the partnerships developed. Various projects in which they are involved focus on increasing access to healthy food across Toronto in partnership with FoodShare or with other civil society or private sector organisations (such as United Way Toronto, the Food Policy Research Initiative and the Vineland Research and Innovation Centre), including:

- Aggregated food procurement: Increasing the nutritional quality of foods served in community and social service agencies while offering cost reductions.
- Healthy corner stores: Expanding access to fresh, healthy food for communities and revitalising Toronto's convenience store sector.
- Community food works: A unique approach combining safe food handling practices with nutrition education, food skills and employment support to low-income residents in Toronto.
- Mobile good food market: Finding new ways to make healthy, affordable food available across the City in neighbourhoods where there are few or no healthy and affordable food stores nearby.
- Locally grown world crops: The Toronto Food Strategy team is working with the Vineland Research and Innovation Centre and the Toronto Food Policy Council to look at the possibility of growing more world crops locally. This can open up new markets for local farmers and make fresh, culturally diverse vegetables more available across the City.
- Food retail environment mapping: Mapping access to healthy food across Toronto to find solutions where the City can work with community and private sector partners to improve healthy food access across the City.



Promoting localised production.

left: @ Henk Renting, RUAF Foundation;
bottom: @ Toronto Food Policy Council

Toronto Agricultural Programme

The Toronto Agriculture Programme was formed in 2013, after the endorsement of the GrowTO Urban Agriculture Action Plan, which was developed by community and institutional stakeholders with participation from various City Divisions and Agencies for the purpose of bringing together the stakeholders who play a vital role in urban agriculture in Toronto. A cross-divisional and cross-sectoral steering committee made up of members from City Divisions and Agencies including City Planning, Economic Development and Culture, Environment and Energy, Parks Forestry and Recreation, Social Development, Finance and Administration, Toronto Community Housing Corporation, Toronto Public Health, Toronto Region Conservation Authority, and Transportation Services was formed to guide the implementation of the Action Plan. Through the Toronto Agricultural Programme, three priorities were identified by the Urban Agriculture Steering Committee and adopted by City Council in June 2014. These foresee that the City will work with community partners to:



1. Support promotion of agricultural activities by supporting the development of new community gardens and creating a guide to growing and selling fresh fruit and vegetables in Toronto;
2. Facilitate access to land for agriculture through creating an inventory and online map; and
3. Identify and address policy barriers to the expansion of agriculture in Toronto, such as planning and zoning barriers.

A key initiative is the Community Engagement and Entrepreneurial Development (CEED, pronounced “seed”) Garden project, which aims to make more land available for urban agriculture. Social Development, Finance and Administration (SDFA) and other City divisions will support a pilot project that includes four urban agricultural gardens on Hydro One corridors (land under transmission lines).

Through a community engagement model, CEED Gardens aim to support and provide participants with opportunities to develop urban agriculture and entrepreneurial skills by growing and selling garden produce. The CEED Gardens will break ground in spring 2016, and in addition to the Gardens, the Programme will focus on pre-employment training, youth development, and income supplementation for low-income residents within disadvantaged communities. A key objective of this initiative is to increase community access to healthy food.

SDFA leads the collaboration among a number of City divisions to determine a cross-divisional structure. The primary divisions are:

- Toronto Public Health (TPH), which leads the environmental assessment of soil contaminants and electro-magnetic fields to ensure the sites are safe and suitable for growing food, and which supports the processes of community partnership development, project implementation, and evaluation;
- Parks, Forestry and Recreation (PFR), which provides background knowledge and advice related to gardening design and obtaining leases with community partners;
- Real Estate Services (RES), which provides advice regarding lease agreements with community partners.
- Other divisions include: Toronto Water; Facilities Management; the Environment and Energy Office; and Economic Development and Culture.

The CEED Gardens will specifically focus on marginalised and/or vulnerable groups and is directly aligned with several key strategic City initiatives: TO Prosperity: Toronto Poverty Reduction Strategy; GrowTO: An Urban Agriculture Action Plan; Transformation Toronto 2050: The Path to a Low Carbon Future; Toronto Strong Neighbourhoods Strategy 2020; and the Toronto Food Strategy. CEED Gardens help to achieve TO Prosperity’s three objectives: (1) address immediate needs; (2) create pathways to prosperity; and (3) drive systemic change.

Live Green Local Food Promotion

The City (Environment and Energy division), residents, and businesses (FoodShare, Evergreen, etc.) are working together to make Toronto the most sustainable city in North America. Programmes for residents include resources to enjoy more local food and ideas such as:

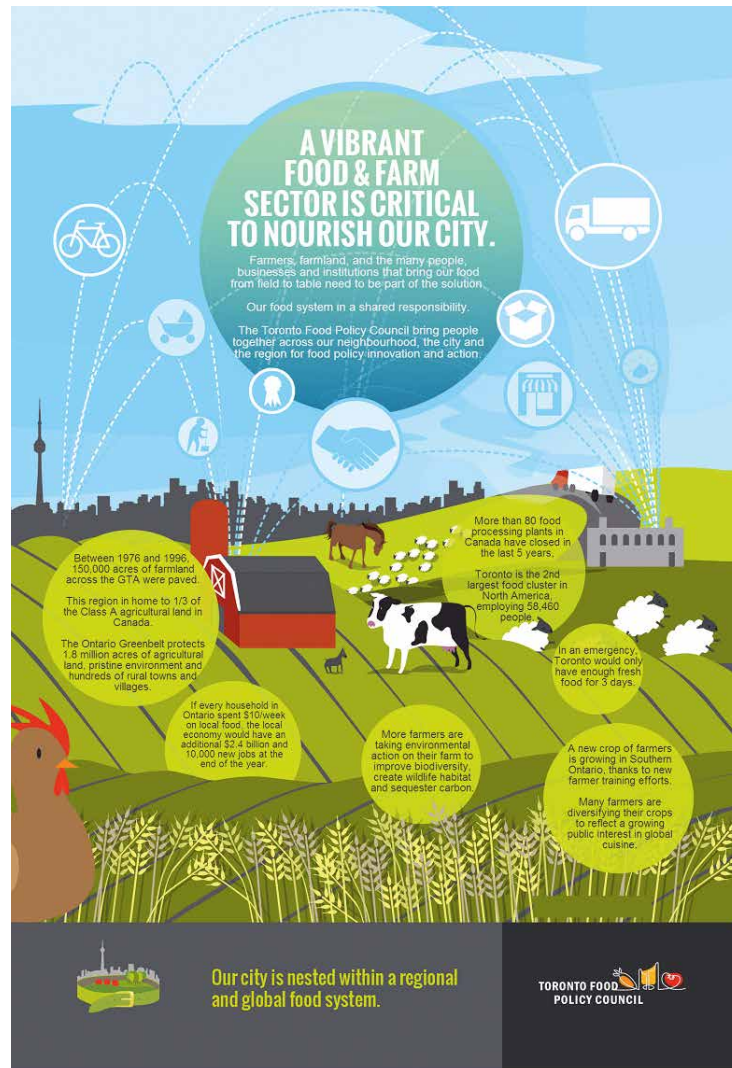
- The Local Dish: Toronto’s largest collection of local food recipes;
- Tips for growing, preserving, buying and cooking locally grown foods, every day of the year, including a list of farmers’ markets;

- Family-friendly local food recipes;
- Live Green Card connecting green shoppers with local businesses (<https://www.livegreencard.ca/>);
- Finding a Community Supported Agriculture farm to get your food directly from a local farmer;
- Finding a Food Cooperative to buy directly from local farmers, wholesalers and producers for a small membership fee or forming your own buying club;
- Preventing food waste by providing consumers with handy tips, such as taking produce out of plastic bags;
- Meatless Mondays to reduce your carbon footprint by going meat-free one day (or more!) per week (<http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=16d099fa45dd5410VgnVCM10000071d60f89RCRD>).

Golden Horseshoe Food and Farming Alliance, Asset Mapping Project

The Golden Horseshoe Food and Farming Alliance is comprised of the Niagara Agricultural Policy and Action Committee, the Toronto and Region Conservation Authority, the Friends of the Greenbelt, the Ontario Ministry of Food and Agriculture, Vineland Research and Innovation Centre, Holland Marsh Growers' Association, Durham College, Country Heritage Park, Ontario Federation of Agriculture, Ecosource, Food and Beverage Ontario, the Regions of Durham, Halton, Niagara, Peel, York, and the Cities of Hamilton and Toronto, as well as local representatives from the food and farming value chain. The Alliance was developed to oversee the implementation of the Food and Farming Action Plan 2021. Municipalities were approached both to support the Action Plan and to contribute financially to the Alliance. This funding leverages other funding from the province and other partners.

The Alliance has developed a tool that helps municipalities in the region gather data and map the agri-food value chain. The Food Asset Mapping project was piloted in the Golden Horseshoe and expanded in 2015 to the Greater Golden Horseshoe. Food assets include the local food infrastructure that ensures food-secure communities and region – farms, processing and distribution capacity, food enterprises, markets, retailers, community gardens, urban farms, community kitchens, student nutrition programmes, emergency food distribution, and community food organisations or centres. The food asset mapping undertaken by the Golden Horseshoe Food and Farming Alliance will reveal how a regional food systems governance body can assess and track local food assets as a way to connect farmers with processors, manufacturers, and new markets. Planners involved are using the information to understand how land use policy and economic development programmes can best support the agri-food sector and support the implementation of the Food and Farming Action Plan 2021. This tool is available to municipal staff in participating municipalities.



”Unfolding Story of Food in Toronto“ Resource Page.

@ Toronto Food Policy Council

Greenbelt Local Food Investment Fund

The Greenbelt Fund – managed by the non-profit Friends of the Greenbelt Foundation and funded by private foundations as well as the Ontario Ministry of Agriculture, Food and Rural Affairs – is about permanently increasing the amount of local food consumed in Ontario. With leading-edge grants to build agricultural business success, agri-tourism, and supportive policies for innovative businesses (such as 100km Foods Inc., Local Food Plus), the Fund seeks to create sustained and systemic changes to the food system. They want to ensure that more Ontario-grown food is purchased and distributed through public institutions and retail markets. By 2015, the Fund has dramatically increased the amount of local food consumed in the province: for every 1 CAD invested, it has realised an increase of 13 CAD in local food sales, replacing imported food.

Stakeholder analysis and collaboration

Important stakeholders include the Toronto Food Policy Council, the Toronto Food Strategy team, the Greater Toronto Area Agriculture Action Committee, the Golden Horseshoe Food and Farming Alliance, Friends of the Greenbelt Foundation, Sustain Ontario, Toronto and Region Conservation Authority and the Ontario Ministry of Agriculture, Food and Rural Affairs.

The Toronto Food Policy Council (TFPC) was established by the Toronto City Council in 1991 as a subcommittee of the Board of Health to advise the City of Toronto on food policy issues. The idea for the TFPC was championed by Councillor Jack Layton, and grew out of a ‘healthy city’ initiative that the City was leading. The TFPC brings together citizens and local policy makers engaged in food issues, and by doing so has become a focal point for new policy dynamics surrounding food and agriculture in Toronto and provides a forum for action across the food system. Initially, the focus of the TFPC was mainly on food and public health, but now it covers all aspects of the food system, including agriculture, economic development, wellbeing, social justice, and environmental sustainability.

The TFPC has up to 30 members, along with 1 full-time coordinator. Members include individuals from the Board of Health, City Councillors, the Toronto Youth Policy Council, individuals from farm and rural communities in the Greater Toronto Area, as well as up to 22 citizen members including members from Toronto Public Health, Toronto City Council, University of Toronto, the non-profit Young Urban Farmers Community Shared Agriculture, Everdale Environmental Learning Centre, Toronto and Region Conservation Authority, Greater Toronto Area Agricultural Action Committee, Evergreen Brick Works, FoodShare Toronto, The Stop Community Food Centre, Toronto Youth Food Policy Council, Ryerson University, food lawyers, and community activists. Members are appointed for three-year terms.

Today’s Food Policy Council has primarily four functions:

1. To act as a **forum** for food issues, fostering communication among sectors, communities and different groups within the food system;
2. To raise public awareness, **coordinate between issue sectors, and integrate issues** of food, health, transportation and economic development;
3. To generate **locally appropriate policy** to change the context for agriculture, hunger, health, and other local issues; and
4. To formulate **programmes** that implement local solutions to the most pressing failures of our current food system (FPC LL report).

Over the past two decades the TFPC has made significant contributions to the GrowTO Urban Agriculture Action Plan, Golden Horseshoe Food and Farm Action Plan, Toronto Food Strategy, Toronto Environmental Plan, Toronto Food Charter, the Official Plan, and the Toronto Food and Hunger Action Plan, and has facilitated City engagement with the Greater Toronto Area Agricultural Action Committee. As part of this work, Toronto adopted a Food Charter in 2001 and a Food Strategy in 2010.



Multi-stakeholder engagement in Toronto's Food Programmes.

@ Toronto Food Policy Council

Toronto Food Strategy/Toronto Public Health. The role of the Toronto Food Strategy team is to support a healthier and more sustainable food system through research, facilitation, partnership building and, above all, the implementation of specific, tangible projects as mentioned above. They partner with City staff, institutions, community agencies such as FoodShare, and private sector organisations such as United Way Toronto, the Food Policy Research Initiative, and the Vineland Research and Innovation Centre on initiatives to expand access to healthy, affordable and diverse food, create good food jobs and more. Working alongside the Toronto Food Policy Council, the Food Strategy team hopes to inspire innovation to unlock the potential of food to enable personal health, vibrant neighbourhoods, and a great city.

The **Greater Toronto Area Agriculture Action Committee** (GTA-AAC) exists to:

- Provide a coordinating function for agriculture issues in the Greater Toronto Area;
- Share information and resources to raise awareness on food and farming in the Greater Toronto area;
- Act as liaison with all levels of government (city, region, province);
- Encourage innovation and diversification within the industry; and
- Combine resources and efforts to achieve a sustainable, long-term agricultural industry within the GTA.

The GTA-AAC is comprised of the following members: four members representing the four respective Regional Federations of Agriculture; four members representing the Regional Municipalities (Regional Chairs, councillors or delegates); one City of Toronto (e.g. Toronto Food Policy Council) representative; two Provincial government representatives from the Ontario Ministry of Agriculture and Food Ministry of Rural Affairs; one Federal government representative from Agriculture and Agri-Food Canada; and two representatives of the agricultural industry (food processing representatives). GTA-AAC participates in the Golden Horseshoe Food and Farming Alliance.

The Golden Horseshoe Food and Farming Alliance was established in 2013, after the development of the Golden Horseshoe Food and Farming Action Plan 2021. The Plan responds to the common challenges and opportunities the area shares. These challenges and opportunities arise from high population density, growth pressures, conflict between agricultural and urban land uses, myriad of regulations and overlapping agencies, and cluster of food and farming enterprises located within the area. The Plan identifies pathways for a more integrated and coordinated approach to food and farming viability in the area to ensure that the Golden Horseshoe retains, enhances, and expands its role as a leading food and farming cluster (Golden Horseshoe Food and Farming Alliance, 2012).

The Alliance coordinates and facilitates the general farm organisations' participation in food system planning and policy (e.g. Ontario Federation of Agriculture, Christian Farmers Federation of Ontario, National Farmers Union), as well as the input from various food industry associations and civil society organisations. It is comprised of the Niagara Agricultural Policy and Action Committee, the Toronto and Region Conservation Authority, the Friends of the Greenbelt, the Ontario Ministry of Agriculture, Food and Rural Affairs, Vineland Research and Innovation Centre, Holland Marsh Growers' Association, Durham College, Country Heritage Park, Ontario Federation of Agriculture, Ecosource, Food and Beverage Ontario, the Regions of Durham, Halton, Niagara, Peel, York, and the Cities of Hamilton and Toronto, as well as local representatives from the food and farming value chain. A City Councillor who sits on the TFPC also participates in the Alliance. This group acts as a regional governance and coordination body, supporting initiatives that enhance agriculture and the economic, social, and cultural viability of the food and agriculture sector.

Friends of the Greenbelt Foundation. The Greenbelt is a key feature of Ontario's land use planning system. The Greenbelt wraps around the Greater Golden Horseshoe. It protects 1.8 million acres of environmentally sensitive areas and productive

farmlands from urban development and sprawl. The Greenbelt, hosting around 5,500 farms, provides fresh fruits and vegetables, dairy, beef, pork, and poultry products and grapes to Toronto, wider Canada, or abroad. Specialty farms in the Greenbelt produce everything from sheep and lambs, mushrooms and maple syrup to horticultural goods (flowers and plants). The Greenbelt is home to two specialty crop regions: The Holland Marsh (mostly carrots and onions) and Niagara (tender fruit trees). Ontario's Greenbelt provides the province with 9.1 CAD billion in economic benefits and 161,000 full-time equivalent jobs. More than 90% of Ontarians agree that the Greenbelt is one of the most important contributions to the future of the province. The Friends of the Greenbelt Foundation is a not-for-profit organisation that was created in 2005 to help foster the Greenbelt in Southern Ontario. The Foundation, which was provided 25 million CAD from the provincial government, has funded many organisations and charities in the Greenbelt, which support agricultural and viticultural activities and help restore the natural environment.

Sustain Ontario is a province-wide, unique cross-sectoral alliance that works with food policy actors from the municipal level to build capacity for food systems reform. Sustain Ontario's Municipal/Regional Food Policy Working Group brings together planners, community organisers, public health professionals, farmers and food policy advocates to share ideas and knowledge in order to influence policy at the municipal (e.g. City of Hamilton Community Food Security Stakeholder Committee, Greater Sudbury Food Policy Council, Ottawa Food Policy Council, Food Partners Alliance Simcoe County) or regional level (e.g. York Region Food Charter Working Group, Halton Food Council, Thunder Bay and Area Food Strategy). Through workshops, webinars and other forms of collaboration, they pool resources and experiences to distil best practices and develop solutions to overcome barriers to public policy development. Community garden implementation, local food procurement strategies, and asset mapping for food access are just some of the issues they are engaged with. Other working groups and networks focus on edible education, meat and abattoirs, fish and finance, farm to cafeteria, farmers markets, community compost and community gardening.

Toronto and Region Conservation Authority (TRCA) is perhaps best known for protecting natural areas and managing conservation areas, but this visionary agency has been proactive on the agriculture front as well: it owns and manages nearly 409 ha of agricultural land. The TRCA was formed in 1957 under the Conservation Authorities Act. It was created by the Ontario Provincial Legislature in 1946 to ensure the conservation, restoration and responsible management of water, land and natural habitat through programmes that balance human, environmental and economic needs. The act authorises the formation of conservation authorities. Apart from Toronto, TRCA receives funding from the Regions of York, Peel and Durham, the Town of Mono and the Township of Adjala-Tosorontio. TRCA recognises that urban agriculture contributes to the development of sustainable communities, and has developed a policy to promote sustainable urban agriculture for some of its land holdings. TRCA has been an instrumental leading partner in four farm projects: the Toronto Urban Farm, the TRCA-FarmStart McVean Incubator FarmProject, which leases 15 hectares of farmland to new farmers who are developing agricultural enterprises; the Albion Hills Community Farm in the Town of Caledon; and The Living City Farm, located in the City of Vaughan.

The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) supports the implementation of Ontario's Local Food Act. This act's (2013) purpose is threefold:

1. To foster successful and resilient local food economies and systems throughout Ontario;
2. To increase awareness of local food in Ontario, including the diversity of local food; and
3. To encourage the development of new markets for local food.

The role of the provincial Minister of Agriculture and Food is to establish goals or targets to improve food literacy in respect of local food; to encourage increased use of local food by public sector organisations (such as the Government of Ontario, municipalities, universities); and to increase access to local food. The Minister will also consult organisations that have an interest in the goal or target. Furthermore, the Minister will prepare an annual report that summarises the government's activities in respect of local food; describes the local food goals or targets that have been established under the Act; and summarises the steps that have been taken and the progress that has been made by public sector organisations in respect of goals or targets.

In the spring of 2013, Premier Wynne reintroduced Bill 36 – An Act to enact the Local Food Act, 2013 (Local Food Act) to the Ontario legislature. In response, Sustain Ontario and ten other signatories representing food and farming in Ontario (Ontario Federation of Agriculture, Friends of the Greenbelt Foundation, FoodShare, Food Forward, Loblaw, Toronto Food Policy Council, Holland Marsh Growers' Association, Organic Council of Ontario, Ontario Fruit & Vegetable Growers Association, Ontario Farm Fresh) wrote a joint letter recommending opportunities to strengthen the Bill by extending its focus to include food literacy, food access, regional economic development, and environmentally sustainable practices. Citizens were also able to share their ideas for making the Local Food Act stronger.

Level of collaboration and coordination between local/sub-national governments at a city region level

The groups above provide opportunities for collaboration and coordination between local/sub-national governments at the city region level. For example: Toronto Food Strategy (2010), Food and Farming Action Plan (2012) and even the Local Food Act (2013) mandate collaboration and coordination. Also, the Golden Horseshoe Food and Farming Alliance coordinates some food system activities with regard to education programmes, distribution and market systems, mapping, and land use planning. Notwithstanding these efforts, coordination is still fragmented and can be improved. There are also other platforms for mayors to coordinate their activities, such as the Association of Municipalities of Ontario.

Description of results and analysis of impacts

At the level of Toronto region the following results and impacts have been achieved over the past years:

- 38 farmers markets established due to City policy to allow farmers' markets in public parks;
- 248 school & community gardens established due to the City community gardening policy and programme, and/or supported by other city programmes and agencies;
- 4 market gardens under development by the City of Toronto;
- Establishment of FoodShare, City partner in healthy food access programmes;
- 160,257 students fed through 724 student nutrition programmes supported by the City of Toronto;
- 1.8 million acres of farmland protected by the Greenbelt;
- 168 community-led projects received partial funding support through the City's Live Green funding programme;
- 2 mobile good food market trucks established with support from the City;
- 23 community food agencies supported;
- 116 kitchens available across Toronto for community use;
- Healthy corner store pilot project established;
- 10 CAD million per year for local food businesses and projects funded through the provincial Local Food Fund in a three-year initiative. Between April 2014 and December 2015, the City of Toronto received 1,955,255 CAD;
- 51 food festivals supported by the City of Toronto;
- 5 Food Co-ops established;
- FoodReach, a purchasing portal for the non-profit sector in Toronto, developed.

The first Local Food Report that reports on progress made under the Local Food Act highlights some of the progress made by the Province and the agri-food sector in promoting and celebrating local food in 2014-2015, including:

- Setting food literacy goals to increase the number of Ontarians who know what local foods are available, who know how and where to obtain local foods and who know how to prepare meals made with local food.
- Providing a tax credit to farmers for making food donations to food banks and student nutrition programmes; farmers receive a tax credit valued at 25 per cent of

the fair market value of the agricultural products they donate to community food programmes, including food banks and student nutrition programmes.

- Piloting a fundraising initiative that helps the province’s schools to fundraise by selling Ontario-grown fruits and vegetables to families. This initiative allows schools to raise funds by selling Ontario produce (in the form of food boxes), to students’ families. Fresh from the Farm was started in 2013 and to date, 150 schools have raised over 125,000 CAD. Over the next two years, this initiative is aiming to expand to all schools in Ontario. According to their website, an additional 150,000 CAD was returned to farmers. More information: <http://www.freshfromfarm.ca/home.aspx>.
- The provincial government has implemented a Local Food Procurement Policy mandating ministries and governmental agencies to contemplate purchasing local food. Specific targets and goals are still undefined by the province. However, certain municipalities have set their own targets and goals, such as the City of Thunder Bay, as acknowledged in the act’s 2014-2015 annual report: ‘The City of Thunder Bay is working to bridge the gap between public sector purchasers and others in the agri-food supply chain. The project has increased the interest of Thunder Bay area food system players in boosting production capacity to meet the potential demand for local food products. By January 2016, it is anticipated that new policies and procurement processes will be in place for the city and other local institutions – with the city expecting to increase its local food spending by 10 per cent compared to 2015.’ The Northern Fruit and Vegetable Programme: As of January 2015, this programme (funded by the Ministry of Health and Long-Term Care) has provided fresh fruits and vegetables to over 36,500 students in Northern Ontario. Deliveries are twice a week from January to June, and are free for students.
- Ontario wineries have been permitted to sell Ontario VQA wines (wines made from 100% Ontario-grown grapes) at farmers’ markets across the province. Since May of 2014, over 75 wineries and 140 farmers’ markets have taken advantage of this market expansion opportunity under the Ontario Wine & Grape Strategy. Sales from this two-year pilot project have surpassed 1 million CAD. More information: <http://www.omafra.gov.on.ca/english/about/wine-grape-strat.htm>.
- While legislation supporting craft brewers has not yet been passed, if it does, 450 grocery stores across the province will be permitted to sell beer. In addition, the Beer Store will have to ‘allocate a minimum of 20% of all shelf space, and merchandising, marketing and promotional programmes to small brewers’. Creating this space for Ontario’s small brewers is just another step forward in creating a sustainable, home-grown agri-food industry.

Overall, local food production, consumption, nutrition education, and awareness have increased as a result of the described policies and programmes. Specific impact data on the impact of the policies and programmes on reduced food insecurity and improved health, etc. are, however, lacking.

Analysis of the enabling global, regional, national and municipal governance structure

The establishment of the **Local Food Act**, representing policy, intergovernmental and cross-sectoral collaboration, and financing (mostly delivered via the Greenbelt Fund mentioned above), has been an important enabling policy framework for Toronto's work.

This legislation, the first of its kind in Canada, is designed to help build Ontario's economy, create more jobs and expand the agri-food sector – by making more local food available in markets, schools, cafeterias, grocery stores, and restaurants throughout the province.

The Act does this, in part, through the following initiatives:

- Helping increase access to local food, which improves **food literacy** in respect of local food, and encourages increased use of local food by public sector organisations, by requiring the Ontario Minister of Food and Agriculture to establish aspirational local food goals or targets in consultation with organisations that have an interest;
- Proclaiming the first week of June each year as **Local Food Week**, during which many different festive activities take place where farmers, farm organisations, agri-businesses and government partners host events across the province;
- Amending the Taxation Act 2007 to create a non-refundable **tax credit** of 25% for farmers who donate their agricultural products to eligible community food programmes such as food banks; and
- Requiring the Minister to prepare an **annual report** that summarises the government's activities in respect of local food.

Together with the Act, the Ontario Ministry of Agriculture and Food has launched a Local Food Fund, which includes a 30 million CAD investment to create jobs and support innovative local food projects over the next three years. In 2015, the fund committed more than 22 million CAD to 163 projects, leveraging a total investment of more than 102 million CAD to expand markets for local food and create jobs. (A list of Local Food Fund recipients is available here: <http://www.omafra.gov.on.ca/english/about/local-food-recipients14.htm>). Some examples of recently approved projects include:

- The Ecological Farmers Association of Ontario (based in Guelph) will receive up to 26,712 CAD to provide small- to mid-scale producers with market-specific training and information, helping create opportunities for networking with potential buyers; advanced level professional development to support the implementation of best practices; and informal sharing of best practices and collaboration among peers. The project will create one part-time job.
- Nature's Mix (based in Kitchener) will receive up to 23,387 CAD to purchase new bagging machinery that will help increase production to meet increasing consumer demand for their products, which are made using locally-sourced oats, honey and maple syrup.

- Evergreen (in Toronto) will receive up to 73,705 CAD to help host four local-food-themed events – Local Food Week, the Blueberry Festival, the Harvest Weekend and the Holiday Market Weekend – that target community engagement around local food issues.

Through the local food act, key indicators will be tracked and measured. The Ministry of Food and Agriculture is working with stakeholders to develop performance measures to track results, and will report on progress toward the food literacy goals in future annual reports. The measurement system will reflect the breadth of food literacy activities in Ontario and will encompass both quantitative and qualitative data (See also Ontario's first Local Food Report 2014-2015: http://www.omafra.gov.on.ca/english/about/local_food_rpt.htm).

Lessons learned and potential for replication

It is this unique mosaic of governance, policy, and programmes that makes Toronto special. **There are multiple platforms that facilitate action and projects, alongside policy formulation.** These illustrate:

- The importance of an organisation like FoodShare for delivering programmes on the ground;
- The importance of an active, coordinated civil society sector;
- Food policy staff who work with civil society, city staff and politicians to move policies and projects forward;
- Heightened public awareness about food issues;
- Engaged public – i.e. community gardeners, people who care about farmers markets, etc. This makes politicians pay attention;
- The focus over time on rural urban linkages and relationship building; and
- The benefit of time spent working on these issues.

A number of specific factors contribute to the success of Toronto's food policy activities:

1. **On-going staff support at Toronto Public Health** for the Toronto Food Policy Council and Food Strategy implementation;
2. **Embedding responsibility for programmes and activities across various City Divisions** including Parks, Forestry and Recreation, Environment and Energy Division, Social Development, Administration, and Finance amongst others; and
3. **Drawing on the expertise of food system stakeholders to provide strategic advice and support for policy and programme implementation.**

Toronto has realised that the urban food system does not exist solely at the municipal level. Toronto's food policies and programmes have shifted over time from food planning at the neighbourhood-city level to the city region level (or more correctly, the city region level has been added).

The Toronto Food Policy Council has inspired the formation of similar food policy councils nationally and internationally.

The promise of Food Policy Councils resides in their potential to bring about positive change by bringing advocates and practitioners together through the integration of food policy spaces with local food system places. Indeed, Food Policy Councils are gaining popularity precisely because they allow citizens to influence food policy and implement food projects in the communities where they live. The challenges facing councils have been much the same over a broad geographic and time scale. Challenges with funding and staff time, over-commitment, dependence on a strong personality or political figure, and to a lesser degree, having a single issue focus, have been recurring themes continent-wide.

Literature, references and contacts for further information

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08_ÎLE-DE-FRANCE REGION, FRANCE

Recovery and Redistribution of Safe and Nutritious Food through Social Supermarkets

Francesca Gianfelici and Louison Lançon¹, Marielle Dubbeling², Camelia Bucatariu and Guido Santini³, Anne Giraud⁴, Arnaud Langlais⁵ and Véronique Blanchot⁶

Summary

The Île-de-France region (the region around Paris in France) concentrates the country's largest social inequalities and highest rate of food waste. In response to these challenges, social supermarkets emerged in France in the 1990s. Social supermarkets are non-profit organisations that sell food and consumer products at lower prices than conventional supermarkets and that restrict access to people living below a certain income threshold. The French Social Supermarket Network (ANDES) provides fresh fruits and vegetables through two programmes:

1. Potager de Marianne, which supplies social supermarkets with fresh fruits and vegetables likely to be discarded by local wholesalers, distributor platforms, and food industries; and
2. UNITERRES Programme, which provides access to fresh products for the most vulnerable urban residents, while establishing direct partnerships and supporting local vulnerable farmers. Both programmes contribute to food and nutrition security and strengthen rural-urban linkages by facilitating food flows within the territory, promoting collaboration among various stakeholders involved at different levels, and reducing food waste.

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6 ANDES, Coordinator of the UNITERRES Programme.

Introduction

It was estimated that in France in 2011, 8.7 million people, representing 14.3% of the population, were living below the poverty line with less than EUR 977/month, and had to turn to food aid structures for support. For most of these households, food represents the second household budget item (17%) after housing (25%).

At the same time, in France, 7.1 million tonnes of edible food are thrown away each year. Food waste is mostly generated at the end of the supply chain, especially from consumers and restaurants, wholesale and retail markets, and food industries: 67% of all food waste is generated by households, 17% by markets, and 2% by food industries. The causes of food waste are: (i) products being close to or over their 'best-before date'; (ii) size or other quality criteria of food failing to meet industry requirements; or (iii) overestimated orders.

At the national level, consumer food waste averages 20kg/person/year. Nearly 50% of the food items thrown away are fruits and vegetables. For supermarkets and retailers, fruits and vegetables are also amongst the items most frequently discarded, followed by meat.

The Region Île-de-France is home to about 11.6 million people. It is made up of 8 departments, with 90% of its population living in the department of Paris (the city of Paris forms a department on its own). The Île-de-France region has among the highest income and resources in France. However, the region is also the one with the largest social inequalities.

Consumer food waste in the Île-de-France Region stands at nearly 114 kg/person/year, compared to the national average of 20 kg/person/year. Although no regional data are available for supermarkets and other retailers, trends figures also indicate higher levels of food waste here in comparison to other regions.

It is a paradox: food insecurity and poverty on the one hand, and large amounts of food waste on the other. In this context, the potential for the recovery and redistribution of safe and nutritious food for human consumption is significant.

It is in response to the above-mentioned challenges and paradox that social supermarkets emerged in France in the late 1990s. Social supermarkets are non-profit and charitable organisations, similar to traditional supermarkets, as they primarily sell food and consumer products, and offer corresponding in-store services. However, social supermarkets have three specific features: (i) they offer a limited assortment of food and household products, mainly coming from food producers, processors and retailers that would otherwise discard them; (ii) access to these supermarkets is limited to people living at risk of poverty or below a certain income threshold; and (iii) the prices are 90% lower than in conventional supermarkets.

The French initiative builds on an earlier experience in Austria, where the first social supermarket was created in 1999 in Vienna, with 3 specific aims: (i) to prevent safe and nutritious food and other products from becoming waste; (ii) to help people facing financial risk; and (iii) to support reintegration of unemployed people, by hiring volunteers and long-term unemployed to work in the supermarket. Starting in 1999, the social supermarkets network in Austria had spread to 80 shops by 2010, compared to 5600 mainstream supermarkets.

International targets for food loss and waste reduction

Food loss is defined as 'the decrease in quantity or quality of food'. Food waste is part of food loss and refers to discarding safe and nutritious food along the entire food supply chain (FAO, 2014).

FAO estimates indicate that per capita food waste at the consumer level in Europe and North America is 95–115 kg/year while in sub-Saharan Africa and South/Southeast Asia this is only 6–11 kg/year (FAO, 2011). The social, economic, and environmental impacts of food loss must be addressed concurrently due to their direct and significant

impact on food and nutrition security, natural resources, and climate change.

It is for this reason that the Agenda 2030 Sustainable Development Goal (SDG) 12 'to ensure sustainable consumption and production patterns' has a specific target 12.3 that aims to: 'by 2030, halve the per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains including post-harvest losses' (UN, 2015).

From the opening of the first social supermarket in France, the phenomenon had grown to more than 800 supermarkets by 2009. The customer group of the social supermarkets is quite diverse. It involves mainly poor families with two or more children. Customers also include elderly people with low pensions, single-parent families, but also, more recently, young people less than 30 years old, or workers with low-income salaries.

The main challenge to be met by social supermarkets is ensuring a stable and continuous supply and provision of a range of products, from dry to fresh food. Social supermarkets therefore combine donations and purchases. With regard to donations, social supermarkets receive food from non-profit organisations, with food banks as their main supply source, as well as food businesses. A national law adopted in February 2016 will reinforce these partnerships between food banks and social organisations, including supermarkets, to contribute to further reduction of food waste (see further below).

By collecting available safe and nutritious food from markets and businesses located in urban, peri-urban and rural areas in the Region for enhanced access – through the social supermarkets – for vulnerable urban dwellers, and by buying food items from rural vulnerable smallholder farmers, the social supermarkets are helping to reinforce rural-urban linkages in the Île-de-France Region in a framework of achieving food security and reducing food waste. In addition, the French Social Supermarket Network (ANDES) has also bought its own farm to provide social supermarkets with fresh food such as fruits and vegetables, meat or dairy products, enhancing the territorial approach behind this intervention.

Description of concrete activities implemented

In France, most of the social supermarkets are aggregated under the umbrella of the ANDES network. ANDES, Association Nationale de Développement des Epiceries Solidaires, was set up in the year 2000.



Provisioning of social supermarkets.

@ ANDES, 2016

The network today includes approximately 500 social supermarkets, also called social and solidarity stores, located in different parts of the country. Every year, from 120,000 to 170,000 people in need purchase their food in these stores. In addition to offering access to a range of products at low prices (an average of 10% of the regular prices), social supermarkets also offer a place to talk and share with others, as well as with professionals providing support and assistance, for example on employment integration. ANDES also organises regular social activities, such as cooking lessons or parents-children activities, in order to improve the diets and nutritional habits of its customers (69% of the people benefiting from the social supermarkets are overweight).

In 2008, ANDES set up a specific programme called Chantiers d'insertion, to meet the fresh food needs of the most vulnerable part of the population. In 2007 there were two studies that showed the significant lack of access and availability of fruits and vegetables in social supermarkets and the impact on the consumers' health. This represented a crucial trigger that pushed the French Ministry of Social Cohesion to financially support and facilitate the creation of this programme. It is now implemented in 4 different areas: Rungis (located in the Île-de-France region, at 17km south of Paris), Perpignan, Marseille and Lille. Chantiers d'insertion collects fruits and vegetables from local sources to distribute them to a network of local social supermarkets and other food aid organisations. At the national level, in 2015, 39% of the total food collected came from

ANDES social supermarkets network.

@ANDES, 2016

Map with latest locations accessible at <http://reseau-andes.viabloga.com/texts/>



donations of food that would otherwise have been wasted and 61% from purchases. The programme promotes long-term social inclusion by hiring workers excluded from the labour market.

The Chantier d’insertion located in Rungis is called the Potager de Marianne. It collects fruits and vegetables mainly from wholesalers and distribution platforms located at the Marché d’Intérêt National (MIN) of Rungis – the world’s biggest wholesale market for agricultural products. It also purchases from local farmers, local food businesses (wholesalers, distribution platforms, trading and import companies, food processing industries), and, rarely, from customs seizures. Thanks to the very central position of the MIN of Rungis, all the sources are located in a 20km perimeter around the MIN, even though the products are imported from all over the world. The stakeholders providing the food items benefit from a tax exemption of up to 60%. The recovery and redistribution of safe and nutritious food for human consumption allows additional storage and destruction costs to be reduced.

Fruits and vegetables are sorted, cleaned and packaged at the MIN of Rungis, by persons hired by ANDES. These may be the very persons excluded from the labour market. The products are then distributed to food aid organisations and supermarkets: in 2015 there were 32 ANDES-social supermarkets and 53 other food aid organisation distribution sites (from Restos du Coeur, Secours Populaire, Croix Rouge, Banque Alimentaire) located in the Île-de-France region.

The supply of fresh products is also complemented with food purchases from local farmers through the UNITERRES Programme. UNITERRES was created by ANDES in 2011 to provide support to both vulnerable smallholder farmers and urban consumers. Long-term partnerships with local farmers were established, providing farmers stable and fair prices, so they are able to plan their farming activities for the longer term. Farmers’ products are bought at a fixed price for a long-term fixed period, ensuring sustainability for both sides. ANDES also helps farmers in setting up their business

or converting to organic agriculture. UNITERRES also organises classes and trips to sensitise urban inhabitants to agriculture and sustainable diets.

Stakeholder analysis

The Potager de Marianne and UNITERRES programmes involve various stakeholders, including the private sector, non-profit organisations, and public institutions.

Both programmes are led by ANDES, a non-profit organisation, which oversees the whole process and coordinates the participation of the different stakeholders.

Private sector involvement is organised through partnerships with the MIN of Rungis, local food industries and businesses, and local farmers for the supply of fruits and vegetables. The partnerships with the wholesalers and distributor platforms located at the MIN of Rungis are particularly crucial, as they represent the major supply sources in terms of donations and purchases for the Potager de Marianne Programme. The MIN of Rungis itself, a public infrastructure run by the private company SEMMARIS, is also an important partner, as they provide financial support to the programme by offering a 60% discount on the rent. Long-term partnerships have also been established between social supermarkets and food banks.

The hiring of vulnerable workers for the processing centre and the supermarkets has given rise to partnerships with employment centres and other public and non-profit organisations active in the field of social integration. These include the Pôle Emploi Choisy-le-Roi (public entity for labour exchange), the local non-profit organisation for labour integration Choisy-Orly-Villeneuve, the public Health Insurance Caisse Régionale d'Assurance Maladie d'Île-de-France, the non-profit organisation France Terre d'Asile and a private training institute Réseau City'pro Organisme de formation.

Level of collaboration and coordination between local/sub-national governments at a city region level

As the programme links farmers, food industries, and wholesale markets located in Paris and its surrounding provinces, and distributes the products to social supermarkets and food aid organisations located in Paris and its surrounding areas, support from public institutions from the different provinces/departments in the Île-de-France is crucial.

ANDES gets support from local, regional and national governments. In particular, it is highly supported by national authorities, through the Ministry of Social Cohesion, the main donor for the Potager de Marianne Programme (mainly for purchasing any missing products) and the one which pushed for its creation. Financial support is also provided (i) at the regional level by the Île-de-France Region and the Regional Directorate of Enterprises, Competition, Consumption, Work and Employment (DIRECCTE); and (ii) at the department (provincial) level by the Departmental Unit of the Marne Valley and the General Council of Marne Valley. Operational support is also provided by public authorities, (i) at the national level, by the Ministry of Social Affairs and Health; (ii) at the regional level by the Interdepartmental Regional Directorate of Food, Agriculture and Forestry of the Île-de-France (DRIAAF); and (iii) at the provincial level by the General Council of Hauts-de-Seine.

ANDES develops actions with these public authorities in different areas including: access to healthy diets, especially among dwellers living in precarious conditions; social supermarkets' network management; prevention and reduction of food waste; and professional integration. National authorities, for example, support the actions of food aid organisations by implementing campaigns to raise awareness of food waste and by advocating regulatory compulsory measures for the recovery and redistribution of safe and nutritious food for human consumption.

Description of results and analysis of impacts

In 2015, 85 food aid organisations and social supermarkets participated in the Potager de Marianne Programme, and 140 farmers spread over 4 regions took part in the UNITERRES Programme by providing fresh products to 20,000 social supermarket beneficiaries.

The Potager de Marianne has an impact at several levels:

- **Food waste reduction:** In 2015, 45% of food that would otherwise have been wasted was instead collected, representing 690 tonnes of food that was recovered and redistributed for human consumption. Food waste reduction takes place at different steps of the food chain: at the production stage through food collection from local farmers, at the processing level via the collection from local food industries, and at the marketing stage through the collection of food at Rungis's wholesale market. The high quality of the given products, mainly thanks to the distributor platforms, which have strict requirements in terms of quality and size, made it possible to distribute 432 tonnes of good quality fresh food out of the 690 total tonnes donated in 2015. In addition, 529 tonnes of fruits and vegetable were purchased, leading to a total amount of 961 tonnes of fruits and vegetables distributed in 2015 through the Potager de Marianne platform.

- **Integration of socially isolated workers into the labour market:** Employees, hired through specific contracts, work at sorting, cleaning, and packaging the collected fruits and vegetables, preparing the orders, and delivering food to specific associations and social supermarkets. In addition to receiving work opportunities, employees are accompanied by an assigned assistant who helps them return to employment. The Chantier d’insertion enabled by the Potager de Marianne offers this reintegration into the labour market (usually employees stay from 10 to 12 months). On average, 24 employees in social reintegration work for 26 hours a week. The experience has been successful, since in 2013, 62% of the 46 social employees managed to reintegrate into the labour market after their stay at the Potager de Marianne.
- **Facilitated access to healthy and fresh food for vulnerable urban dwellers:** Easier access to fruits and vegetables for vulnerable dwellers in the cities has significantly increased their consumption. Customers patronising a social supermarket which offers fruits and vegetables are twice as likely to eat more than 2 fruits/day, when compared to those patronising a social supermarket that does not offer fruits and vegetables (Malandrin, 2014). This demonstrates the direct impact of the programme on their shopping habits and the positive impact on their diets.

The UNITERRES Programme has a strong impact on both vulnerable smallholder farmers and urban dwellers:

- **Facilitated access to healthy and fresh food for vulnerable urban dwellers** (see above); and
- **Support for vulnerable local smallholder farmers** – the establishment of long-term partnerships with local farmers, providing them stable and fair prices, and offering them the possibility to plan their farming activities for the longer term.



UNITERRES picks up produce from local farmers.

@ ANDES, 2016

Analysis of the enabling national, regional and municipal governance structure

Paris has been particularly active in on-going international initiatives related to food security and strategies for environmental, social, and economic sustainability. In 2015 Paris was one of the signatories of the Milan Urban Food Policy Pact presented during the World Food Day at the Milan Expo 2015.

With its new law on food waste reduction, adopted in early 2016, France has become the first country in the world to ban supermarkets from throwing away or destroying unsold food, thus proving an enabling legal framework for organisations such as ANDES and programmes like the Potager de Marianne.

On the 3rd of February 2016, the French Senate unanimously adopted a new law aimed at reducing food waste at supermarkets, food industries, and households. The law includes different clauses and actions. The most important clause is that supermarkets larger than 400 square meters are obliged to establish partnerships with non-profit organisations to give away any unsold food. In addition, supermarkets are barred from deliberately spoiling unsold food (some supermarkets doused discarded food in bleach to stop it from being eaten by people foraging in stores' bins). The law also prohibits any contractual provision constituting an obstacle to food donations and includes food waste issues in school programmes, as well as in companies' corporate and social responsibility programmes.

From the perspective of non-profit food organisations, this law will allow them a more stable and diverse food supply, especially in terms of meat, fruits, and vegetables. Nevertheless, it also raises a new challenge due to the fact that they may have to adapt their infrastructure and mechanisms to be able to receive and distribute larger amounts of food in a safe and efficient manner.

Even though the impact of this new law cannot yet be measured, media attention has already played a crucial role in raising awareness and putting more pressure on conventional supermarkets and food industries. It has also driven the creation of (social) companies and small businesses that facilitate the link between food industries and non-profit organisations.

Lessons learned and potential for replication

Based on the success of the Potager de Marianne in Rungis, ANDES has developed the same kind of programme in 3 other regions in France, in partnership with wholesale markets:

- The Cistella de Marianne at Perpignan, opened in 2009;
- The Banaste de Marianne at Marseille, opened in 2010, where 48% of the collected food comes from the recovery and redistribution of safe and nutritious food; and
- The Jardin de Marianne at Lille, created in 2011.

In each programme, partnerships with local businesses and social supermarkets are needed, as well as strong cooperation with local and regional public authorities. The experience shows **that the uptake and implementation of innovations in urban food systems and the prevention and reduction of food waste requires the active involvement of the private sector and civil society.** The development of various types of social enterprises offers new opportunities for job and revenue creation and helps shift the food system for the benefit of food supply chain actors and consumers alike.

Scaling up these initiatives is facilitated by public support and changes in policies and regulations that promote prevention and reduction of food waste and facilitate recovery and redistribution of safe and nutritious food for human consumption.

The French National Parliament has now set a target of reducing food waste volumes by half by the year 2025. Additional efforts are being undertaken by local authorities and NGOs to raise awareness among households and school canteens on how much food waste they produce and how to reduce this amount. As shown by this case study, **the prevention and reduction of food waste needs to be supported also through integrally targeted capacity development along food supply chains, education and awareness raising, funding, and legal support.**

Food donations have to be better integrated in supermarkets, distributor platforms, and wholesalers' processes, rather than merely being a way to get rid of food that cannot be sold. This being done, safe and nutritious food items could be identified and recovered in an efficient way, allowing the redistribution of better quality products and the better organisation of the system's logistics.

Nutrition education is key to healthy diets.

@ ANDES, 2016

Local coordinators have emphasised that – given the context-based predominantly random feature of recovery and redistribution activities, including donations, coupled with the fresh nature of products that do not allow long-term stocks – parallel actions concerning direct purchases are crucial. This helps to ensure a continuous supply of various and good quality products. **Combining food donation programmes with purchases from local farmers allows for a more integrated management of the entire city region food system.**

Even if enhanced economic access to fruits and vegetables has increased consumption by vulnerable urban dwellers, consumption levels still remain well below the recommendations for a healthy diet (that is, to eat 5 fruits/vegetables a day). **This shows that, in addition to the provision of economic and physical access to these products, there are other socio-cultural barriers to the consumption of these products that need to be addressed, such as: cooking knowledge, food and shopping habits, dietary habits, etc.** This demonstrates the need to engage customers and to provide assistance in food preparation, cooking, and dietary habits. Although ANDES already organises cooking classes, these need to be reinforced to further improve the nutritional status of urban dwellers.



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09_MEDELLÍN, COLOMBIA

Food Redistribution and Value Addition from Rural to Urban Areas

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Summary

SACIAR Foundation is the first food bank of Colombia. It is involved in two main interventions targeting the urban poor and food-insecure residents:

1. The REAGRO programme, focused on the recovery and redistribution of safe and nutritious food for human consumption through food banks; and
2. The NUTRIAMOR® programme, focused on value addition for safe and nutritious resources identified in the banana export supply chain. Resources are processed into powder and used as supplements for young children, pregnant and breastfeeding women, and the senior population in conditions of nutrition vulnerability.

SACIAR collects food from the food industry, agricultural sector, supermarkets, and wholesale markets with the support of volunteers and a number of permanent employees. It does so through direct donations of food items or buys food using monetary donations.

This recovery and redistribution of safe and nutritious food for human consumption is based on the collection of available production volumes among rural agricultural producers and agro-industry sectors (such as the banana chain) located in the Antioquia province. This action benefits urban (and rural) vulnerable dwellers in the Medellín Metropolitan Area and enhances their food security and nutrition. The two programmes mitigate the negative environmental impact that would result if the food and related safe and nutritious resources were discarded or wasted.

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Introduction

The Municipality of Medellín is the second-largest city in Colombia and the capital of the department of Antioquia. It is located in the Aburrá Valley, a central region of the Andes Mountains in South America. The city had an estimated population of 2.44 million as of 2014. With its surrounding area, which includes nine other cities, the metropolitan area of Medellín is the second-largest urban agglomeration in Colombia in terms of population and economy, with more than 3.5 million people.



Metropolitan area of Medellín.

@ https://upload.wikimedia.org/wikipedia/commons/f/fa/Corregimientos_de_Medellín.png

More than half of Medellín's 2.5 million residents do not have access to three meals a day due to low levels of acquisition power, among other factors.

42.7% of the Colombian population are food insecure and lack fruits and vegetables in their diets. 21% of the fruits and vegetables produced (1.4 million tonnes) in the country are lost every year. According to a MANA-FAO 2015 study these losses are partly caused by inefficient relations between areas of production and consumption. For specific crops like yucca, mango and vegetables, 50% food losses have been recorded. The given volumes of food losses could, however, feed 9.5 million people for one year.

Today there are 20 food banks in the country, providing food support to the food insecure. All food banks are part of the National network of food banks (ABACO). ABACO is the only stakeholder for the recovery and redistribution of safe and nutritious food for human consumption at the national level. This ensures 4 main advantages: quality control, more efficient logistics, financial leverage, and increased sustainability.

National strategy for the prevention and reduction of food loss and waste: Colombia

On 27 January 2016 in Quito (Ecuador) on the occasion of the Fourth Summit of the Community of Latin American and Caribbean States (CELAC), the region's leaders reaffirmed their commitment to prioritising the consolidation and implementation of the CELAC Plan for Food Security, Nutrition and Hunger Eradication. This included the creation of the Regional Alliance for Reducing Food Waste and Losses and the establishment of national committees seeking to halve waste in the region by 2030. FAO has been providing technical support to the process through the Regional Expert consultations and networks since 2014.

The Colombian Department for Social Prosperity of the Presidency of the Republic (DPS) has recognised the importance of formulating national public policy guidelines that address the prevention and reduction of food loss and food waste.

The formation of an Extended Technical Committee is currently being considered to lead work on Food Loss and Waste policy under the framework of the Inter-sectoral Commission on Food and Nutrition Security (CISAN), formed by 11 ministries and public institutions and other stakeholders.

The actors involved include ABACO, DPS, Ministry of Agriculture and Development, Colombian Family Welfare Institute, Externado University, Food and Nutrition Security Observatory of the National University of Colombia, National Statistics Department, National Association of Business of Colombia, National Institute for Food and Drug Administration, Alpina Productos Alimenticios S.A, Horticulture Association of Colombia (Asohfrucol), and the Confederation of Colombian Consumers.

Source: <http://www.fao.org/save-food/regional/latinamerica/en/>

Description of concrete activities implemented

Medellín currently has two main food banks: Fundación SACIAR and Fundación Banco Archidiocesano de alimentos de Medellín. This case study will focus on the experience of SACIAR and its REAGRO and NUTRIAMOR® programmes.

The SACIAR Foundation

The SACIAR Foundation is a non-profit humanitarian institution and the first Colombian food bank, established in 1999. It is part of ABACO and The Global FoodBanking Network (GFN). Its mission is to provide essential food and products to the most vulnerable members of the population in two ways: through food banks (institutions) and through 'templos comedores y comedores del Corazon' (places created by SACIAR in isolated and poor areas, to provide food and education on food).

The Foundation is involved in two main interventions that will be further described below:

1. The REAGRO programme, aimed at recovering and redistributing agro-food products through food banks; and
2. The NUTRIAMOR® programme, focused on safe and nutritious resources from the banana export sector that are processed into powder and used as supplements for young children, pregnant or nursing mothers, and the elderly.

SACIAR collects food from the food industry, agricultural sector, supermarkets, and wholesale markets with the support of 157 volunteers and a number of permanent employees. It does so through direct donations of food items or the purchase of food using monetary donations. The collection of food is directly managed by SACIAR vehicles.

The mechanism functions as follows: in order to select intervention areas in Antioquia and other regions in the country, a study is undertaken and a municipality is identified, then contacts between SACIAR officers (REAGRO promoters) and community and local government leaders, including churches, are initiated. These actors are invited to join the programme, which is called the awareness-raising phase. Next the SACIAR Foundation uses its vehicles to collect the food surpluses to be distributed, along with donated food, to needy communities of that particular area.

Information and awareness raising materials on food waste prevention and reduction.

@ Fundación SACIAR, 2016

EMPRESARIO COMERCIANTE AGRICULTOR Y PÚBLICO EN GENERAL. USTED PUEDE CONTRIBUIR AL NO DESPERDICIO DE ALIMENTOS

Done los alimentos consumibles que ya no va a comercializar

ya sea por razones técnicas o de mercado, próximas fechas de vencimiento, averías en el empaque o baja rotación. Con dichas donaciones, Fundación SACIAR a través de las Instituciones Humanitarias y Templos Comedores que atiende, sirve la mesa de los más pobres: niños, ancianos, madres gestantes y lactantes, desplazados, enfermos y desvalidos, beneficiando poblaciones y familias en condición de vulnerabilidad con alimentos y productos de primera necesidad.

SACIAR agradece

A los actuales benefactores por su fidelidad, generosidad, y constancia con las donaciones durante 16 años de servicio humanitario que tiene la Fundación e invita a aquellos que aún no donan sus excedentes, a vincularse.

SACIAR ABAC The Global FoodBanking Foundation

DONE SUS EXCEDENTES ¡ NO LOS BOTE !

Colombia bota comida ¡ Pero muere de hambre !

Todos los días en nuestro país mueren cientos de personas a causa del Hambre y de la Desnutrición

Evitando el desperdicio de alimentos para que nada se pierda, Fundación SACIAR contribuye a la disminución de los altos índices de marginación y miseria que muchos colombianos padecen.

Fundación SACIAR @FundacionSaciAR

SACIAR BANCO DE ALIMENTOS DE MEDELLÍN ORIENTE ANTIOQUEÑO Y URABÁ

The beneficiaries of these initiatives include the poor, children, the elderly, pregnant and nursing mothers, migrants, prisoners, the disabled, and vulnerable families. Institutions which receive food from SACIAR have to give some of their time to the Foundation in return, by helping with the food collection, sorting, or distribution.

The REAGRO (Recuperación de Excedentes Agropecuarios en los Bancos de Alimentos) Programme – Recuperation of Agricultural Availabilities through Food Banks

Launched in 2012 by the SACIAR Foundation, the REAGRO programme's main objective is to recover available production volumes that are at risk of being discarded on farms – due to a lack of effective marketing, among other reasons – and to improve living conditions of farming families, by buying at a low price the food that otherwise would have been wasted. Targeted farmers are located in the rural areas of the municipality outside the urban perimeter, throughout the entire territory of Antioquia department. Such recovery and redistribution mitigates negative environmental impacts.

Food waste at farm level.

@ Fundación SACIAR, 2016



The REAGRO programme thus collects unsold food items that are still suitable for consumption. The food is at risk of becoming waste for various reasons: it remains unsold because its price, shape, size, or quality do not match the market's requirements.

Other examples of food redistribution in Medellín city region

The Archdiocese Food Bank has a 12-year plan to increase food security, which was intended for implementation by the end of 2015. This plan encompasses not only the provision of food through reducing waste and recovering much of this at a much lower cost than the initial purchase price, but also the development of investments with

private and public efforts across the city, 'involving production, trade and the entire supply chain'.

The Archdiocese Food Bank is one of Colombia's 19 food banks, distributing food across 84 municipalities in the western province of Antioquia, feeding over 20,000 families through 264 different social organisations.

Food distribution.

@ Fundación SACIAR, 2016



The NUTRIAMOR® Programme

SACIAR Foundation developed the project **NUTRIAMOR® Nutritional supplement**, taking into account the great volumes of banana leftovers from export production in the sub-region of Urabá⁵. The programme seeks to process large quantities of agricultural surplus into nutritional products and also to contribute to improved nutrition for children and women. Waste/leftovers from the banana export sector are recycled in the form of powder and used as a supplement for young children, pregnant or nursing mothers, and the elderly.

NUTRIAMOR® is a powdered nutritional supplement produced by transforming whole green bananas into banana flour, which is fortified with animal and vegetable protein and an exclusively developed premix that provides eight vitamins and eight minerals in micronutrients, four of which are amino chelated: iron, zinc, magnesium, and calcium. The products developed are: NUTRIAMOR® Primera Infancia, which provides necessary but scarce vitamins and minerals crucial for children from the ages one to six, NUTRIAMOR® Maternas, and NUTRIAMOR® Adulto Mayor (specifically developed for the elderly population).

Specifically, the NUTRIAMOR® programme aims to:

1. Contribute – over the next 5 years – to the nutritional intake of 200,000 beneficiaries: children, mothers, pregnant and breastfeeding mothers, and other adult populations at risk or vulnerable to food insecurity and malnutrition; and
2. Use the economic profit generated from the activities of the Fundación NUTRIAMOR® to strengthen the humanitarian programmes of Fundación SACIAR – Banco de Alimentos de Medellín, Oriente Antioqueño and Urabá.

Stakeholder analysis

SACIAR, a part of the national network of food banks in Colombia, is the driving force for the implementation of the food bank activities in Medellín. The Medellín municipality and the SACIAR Foundation have signed a Cooperation Agreement aimed at enhancing the food security of vulnerable families and individuals at risk of hunger and social exclusion in Medellín.

Food is recovered and redistributed, including through donations by enterprises, farmers and agro-industry processors, and single individuals.

With the producers (from rural areas in the Antioquia province) an agreement is established in which producers donate food waste and receive in return agricultural inputs and necessary food items from the food bank.

Agro-industries and retailers (located in rural, urban and peri-urban areas of Antioquia) receive a certificate of donation which guarantees a 12.5% allowed deduction on taxable income from the national government and the exclusion of VAT in the event that the donated products (fruits and vegetables) are subject to this tax.

⁵ Urabá Antioquia is a sub-region in the Colombian Department of Antioquia. The region is made up of 24 municipalities.

For the NUTRIAMOR® programme in particular, an important collaboration has been established with academic research: Griffith Colombia's research and development team. Griffith Colombia has supported Fundación SACIAR for many years, providing them with food, funds, volunteers, and intellectual capital. Griffith Colombia's research and development team helped SACIAR to develop NUTRIAMOR®.

The involvement of the informal sector consists of volunteers from the donor municipalities. They are in charge of collecting and loading food in each donor area. In addition, there are families who link themselves to the programme, giving food to the promoters and volunteers who tour different streets and estates. Some families also play the role of SACIAR promoters. All these people benefit from access to a weekly SACIAR market, which trades all the remaining available food.

Level of collaboration and coordination between local/sub-national governments at a city region level

The SACIAR Foundation operates at the level of Antioquia Province for reasons of scale (in order to receive sufficient food) and logistical efficiency (in order to be able to organise and manage transport).

In order to procure sufficient food items, the Foundation operates in the 20 municipalities⁶ of Antioquia province. This allowed it to recover 2,468 tonnes of food in 2014 (including 80 varieties of fruits and vegetables).

To provide incentives to agro-industry processors and retailers, agreements have been made with the national government, so that SACIAR can issue certificates of donation that allow these enterprises to receive tax reductions or benefit from net income deductions.

⁶ The above-mentioned municipalities: Envigado, San Pedro, Abejorral, Concepción, El Carmen de Viboral, El Retiro, El Santuario, La Ceja, La Unión, Marinilla, Rionegro, San Francisco, San Vicente Ferrer, Sonsón, Urrao, Betulia, Apartadó, Mutatá, Dabeiba, and Belén de Bajirá.

Description of results and analysis of impacts

To date, more than 36,000 people have benefited from the SACIAR programmes, including farmers' families, social institutions and templos comedores.



SACIAR beneficiaries.

@ Fundación SACIAR, 2016

In 2014, REAGRO received 4,761,697 kg in food donations and purchased an additional 290,055 kg of food. It distributed 4,700,706 kg of food (350,046 kg were not distributed due to insufficient quality of stocks). Food was donated by 75 entities, including producers, agro-processors, and retailers. In addition, safe and nutritious food resources were collected from 528 banana producers.

The two programmes have produced impacts in terms of enhancing food security and nutrition, as well as sustainability of the agricultural sector, especially with regard to vulnerable rural farmers, who no longer waste available safe and nutritious food and related resources, while generating additional income.

In addition, the economic impact affects small farmers and agro-industries in terms of tax reductions (VAT) and exclusion from local taxes for waste collection (Tasa de Aseo), when food is collected by SACIAR vehicles.

Analysis of the enabling national, regional and municipal governance structure

SACIAR is part of the ABACO, the only stakeholder for the recovery and redistribution of safe and nutritious food for human consumption at the national level. The SACIAR programmes benefit from the formal agreement signed with the Medellín municipality that includes a system of issuing bonus/vouchers to vulnerable families and individuals who can then receive support from the food bank.

At the national level SACIAR is recognised for issuing certificates of donation which allow producers, agro-processors, and retailers to receive tax exceptions and/or reductions.

ABACO launched an initiative addressed to the national government to approve a law in Congress to motivate farmers to recover and redistribute their food surplus. With the Tributary Reform transformed in Law 1607 (26/12/2012), changes in the application of VAT recognised exceptions for safe and nutritious food for human consumption if donated to legally established Food Banks. According to Articles 356-364 in the Tributary Law, SACIAR benefits from a special tributary rule which allows tax reductions for donations. Beneficiaries benefit from tax reduction as stated in Article 126-2, which recognises a deduction of 12.5% of income (Concepto Dian 76502 de 27 de Noviembre de 2013). It should be noted that VAT exclusion is only applied to donations of food for human consumption, whereas the deduction of 12.5% of income is for any donation for the benefit of Food Banks; thus food donations get a double benefit.

Lessons learned and potential for replication

Ensuring a more localised food system requires not only support for food production in rural areas close to cities, but also the effective recovery and redistribution of safe and nutritious food for human consumption.

One of the factors in the success for the SACIAR programme is related to its scale of work at the provincial level. This allows for economies of scale and logistical efficiency for the collection of food from different parts of the chain (production, processing, and retail) for the benefit of urban consumers. The impact of the programme could be further expanded by the inclusion of other actors in the food value chain, such as restaurants, local markets, schools, and hospital canteens.

Working at the level of the city region allows for the improved use of resources and resource efficiency (reduction and recycling of food waste) as well as the improvement of the livelihood conditions of the urban population.

The SACIAR-REAGRO programme has already been replicated by 4 other food banks in the country, showing potential for even wider uptake.

Assessment of food loss and waste for different supply chains and along the entire chain is needed, in order to define the most relevant interventions at specific parts of the chain and in different areas of the city region. For Medellín and Antioquia, chains for yucca, mangoes, and vegetables could also be considered, given the large documented volumes of food loss.

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10_YORK, CANADA

The Ontario Food Collaborative – A City Region Initiative For Preventing and Reducing Food Waste

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Summary

The Ontario Food Collaborative (OFC) in Canada is a cross-municipal collaboration to establish a multi-stakeholder strategy for reducing food waste. This case study focuses on the participatory and multi-stakeholder mechanism put in place with the aim of reducing food waste in the Region, which resulted in the approval of a strategic plan of action in 2016. The Ontario Food Collaborative brings together stakeholders to take a holistic food systems approach in supporting individuals and families to reduce food waste. Thirty-nine representatives from provincial (Southern Ontario),

regional (York Region) and municipal governments, food businesses, and food and farming organisations attended the first meeting of the (Southern) Ontario Food Collaborative, held in November 2014. The OFC actors include Government (all levels), Non-Government Organisations (NGOs), Food Producers (Farmers), Food Processors/Manufacturers, Distributors and Retailers, and Restaurants/Food Services. OFC Membership is diverse and reflects a balance of groups and individuals committed to food waste reduction and healthy eating.

1 Food and Agriculture Organization of the UN.

2 Director RUAF Foundation, The Netherlands.

3 Food and Agriculture Organization of the UN.

Introduction

The Regional Municipality of York, also called York Region, is located in Southern Ontario, Canada, between Lake Simcoe and Toronto. It replaced the former York County in 1971, and is part of the Greater Toronto Area and the inner ring of the Golden Horseshoe.

The 2011 census population stood at 1,032,524, with 53,989 residents inhabiting rural areas in the municipality, 67,551 residing in small urban areas, and 910,984 residing in large urban areas. Its 2006 to 2011 growth rate of 15.7% was the sixth highest amongst all census divisions in Canada, and the Government of Ontario expects its population to surpass 1.5 million residents by 2031. This rapid growth has resulted in the conversion of approximately 160 square kilometres (62 square miles) of countryside to urban uses since 1971.

The economy of York Region is diverse and includes a full range of businesses from industrial to high-tech sectors as well as agricultural sectors.



Southern Ontario location in Canada (red).

@ https://en.wikipedia.org/wiki/York_River_%28Ontario%29

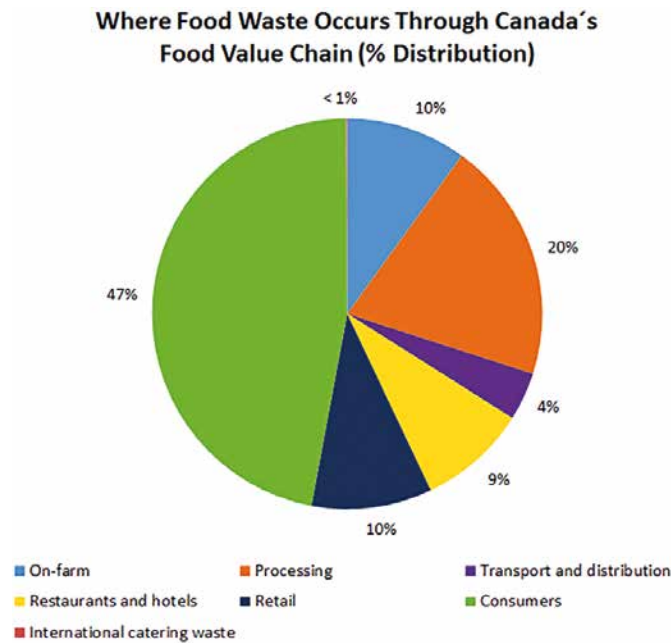
The Regional Municipality of York plays an important role in the Greater Toronto Area (GTA) and Ontario economy. York Region continues to show overall business growth, with the economic losses in manufacturing being more than offset by the growth in service-based employment. More than four out of five jobs in the Region are service-based. Only 1% of the York labour force is employed in natural resources, agriculture, and related production occupations (Economic Development Action Plan 2016 to 2019, Regional Municipality of York).

York Region is composed of nine area municipalities (Aurora, East Gwillimbury, Georgina, King, Markham, Newmarket, Richmond Hill, Vaughan and Whitchurch-Stouffville) and covers 1,776 square kilometres (686 square miles), stretching from Steeles Avenue in the south to Lake Simcoe and the Holland Marsh in the north.

Studies done by the Value Chain Management Centre, Food Waste in Canada (November 2010) and the ‘York Region Integrated Waste Management Master Plan 2013’ show that 40% of food produced and sold in Canada is wasted (valued at CAD 31 billion), with 51% of food waste in Canada occurring at home. The figure below shows the main sources of food waste in different parts along the supply chain.

Food waste generation in different parts of the supply chain in Canada.

@ VCM, 2014



Food waste prevention in the framework of the Committee on World Food Security (CFS)

The CFS 41st session policy recommendations on food loss and waste (FLW) in the context of sustainable food systems indicated that all concerned stakeholders, according to their priorities and means, should undertake cost-effective, practical and environmentally sensitive actions under the following mutually supportive tracks, in an inclusive, integrated and participatory manner:

Carry out training and capacity building to promote the use of appropriate practices and technologies and best practices to reduce FLW.

Promote innovation, the exchange of best practices, knowledge and voluntary technology transfers on mutually-agreed terms in order to reduce FLW.

Promote the coordination of stakeholders to improve governance and efficiency of the food chain and organise collective understanding and action to reduce FLW.

Encourage consumers to reduce the level of food waste in households through advice and the dissemination of evidence-based information and scientific and traditional knowledge.

Encourage engagement of all actors, especially women, in public campaigns, education of youth, and awareness-raising among consumers on the importance and modalities of reducing FLW.

Encourage the strengthening of the organisation of the food chain for reducing FLW, recognising the impacts of actions throughout the food system.

More information at:

http://www.fao.org/fileadmin/templates/cfs/Docs1314/CFS41/CFS_41_Final_Report_EN.pdf

Household food waste results in economic losses of about CAD 1,500 per year for each Canadian household (equalling one quarter of the average household food budget). In York Region, approximately 20% of the food wastage at home could be avoided by improved practices (based on York Region audit data). As part of their Waste Management Master Plan, the York Region has targeted a 15% reduction in avoidable food waste by 2031.

Description of concrete activities implemented

The Ontario Food Collaborative (OFC) is a cross-municipal collaboration to establish a multi-stakeholder mechanism with the aim of reducing food waste in the Region.

York Region has operated a Green Bin programme since 2007. The programme's purpose is to reduce the amount of waste shipped to landfills by turning organic waste into compost. York Region's Integrated Waste Management Master Plan (the SM4RT Living Plan) identified the goal of reducing avoidable household food waste in the Green Bin by 15% by 2031. The Environmental Services Department has developed a communications strategy and public education campaign to help residents take action to reduce food waste.

The campaign was based on market research conducted by York Region amongst leading grocery stores to understand consumers' motivations regarding food purchasing, preparation, and waste; and to gather feedback and opinions on food waste and education. The results reveal that consumers are motivated in their food choices by the health and wellbeing of their families. The campaign has two approaches: the first focuses on improving diets and cooking habits, the second on reducing food waste as a tool to save money.

York Region approached neighbouring municipalities in the Greater Golden Horseshoe region, relevant non-government organisations, and major food retailers to explore opportunities for collaboration. In November 2014 a first meeting of the Southern Ontario Food Collaborative was organised by York Region. The meeting was attended by 39 representatives from provincial (Southern Ontario), regional (York Region) and municipal governments, food businesses, and food and farming organisations.

The purpose of this first meeting of the Ontario Food Collaborative (OFC) was to bring together leaders from government, business, and non-government organisations in the region to share information and ideas regarding food and food waste; and to investigate the possibilities of working together to decrease wasted food through public education and by offering grocery stores easy-to-use tools to motivate their customers to better plan their meals, buy healthy foods, cook and eat with their families regularly, and throw away less food. On this occasion, the OFC adopted the following Vision and Mission:

1. All Ontarians eat well and no food is wasted.
2. The Ontario Food Collaborative will bring together stakeholders to take a holistic food systems approach in supporting individuals and families to eat well and reduce food waste.

Core principles of the OFC are:

1. The Collaborative strives to be a multi-stakeholder group representing diverse food system stakeholders;
2. Collaborative members are committed to reducing food waste, promoting healthy eating, and improving the systems of support to positively affect these changes;
3. The Collaborative recognises the important role of key food system stakeholders in encouraging and supporting food waste reduction as well as promoting healthy food choices by consumers, and seeks to engage these stakeholders in the work of the Collaborative;
4. Shared leadership, collaboration and learning are the key to achieving the mutually agreed-upon objectives of the group. Collaborative members will share information, effective practices, resources, and programmes, and work together on pilot projects where appropriate.

In 2015, members worked towards developing common key messages for food waste reduction, exploring collaborative projects to decrease wasted food through public education and advocating for changes in policy to support food waste reduction. They formed a Steering Committee and three Working Groups and developed a first strategic action plan for the period January 2015 to January 2018. Moreover, they agreed to undertake a multi-year public education and action campaign with collaboration between waste management and public health business areas, focusing on healthy food and family meals. Food waste reduction will be one of the impacts of this campaign.

Food distribution in Halton.

@ The Golden Horseshoe Food and Farming Alliance (GHFFA)



Stakeholder analysis

The OFC includes different types of government, private sector, and civil society actors. Their respective roles have been identified as follows:

Government (all levels): Policy development and harmonisation, food safety and labelling, food guidelines; funding support/partnerships; messaging; research, sharing best practices from other jurisdictions; curriculum development; and programmes. For the period from January 2015 to January 2016, York Region funded the process for organising the Collaborative and developing and launching its initial strategic plan.

Non-Government Organisations: Messaging and awareness-raising; innovation and advocacy.

Producers (Farmers): Improving farming practices; helping to change consumer acceptance and awareness; on-farm education about the process of food production.

Processors/Manufacturers: Reduce production of food loss or waste; provide infrastructure to support food banks and other recovery and redistribution of safe and nutritious food for human consumption hubs; packaging – extend shelf-life of food, use sustainable packaging; labelling and messaging on products; easy separation of product from package for redistribution or disposal.

Retailers: Improve storage/refrigeration practices; messaging and driving consumer behaviour; apply best before dates and food safety guidelines.

Restaurants/Food Service: Improve storage, refrigeration and food preparation practices; adapt portion sizes; promote takeaway of leftover food.

The lead actor of the OFC is the York Region, which has sponsored and launched the initiative since the beginning, funding the initial phase and facilitating the participation of different stakeholders.

Date marking in Codex Alimentarius

Date marking in national/regional legislation, in general is based on the Codex General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1-1985). However, date marking if incorrectly used and interpreted may be a contributor to food waste.

1. Date marking provisions in Codex standards- Food labelling provisions are included in commodity standards. The provisions are developed based on the guidance laid down in the General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1-1985). . Regarding date marking, the General Standard for the Labelling of Prepackaged Foods (CODEX STAN 1 – 1985) makes provision for:

- Date of Manufacture
- Date of Packaging
- Sell-by Date
- Date of Minimum Durability
- Use-by-Date

In addition, for pre-packaged foods, CODEX STAN 1-1985 makes exemptions for certain foods for which a 'date of minimum durability' shall not be required. Codex, through its Committee on Food Labelling (CCFL) is currently reviewing and revising its date marking provisions in CODEX STAN 1-1985 in order to bring clarity and better guidance on which date markings are required, on how and when to use the defined date markings; and to contribute in some way to the reduction in food waste. In 2014 (CCFL42), it was agreed to delete the "sell by date" but further work is ongoing on the other date markings, their definitions, the format of date marking and which foods should be exempted from "date of minimum durability" date marking, amongst others.

Level of collaboration and coordination between local/ sub-national governments at a city region level

The establishment of the Ontario Food Collaborative has been used as a clear strategy to enhance coordination and collaboration between different levels of government as well as public-private-civil society collaborations. Founding members of the Collaborative include a large number of local and regional governments, including: the Regional Municipality of York; City of London; City of Toronto; County of Simcoe; Durham Region; Halton Region; Middlesex-London Health Unit; Niagara Region; Province of Ontario (OMAFRA); Provision Coalition; Region of Peel; as well as key civil society organisations such as Sustain Ontario; University of Guelph; and the York Region Food Network.

Description of results and analysis of impacts

Expected results and benefits from the Food Waste Management Plan and Collaborative include:

- higher levels of collaboration between different government departments (and with other municipalities);
- decreased operating and capital costs for waste management;

- lower food and energy waste, and related reduction in greenhouse gas emissions; and
- decreased costs at the level of food producers, processors, distributors, retailers, and consumer households.

In addition to the above, the OFC aims to be recognised as a collective and influential voice on issues of food waste reduction and healthy eating. It intends to function as a laboratory and source of innovative practice; to advocate for further policy change based on collective practice and common data; and to implement a wider variety of consumer-focused pilot projects for the prevention and reduction of food waste, implemented with diverse food system stakeholders.

Analysis of the enabling national, regional and municipal governance structure

The SM4RT Living Integrated Waste Management Master Plan, launched in 2013, provides the policy framework for the realisation of the OFC and its food waste action plan. The 2013 Plan lays out the direction for waste management over the next 25-40 years.

SM4RT Living Integrated Waste Management Master Plan

Objectives of the plan: identify/assess/document roles and responsibilities, expertise, and efficiencies of different waste management actors; schedule/plan for waste management to meet the region's global commitments; ensure citizens' involvement and establish a transparent decision-making approach.

32 initiatives will be launched in the first 5 years of the Programme (2013-2018). Food waste reduction and on-site composting are two of the actions related to food.

Collaboration and partnerships with other organisations such as the York Region Food Network will be supported.

More information at:
<http://sm4rtliving.ca/the-project/project-reports/>

In addition to the above, the OFC also fits into the York Region Food Charter framework, which promotes a system, from farm to table, that provides access to local, affordable, and nutritious food for all. Based on 5 interconnected pillars, the York Region Food Charter is a guiding document for the development of coordinated food-related policies and programmes in York Region.



YORK REGION FOOD CHARTER

*A GUIDING DOCUMENT FOR THE
DEVELOPMENT OF COORDINATED
FOOD-RELATED POLICIES AND
PROGRAMS IN YORK REGION*

We believe a collaborative and integrated approach is essential to create a healthy and just food system for all.

We value...

HEALTH AND WELL-BEING

- Access to a variety of healthy and affordable food in all neighbourhoods and facilities.
- Food policies and practices to improve and inspire health.
- The importance of food for physical, mental, emotional and cultural wellbeing.
- Community ownership of healthy, locally-grown and processed food.

ECONOMIC OPPORTUNITIES

- Economic development plans that ensure robust and financially sustainable agriculture.
- Innovative food and related industries that unite producer, processor, distributor, health, tourism, education and hospitality sectors.
- Locally-grown traditional and world foods.

ENVIRONMENTAL SUSTAINABILITY

- Rural and urban agriculture practices that protect biodiversity and improve the health of our land, soil, water, and air.
- Integrating agriculture and food into energy and climate change policies and strategies.
- Protection of agricultural lands and a streamlined regulatory framework.
- Reducing food and packaging waste among consumers, retailers, processors and producers.

EQUITY AND SOCIAL JUSTICE

- The basic right of all residents to safe, nutritious, culturally appropriate, accessible food.
- Dignified access to food for all.
- Fair compensation and a safe and respectful work environment in the agriculture and food sectors.

EDUCATION AND SKILLS

- Food literacy and skills for all residents, with a focus on food growing, healthy cooking, and composting.
- Education that supports opportunities in the agriculture and food sector.
- Understanding the connections between food, farming, health and the environment.



The York Region Food Charter aligns with a food movement across Canada, promoting a system from farm to plate that provides access to local, affordable and nutritious food. The York Region Food Charter is a vision of thriving urban and rural communities where residents, businesses, and governments are creating a resilient food system.

March 2013

Find us online at www.yorkregionfoodcharter.com

The York Region Food Charter

@ York Region, 2013a

The York Region Official Plan 2010 and the related York Region Official Plan Policies support the Regional Council in promoting local food production through this Food Charter. Finally, the York Region has longstanding experience in connecting different stakeholders on food-related issues. The York Region Food Network was initially established in 1986 as a multi-agency body organised to coordinate food drives and act as a liaison between food banks and agencies in York Region with food access programmes. Over the years, the York Region Food Network has expanded its mandate in an effort to raise public consciousness on the issue of food security. The York Region Food Network has become involved in many community initiatives that seek to increase access to fresh, affordable, nutritious food for all people in York Region. Today, the York Region Food Network seeks to be an acknowledged and respected centre for the promotion of food security and of a healthy, accessible, and sustainable food system. In support of this vision, the network raises public awareness on the many issues affecting food and nutrition security, such as affordable housing, adequate employment, education, accessible childcare and social assistance policies, food waste prevention and reduction, and adequate management through programming, outreach, and advocacy initiatives.

Lessons learned and potential for replication

The OFC is an innovative coordination platform, which was generated from previous experiences at York region-level in the domain of food security (e.g. Food Charter, Food Network). It shows how different levels of governance and other stakeholders in the region can work together for the achievement of common goals.

The initiative shows that it is important **to raise awareness of food loss and waste through targeted events and campaigns and to identify focal points for action** such as educational institutions, community markets, company shops, and other solidarity or circular economy initiatives.

It is also important to emphasise the need **to integrate food loss and waste concerns and solutions, as appropriate, into agricultural, food, and other relevant policies and development programmes**. This requires collaboration between government departments and other stakeholders engaged in these different fields.

Reducing food waste and loss between the farm-gate and the last point of sale in urban areas, requires understanding and analysis of the entire food supply and value chain. To adequately plan for interventions to reduce food loss it is crucial to adopt a food systems' perspective and look at its different dimensions. To reduce food waste in the last part of the chain, at the consumer level, an awareness of purchasing and consumption habits is needed.

In addition, it is recommended to utilise mechanisms for measuring improvement and trends over time, setting targets as appropriate, and introducing an enabling environment through policies and incentives as well as the promotion of the recovery and redistribution of safe and nutritious food for human consumption. In this context, it is recommended **to establish mechanisms to monitor progress towards local, national, and global goals for reducing food loss and waste, in the framework of the Sustainable Development Goals: SDG2, SDG target 12.3 and SDG target 12.5**.

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11_CURITIBA, BRAZIL

Reduction and Recycling of Urban Waste in Support of Adequate Urban Diets and Prevention of On-farm Food Waste

Francesca Gianfelici, Louison Lançon and Camelia Bucatariu¹, Marielle Dubbeling², and Guido Santini³, Marcelo F. Munaretto⁴, Luiz Bittencourt Teixeira⁵

Summary

The City of Curitiba, Brazil has ideated, launched and begun the implementation of an innovative way to collect solid waste directly from its citizens, enhance food and nutrition security, and improve economic and environmental development of the city region. In the Cambio Verde Programme, fruits and vegetables procured from producers located in the city's peri-urban greenbelt and rural metropolitan area are distributed to vulnerable city-dwellers in exchange for recyclable waste.

The programme and its partners ensure that solid and oil waste does not end up polluting the city, while local farmers' livelihoods are supported, and social cohesion, including job creation, is strengthened. This action enables families to spend less on food purchases while improving their diets and eating habits. Families assisted by social

programmes are also supported. Schools, as well, are involved in education and awareness-raising campaigns. Local family agriculture is supported and small farmers benefit from more stable demand for their agricultural products. This programme represents for producers a constant and guaranteed volume of sale that enhances producers' income and livelihoods.

The programme specifically applies a nexus approach in directly linking waste management and recycling to food and nutrition security. The environmental and food supply Municipal Secretariats see this programme as an efficient way of connecting different stakeholders involved in urban management and planning issues with economic and social opportunities created by the food system, notably the local agricultural system.

1 Food and Agriculture Organization of the UN.

2 Director RUAF Foundation.

3 Food and Agriculture Organization of the UN.

4 Secretario, Secretaria Municipal do Abastecimento, Curitiba, Brazil.

5 Secretaria Municipal do Abastecimento, Secretary's planning manager.

Introduction

Curitiba is the capital and largest city of the Brazilian state of Paraná. The estimated population of Curitiba in 2007 was 1.8 million inhabitants, occupying the 7th position in the ranking of Brazilian capitals. In Paraná State, it stands out as the largest municipality in number of inhabitants, accounting for 17.5% of the total population. The municipality of Curitiba is divided into ten zonal governments. The municipality is part of the Curitiba Metropolitan Area of about 430 km² comprising 26 municipalities with a total population of over 3.2 million.

With an estimated GDP in 2007 of 15.3 billion USD, representing a share of 1.4% in the national GDP, Curitiba occupies the 4th position among Brazilian regional capitals. The Services Sector contributes significantly to the composition of the GDP, accounting for 77% of the total GDP. Industry accounts for almost 23% and agriculture for less than 1%.

In 2013, there were 7.2 million people in Brazil going hungry or lacking a balanced diet, according to the Brazilian Institute of Geography and Statistics. In direct contrast, the amount of food lost or wasted (mainly grain, vegetables and fruit) is so high that it would be enough to provide food security to the vast majority of this population. Curitiba's economy is based on industry and services. High population growth in the 1970s, coupled with changes in urban consumption patterns, has resulted in higher proportions of waste generated and a depletion of the city's landfill capacity. In response to this, Curitiba embarked on new urban planning, public transportation, waste management, and healthy food promotion systems and initiatives. Amongst these are the 'Lixo que nao è Lixo' (garbage that it is not garbage) and 'Cambio Verde' (green exchange) programmes.

- **Lixo que nao e Lixo** is a programme by means of which the city established complementary currencies to reward people for separating their organic and non-organic recyclable wastes and bringing them to waste stations, where they can exchange the currencies for public transport tickets, food, and school-books.
- **Cambio Verde** is a programme that incorporates locally grown, organic, healthy foods into this recycling program. Under this programme, citizens can trade recyclable materials for fresh produce originating from family farms in peri-urban areas or can buy them at 30% cheaper prices than in regular stores.

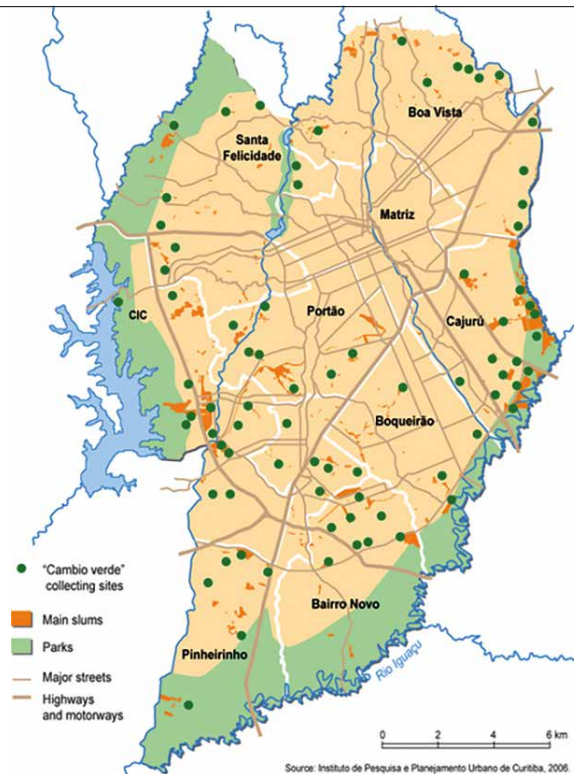
Description of concrete activities implemented

Research has shown that the consumption of vegetables by Curitiba's population declined in the 1990s even as availability of agricultural products in the city's green belt was adequate to allow a balanced diet. In June 1991, the Cambio Verde programme was launched jointly by the Municipal Secretariat of Food Supply and the Municipal Secretariat of the Environment, following a proposal by Jaime Lerner, an architect and former mayor of Curitiba. Cambio Verde was started to ensure that this food did not go to waste, while at the same time strengthening existing waste management programmes such as Lixo que nao è Lixo.

Concrete actions under this programme include: educational initiatives including in schools for children living in slums areas, environmental preservation, i.e. by reduction of waste in illegal dumping sites and reduction of food waste on-farm, and activities against hunger and poverty, i.e. provision of fresh food and employment opportunities. The Cambio Verde works as follows: the city of Curitiba buys food items from regional producers at a set price and distributes it to recycling collectors located in a large number of distribution points around the city. Recyclable waste brought in by citizens is exchanged for these food items.

Map of Curitiba illustrating the distribution of Cambio Verde collecting sites as distributed in the municipality territory.

@ IPPUC, 2006



Concretely, citizens can trade every four kilograms of recyclables (paper, glass, etc.) for one kilogram of fruits and vegetables. Plant or animal-based oil is also accepted: 2 litres of oil equals 1 kg of food. The exchange takes place every fifteen days at 100 different trading sites across the city of Curitiba, following an annual calendar set by the Municipality, and available online for citizens' consultation.

A specific recycling programme (Cambio Verde Solidariedade) exists for Social Assistance Programmes, with the objective of feeding the people that live in or are assisted by these entities with at least 1 meal per day.

The recyclable waste that is traded for the fruits and vegetables is collected once a week by private contractors and taken to a processing centre operated by a local NGO: the Pro Citizenship Institute (Instituto Pro Cidadania Curitiba, IPCC). IPCC separates, compacts and sells the materials to surrounding recycling factories that provide employment to over sixty employees. Here cooking oil is recycled into soaps and fuel. Other materials are reused for cement production.

Other groups that benefit from municipal assistance and recyclable materials are citizens' eco-cooperatives. These small groups, mainly operated by women, sell recycled materials and so have an opportunity to increase their income.

The programme ensures that waste does not end up polluting the city, tainting the landscape, contaminating the water or filling up drainage canals, ultimately causing floods. It improves garbage collection, which is particularly important in areas which are difficult to access by roads and municipal garbage services.

Low-income families trading waste for food also benefit from savings on food purchases, while nutrition/diets are improved and better eating habits are promoted. Families assisted by social programmes are also supported in their food security and nutrition. Local family agriculture is supported and small local farmers benefit from more stable demand for their agricultural products.



Exchange of recyclable waste for food.

@ Portal da Prefeitura de Curitiba

The financial resources used for programme implementation come from Curitiba City Hall, through its Municipal Secretariat of the Environment, which funds the entire infrastructure (equipment, logistics, physical spaces, human resources) and inputs. Additional support is provided by the Municipal Secretariat of Food Supply, which assumes the costs of its own services, performs selection procedures, sorts, weighs, and transports food to the storage location. Farmers bear the costs of food transport to storage locations, and the Parana's Federation of Associations of Agricultural Producers pays for physical storage. No resources from the state government or the federal government are used for the implementation of this programme.

Stakeholder analysis

Curitiba Municipality has driven the entire development of this intervention. The *Cambio Verde* programme is managed by the Municipal Secretariat of Food Supply and the Municipal Secretariat of Environment, under the Municipal Public Administration.

The Municipal Secretariat of the Environment (SMMA) is responsible for managing and implementing the programme and for providing the infrastructure (vehicles and operational staff). It is also responsible for the financial resources needed to purchase the food from producers. The operational team conducts collection, weighing, control,

and disposal of the collected recyclables – as well as accompanying and supervising the exchange points – while technical teams perform environmental education. SMMA hired the private company Cavo Serviços e Meio Ambiente (CAVO) through a public competition for the provision of public waste collection services. In the Cambio Verde programme, the CAVO undertakes collection activity, the weighing of recyclables, and the delivery of the corresponding weight in fruits and vegetables.

Food products are bought by the Municipality in negotiation with the Association of Producers, which unites small- and medium-sized producers in the Metropolitan Area through the Federation of Parana Rural Producers (FEPAR). Resources for such institutional procurement come from the Environmental Department. Expenditures for the Environmental Department represent a mere 1-2% of Curitiba's municipal budget.

The Municipal Secretariat of Food Supply (SMAB) is responsible for identifying areas where the programme should be implemented, that is, identifying the best spots where the vehicle and the team responsible for the operation of the programme should be located. It is also responsible for organising and mobilising the community by informing and promoting activities. SMAB is responsible for the team that receives food from the family farms and selects, sorts, weighs, and transports the food to be delivered to the exchange points. The team of nutritionists also develops food education plans for the people participating in this programme.

The Federation of Parana Rural Producers (FEPAR) is the entity that represents the Agreement with the SMMA for the supply of horticultural products from family farms, providing the products and the physical space for storage of food. Participating family farmers must be linked to an association of producers or directly to FEPAR through the existing Terms of Agreement, in order to supply the programme with fruits and vegetables. The farmers transport and unload their production directly to the FEPAR storage point.

The non-profit and non-governmental organisation IPCC is responsible for the administration of the Recyclable Valuation Unit, where the recyclable waste collected in the Cambio Verde trading points is selected and sold on the market for the best price proposal. The partnership of the Curitiba City Hall with the IPCC is regulated through a Terms of Agreement with the SMMA.

The Social Action Foundation (FAS) is responsible for the Social Municipality Assistance Policy. FAS has IPCC support in caring for families that are socially vulnerable, to the extent that the funds raised are directed to alleviating emergency situations. Within the actions of the Cambio Verde Programme, FAS is responsible for using the funds generated by the sale of recyclable material to purchase, for example, blankets for donation (during the duration of Campaign Blanket), emergency purchases, and other assistance actions.

The participation of society occurs as each individual household delivers its own collected waste to the collection points.

Level of collaboration and coordination between local/sub-national governments at a city region level

The Cambio Verde program only serves the city of Curitiba, with no counterparts or partnerships with other municipalities or the government of the state of Paraná. On the other hand, this programme assumes a small part of the larger effort assumed by Curitiba, which prioritises the organizations of small family farmers in the Metropolitan Area in their food consumption and acquisition.

Description of results and analysis of impacts

The waste management programmes ensure that less waste ends up polluting the city (informal dumping, clogging of canals), help reduce household expenditures on food, improve nutrition, and support local family agriculture in peri-urban and rural areas in the Metropolitan Area. Urban waste management and consumption of fruits and vegetables is directly linked to support for peri-urban/rural food production.

The programme has contributed to 22% of the city's waste being recycled each year. With this amount of recyclables diverted from the landfill, its lifetime has been extended and costs for its maintenance reduced.



Community waste collection.

@ Cesar Brustolin

The recycling households are not the only ones financially benefitting from the compensation through trading. Other actors in the chain, such as recycling operators and factories/cooperative groups, also earn an (additional) income from selling recyclable materials.

The amount of food distributed is steadily increasing. In January 2013, 86 tonnes of food was distributed to 7.5 million people. In July 2014, this increased to 97 tonnes of food distributed to 7.2 million people. For the whole of 2014, a total of 847 tonnes of seasonal fruits and vegetables were distributed to Curitiba's urban vulnerable dwellers.

The implementation of this programme has had wide ranging impacts, including:

1. the development of a culture of environmental preservation in urban areas, with a special focus on lower-income individuals;
2. the reduction of informal waste dumping and of disposal of waste in riverbeds and protected areas (resulting in consequent savings in public cleaning);
3. the stimulation of better eating and consumption habits for families;
4. the provision of an alternative market outlet for available safe and nutritious produce from family farming and improvement of family farmers' livelihoods, reducing food waste; and
5. the facilitation of a more circular economy for the city, linking waste management and recycling to food production and consumption.

In 2010, the city of Curitiba won the Global Sustainable City Award, given to cities which set an example in sustainable urban development in terms of urban landscapes, citizen participation, education and health care.

Statement from Marcelo F. Munaretto, president of the Curitiba Food Supply Secretariat (Feb 2016):

'The Cambio Verde is really a programme that inspires many people. That is because with one single and simple action we can reach many different goals. From an environmental point of view: this programme is a way to motivate people to separate the recyclable materials from the garbage, and take them to the right destination. Alternatively, in Curitiba's poorest areas, an impressive amount of this material would be wasted, thrown away in small rivers, or abandoned on empty urban plots, tainting the soil, causing floods and spreading diseases. However, because of the Cambio Verde programme, about 3 thousand tonnes of recyclable material is properly treated each year. From a nutritional, social, and economic point of view, last year the programme distributed

847 tonnes of seasonal fruits and vegetables, contributing to better nutrition for the poor. Also, the money they saved on buying this amount of food was used by those families to pay other bills or fulfil some other needs. There is also a sense of inclusion once the poor families can have quality food. The points of exchange are used as a point of contact with the citizens to approach themes such as environmental preservation, healthy eating habits, and so on. From the perspective of countryside development, because the fruits and greens are bought from small family farmers from the metropolitan area, this programme represents for them a constant volume of sale that helps producers to improve their livelihoods'.

As recognised in international analysis, Curitiba's strategy has turned waste into a resource, thereby unleashing a range of positive impacts. The widespread problem of food and nutrition security has been alleviated and city spaces are no longer covered with garbage – not only enabling better use of materials but also reducing hazards to the environment and health. Employment has been created in various ways. Firstly, recycling created jobs. Secondly, the green trade for bus tickets enabled more of the city's poorest citizens, e.g. those living in distant informal settlements, to travel to where existing jobs were on offer, especially in the city centre. With more jobs in the formal economy, another benefit is greater tax revenues to support urban governance and public services. All of these benefits can be seen to create positive multiplier effects. That is,

employment, education, environmental clean-up, food and nutrition security, and social inclusion are not only positive in themselves but enable other positive effects.

In addition, although the programmes are implemented with the voluntary involvement of citizens living in slums, 70% of the households participate. The whole recycling program costs no more than a landfill costs and has the advantage of improving public health, as well as improving nutrition amongst the poorest and creating jobs. The recycling plants employ disabled people; former alcoholics and homeless people are given a second chance by the job opportunities created from recycling.

Analysis of the enabling national, regional and municipal governance structure

The Municipality of Curitiba has a long-term and strong commitment to sustainability and a trajectory linking different policy departments to look at sustainability in a more integral way (social, economic, and environmental). This has facilitated the inter-departmental municipal collaboration, i.e. between the food supply and environment secretariats, that is the key to the Cambio Verde programme.

The exhaustive educational and awareness campaigns that have been carried out by the city government for many years have paid off, as most of its citizens now incorporate environmental awareness as part of their lifestyles. This has been crucial to the success of the programme.

The Brazilian government has made sanitation – including water, wastewater, drainage, and waste management – a priority. The Attorney General's Office enforces federal legislation enacted in 2007 and 2010 to strive towards adequate solid waste management policies. In Brazil, municipalities are responsible for municipal solid waste collection and disposal.

Lessons learned and potential for replication

Public awareness and education campaigns on environmental responsibility were crucial in engaging citizens in waste management actions. Such awareness-raising programmes should help create habits to separate recyclable waste at the household level and to sensitise communities on the correct final uses of such waste.

Collaboration between the Municipality and the private sector can effectively promote environmental conservation, engaging with the private sector through Public-Private-Civil Society Partnerships to promote and raise awareness of sustainable consumption and food loss and waste, as well as by implementing concrete activities.

Curitiba's Cambio Verde programme also shows **how urban (low-income) groups can be included in the delivery of urban services and the improvement of their living conditions, other than by directly receiving money, thus building more social inclusiveness.**

The Cambio Verde programme is a highly successful programme. However, there are two important aspects to consider and take into consideration before implementation:

- It should be decided whether materials that are not fully recyclable will be accepted, or not. This is due to the fact that many people bring materials that are not organic waste, for which the technology for recycling may not be available. If such materials are simply rejected for exchange, they will probably be disposed somehow within the city, causing environmental problems. If such materials are accepted for exchange, then the programme's costs may rise. So far, when people bring these kinds of materials they are accepted, and the issue is raised in the environmental education actions.
- It should be decided whether there needs to be a limit to the amount that can be exchanged per person. In some cases, the neighbours organise themselves, so that one of them takes the material from all the others, exchanges it and later distributes the food received. Indeed, many people cannot be at the exchange point at the time scheduled and this may also bring the community together. However, it is known that there are some people who collect every sort of material and exchange these for many kilos of food, selling the products. In consideration of the fact that the first case is much more common, and in recognition of the benefits of social organisation, weight limits are not set.

Currently, the evaluation process has identified the need to review the location of collection points and incentives for community participation.

Inspired by the Cambio Verde programme, the 'Trueque Verde' (green barter) project was set up in Mexico. This is an innovative recycling program in Morelia, Michoacan (Mexico), which collects recyclable materials from poor neighbourhoods and exchanges these materials for basic food staples and fresh local produce. For every four kilos of materials turned in, the family receives one kilo of healthy food, including rice, beans, eggs, fresh fruits and vegetables. This shows the potential for replication of the Curitiba experience in other cities and other countries.

Truck full of recyclable materials collected by Trueque Verde.

@ Común Tierra, 2010



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12_LINKÖPING, SWEDEN

Linking Rural and Urban Areas through Agricultural and Urban Waste Recycling

Francesca Gianfelici, Louison Lancon and Camelia Bucatariu¹,
Marielle Dubbeling² and Guido Santini³

Summary

The Linköping Waste-to-Energy (WTE) plant transforms organic waste from agriculture and slaughterhouses around Linköping, Sweden into biogas for fuelling the city's public transport system and to reduce emissions and pollution from the urban transport system. One of the key aims of the Linköping municipality is to develop an integrated system to turn waste into biogas.

Organic waste (manure from animal farms located in rural areas surrounding the city) is – together with urban wastes, abattoir waste and food waste from canteens and restaurants – incinerated for the production of biogas and bio-fertiliser. Aggregation of rural and urban waste

production is needed to ensure sufficient waste volumes and biogas plant efficiency. Products are used in rural areas (bio-fertiliser) and urban areas (biogas), thus connecting rural and urban areas, enhancing agricultural sustainability and improving the environment for Linköping's citizens.

The waste-to-energy project contributes to coordinating efforts at the city region level in combining waste management activities, sustainable agriculture development, and the decrease of CO₂ emissions. WTE contributes to Sweden's national strategy of overall reduction of food waste.

1 Food and Agriculture Organization of the UN.

2 Director RUAF Foundation, The Netherlands.

3 Food and Agriculture Organization of the UN.

Introduction

Linköping is a fast-growing municipality with 153,000 inhabitants located in the heart of southern Sweden. It is the fifth largest municipality in Sweden and capital of Östergötland County (East Sweden Region). The city hosts a university and a number of important industries and is located in the middle of an agricultural district. The farming and forestry sector employs 1.5% of the total labour force.

Sweden's interest in renewable fuels began in the 1970s after the oil crisis, which led to a massive hike in fuel prices. In addition, worsening air quality from vehicle emissions required swift intervention, and the use of biogas for Linköping's public bus system was identified as an opportunity to address rising costs and environmental issues simultaneously. The City decided that the buses should run on locally produced biogas. The fuel is suitable for a city context as it can be collected from local waste streams, including agricultural and urban waste, and does not require too significant an investment. Key aims were to develop an integrated system to turn waste into biogas, which would connect rural and urban areas, and to improve the environment for Linköping's citizens.

Description of concrete activities implemented

Linköping Biogas AB was formed in 1995 as a result of co-operation between the City of Linköping, the local abattoir (Swedish Meats AB) and the farmers' association (Lantbrukets Ekonomi AB). The company decided in 1995 to build a biogas plant to supply all the city buses in Linköping with gas and received funding of Euro 140,000 from the city government. Construction work started in March 1996 and the plant began operation in December 1996. Since 2005, the plant has been owned and operated by Svensk Biogas (Swedish Biogas), a subsidiary to the City of Linköping. Over the past few years, the plant has undergone several upgrades to increase its capacity to match the growing demand for biogas.

The Linköping Waste-to-Energy plant uses organic waste from agriculture and slaughterhouses around Linköping for transformation into biogas, fuelling the public transport system and reducing emissions and pollution from urban transport. Additionally, the plant supports local production through the production of 52,000 tonnes/year of bio-fertiliser for farms in the region. In 2001, the project was expanded to include waste from school canteens and restaurants, by installing three waste macerators throughout the city. Svensk Biogas currently owns and operates 12 public refuelling stations in Linköping and in the surrounding area. The filling stations are used by private cars as well as by taxis and distribution vehicles from different companies.

The Linköping plant receives the majority of its waste from different food industries (waste fat, vegetable waste, slaughterhouse waste, etc.), 2,000 tonnes/year of animal manure and 36,000 tonnes/year of other waste materials for a total of 100,000 tonnes. The waste is mixed with manure at the biogas plant and then pasteurised for 1 hour at 70°C. The material is then fed to the digesters. The digested product is regularly removed from the digester and stored at the plant for a few days before it is transported back to farmers and used as bio-fertiliser.

The annual production of bio-fertiliser is around 52,000 tonnes. The bio-fertiliser has a dry matter content of 4.5% and a nitrogen content of more than 7 kg/nm³. It is certified according to the Swedish certification system SPCR120 and thereby approved for recycling to farmland. Since March 2015, all the bio-fertiliser produced in Tekniska Verken's biogas plant is also ecologically certified (KRAV⁴ certified).

Filling station for biogas busses in Linköping.

@ Sharon Boddy



Stakeholder analysis

The local government, through the municipal services provider “Tekniska Verken” (TVAB), has been a key stakeholder in and initiator of the process. The private sector was engaged to ensure sourcing of waste from, for example, the local slaughterhouse owned by Scan-Farmek, as well as from the Federation of Swedish Farmers (LRF). These three stakeholders – TVAB, Scan-Farmek and LRF – started an associated company with shared ownership called Linköping Biogas AB (now Svensk Biogas) in 1995. The company received municipal government funding to build a methane production facility. As in the late 1990s, the financial demands to maintain and further develop the plant were too high and additional funding and expertise was sought from other actors, including the county and the regional bus authority.

Level of collaboration and coordination between local/sub-national governments at a city region level

The activity is supported by the County administration, which aims to coordinate the environment, competence sourcing, business community, social development, animal protection, gender equality, integration, transport, infrastructure and housing, and other areas of public responsibility to achieve efficient solutions for a sustainable society. The County Administrative Board is the national government representative office in the county of Östergötland and as such constitutes an important link between municipalities on the one hand and government and central authorities on the other.

⁴ KRAV standards. <http://www.krav.se/english>

Description of results and analysis of impacts

The Linköping biogas plant has made it possible for the city of Linköping to decrease costs of fuel for their transport system, decrease CO₂ emissions from urban transport, and also to decrease the local emissions of dust, sulphur, and nitrogen oxides. The plant has contributed to farmers' replacing artificial fertiliser, by digesting and providing an environmentally sound process for treatment of the organic waste in the region.

The biogas from the plant replaces about 5.5 million litres of petrol and diesel each year, substantially decreasing the need to import fossil fuels. Biogas production has increased by 334,580 m³/year, equivalent to 12.65 GWh of renewable vehicle fuel per year. Carbon dioxide emissions have been reduced by about 9000 tonnes each year, while air quality for citizens has improved.

Waste is recycled, decreasing the volume sent to the landfill and, thus, increasing the lifetime of the landfill. The majority of the produced bio-fertiliser of 3,422 tonnes/year is recycled to 17 farms in the surrounding area of Linköping. The bio-fertiliser is managed and resold by Biototal to farmers. Thanks to the production of bio-fertiliser, resource loops are closed and the use of energy-intensive, fossil-fuel-based fertilisers is reduced. The quantity of phosphorus recycled has risen by 689 kg/year and nitrogen by 7,136 kg/year, rather than accumulating in toxic concentrations at landfills.

The project has also contributed positively to the city's economy. Including local farmers in the production of biogas and sale of bio-fertilisers has increased their competitiveness and kept financial flows within the local economy.



Transport of bio-fertilisers sold to farmers.

@ Cleantech Oestergoetland network, 2015

Analysis of the enabling national, regional and municipal governance structure

Linköping city political and financial support has continued to drive the development of the biogas plant and has supported research. Public funding resources have facilitated the starting phase, and multi-level governing intervention guaranteed the upgrading of this plant in the late 1990s as previously described. The political commitment and support at different levels (county, municipal) has been maintained due to the fact that

this plant contributes to achieving Swedish goals for sustainable development, waste management, and CO₂ emissions reduction.

Under the heading of ‘High-quality Urban Environments’ the Swedish government had set the goal that at least 35% of food wastes from households, restaurants and shops should be recycled through biological treatment by 2010. In 2009, around 21% of food waste was treated biologically in various compost and biogas plants. In addition, the deposition of organic waste in landfills was banned in Sweden in 2005. Another target under ‘high-quality urban environments’ states that by 2015, at least 60% of the phosphorous in sewage should be recycled for productive purposes, with at least half being returned to arable land. Application of the nutrient-rich residue from the biogas process on agricultural land should help to meet these targets.

Prevention and reduction of food waste is included in the Swedish Waste Prevention Programme, the Swedish environmental policy and the Swedish Waste Management Plan (2012-2017) that introduced national targets for food waste reduction: “by 2018 at least 50% of food waste from households, canteens, shops and restaurants shall be collected separately and treated biologically to secure the recovery of nutrients, of which 40% is treated in a way that also energy is recovered.”

Lessons learned and potential for replication

There is still scope to expand waste collection for the plant to integrate waste from food markets, wholesale, retail and consumers, as the volume of such waste used currently remains marginal. Broadening stakeholder involvement would help achieve a more comprehensive and city-wide waste collection and recycling system.

The long-term past/history of co-operation among the city, the farmers’ association, Linköping University, transportation authorities, and other actors can be identified as the most significant factor contributing to the project’s success. **Local stakeholders were involved early on and took part in the decision-making process at a very early stage, helping to ensure sustainability and ownership.**

Linköping’s intervention has already been replicated in other cities, especially in Europe. Today, for example, the entire city fleet of the metropolitan region of Lille in France is fuelled with bio-methane produced from organic waste.

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13_BALANGODA, SRI LANKA

Composting Urban Organic Waste into Agricultural Inputs

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Summary

As in other cities of Sri Lanka, solid waste management has been a key problem in and concern for Balangoda Urban Council. Waste accumulations in the city have caused many problems, including unpleasant odours, contamination of water bodies, and contamination of paddy fields, giving rise to epidemic diseases such as Salmonella, typhoid fever, and diarrhoea. A Balangoda compost plant has been set up to process municipal solid waste into compost. The project started in 1999 as a city service to provide a solution to the solid waste problem, but converted into a business in later years. Integrated waste management in Balangoda now consists of a Municipal Solid Waste compost plant, septage treatment plant, plastic pelletiser and an open dump.

In addition, as there is increasing awareness of environmental and health risks related to the use of agro-chemical fertilisers, demand for alternative – organic – fertilisers is increasing. As per the majority of the compost plants in the country, the Balangoda plants are located in semi-urban or rural areas, facilitating reuse of waste in agriculture, with farming areas located near the compost plants. The Balangoda system thus operationalises rural-urban linkages through the collection of urban food and organic waste and its recycling, sale, and reuse as compost for rural (and peri-urban) producers.

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Introduction

According to the 2014 Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report: ‘Global food loss and waste generate annually 4.4 GtCO₂ eq, or about 8% of total anthropogenic Green House Gas – GHG – emissions’ (6-IPCC, 2014 Fifth Assessment Report. Chapter 8: Transportation). This means that the contribution of food – and other related organic – waste emissions to global warming is almost equivalent to global road transport emissions. If food and related organic waste are minimised at source or prevented, or if safe and nutritious food waste is re-used for human food and for high value non-food consumption (as animal feed, fertiliser or biomass), then the economic and environmental impact could be reduced.

In Sri Lanka, much of the solid waste is openly dumped into waterways and vacant fields in populated areas. Generally, municipal waste collection services are insufficient and only cover the urbanised and commercial areas of cities and towns. Most of the collected waste in Sri Lanka ends up in landfill sites. These sites are usually located close to streams, marshy lands or forest areas and can create adverse impacts on the environment and public health.

In areas where households have larger land plots, waste is managed by households themselves on their own premises. In these peri-urban areas and rural contexts it is common to use food waste as animal feed and organic waste for home composting using the pit composting method. In such cases inorganic waste is burned and organic waste is composted or buried.

As in many other countries, the governance and administration structure in Sri Lanka is decentralised. The structure has been divided into three tiers: (a) local level; (b) provincial/regional level; and (c) national level. Sri Lanka’s local authorities are the local bodies responsible for Municipal Solid Waste (MSW) collection and there is no separate charge or fee for waste collection in general. MSW is collected as mixed waste, except in a few cases, thus far with varying degrees of success. On average, the biodegradable fraction of MSW in Sri Lanka decreases from 66% in urban areas to 40% in rural areas. This can be explained not only by more frequent recycling processes in rural areas, but also by larger collection coverage in urban areas, which has been expanded to the residential areas as well. In semi-urban and rural areas the collection coverage is mostly limited to the town centres, which produce comparatively less organic waste.

Although the composition of MSW in Sri Lanka shows a high proportion of organic matter, it also has high moisture content (60–75%) and low calorific value (1000–1200 kcal/kg). This means that MSW incineration with its current composition for energy is not viable, as a result of this low calorific value and high moisture content. On the other hand, high organic content and high moisture content offer great potential for composting.

Composting potential of organic food waste in Sri Lanka capital

Colombo Municipal Council (CMC) produces 700 tonnes of Municipal Solid Waste (MSW) per day, which is approximately 10% of the total MSW generation in Sri Lanka. The majority is food waste/organic materials. These sources include waste collected from markets (ca. 25 tonnes of vegetable waste and 8.5 tonnes of meat/fish waste per day), slaughterhouse waste (9 tonnes of waste per day)

and food waste from restaurants (110 tonnes/day). These sources together comprise about 36% of the total organic waste collected within the CMC. If this amount were composted and not landfilled, about 50,000 tonnes of CO₂/year of GHG could be avoided, while between 280 and 330 tonnes of NPK could be returned to agriculture annually.¹

Various small- and medium-sized cities in Sri Lanka have introduced compost plants – with government funding support – to recycle organic waste and produce compost for use in peri-urban and rural agriculture. As there is increasing awareness of environmental and health risks related to the use of agro-chemical fertilisers, demand for alternative – organic – fertilisers is increasing. In addition, and thus far, most of the compost plants have been established in semi-urban or rural areas, facilitating reuse in agriculture, as the farming areas are located near the compost plants.

The Balangoda Urban Council in Sri Lanka is one of the oldest local administrations, dating back to 1939. As with many other cities, sanitation is one of its biggest constraints, the reason why the city started a waste management project to improve current conditions. The present administration's main objective is to build a green and environmentally friendly city by 2025.

Balangoda Urban Council is located in the Sabaragamuwa Province at 150 km from the capital Colombo. The population of the Balangoda Urban Council Area was 23,220 as of 2014. In addition, the city hosts an estimated 40,000 Sri Lankans who commute into the city daily. Total MSW collection per day stands at 20 tonnes/day, with 100% collection coverage. The garbage collected by the urban council is divided into degradable garbage and non-degradable garbage. Non-degradable garbage, e.g. plastic or glass, is sold and the degradable garbage is used to make compost.

City dwellers benefit from improved waste management and reduced health risks by reducing direct contact with untreated waste in informal dumping sites. Farmers around Balangoda benefit from the production of organic fertilisers. This recycling of urban waste resources for the benefit of peri-urban and rural agriculture constitutes a clear strategy for operationalising urban-rural linkages.

Description of concrete activities implemented

As in other cities, solid waste management was a key problem and concern for Balangoda Urban Council. Waste accumulations in the city caused many problems, including unpleasant odours, contamination of water bodies, and contamination of paddy fields, giving rise to epidemic diseases such as Salmonella, typhoid fever, and diarrhoea.

¹ NPK fertilizer is primarily composed of three elements, each of these being essential in plant nutrition: Nitrogen (N), Phosphorus (P), and Potassium (K).

A Balangoda compost plant was set up to process municipal solid waste into compost. The project started in 1999 as a city service to provide a solution to the solid waste problem, but converted into a business in later years. Integrated waste management in Balangoda now consists of a MSW compost plant, septage treatment plant, plastic pelletiser and an open dump.

The Balangoda Composting Plant recycles MSW, faecal sludge, fish waste, and slaughterhouse waste, and has a capacity of 14 tonnes/day. In 2005, a waste-purchasing centre was built with support from the municipality to buy non-degradable waste in the city. In 2008, a night soil treatment plant was established with funds from the 'Pilisaru' project of the Central Environmental Authority. Operation and maintenance costs are estimated at around USD 1340/month. The initial operation costs were covered by the Balangoda council until the project began making a profit. The current revenue stream of the plans now consists of the sale of compost from MSW and 'super compost' from the night soil. In addition to the recovered resources from organic material, the plant also sells non-degradable materials to recyclers.

The plant uses a turning windrow composting system. Hand-sorted MSW are piled up to a size of 5x5x12 feet (27.8 m²). Every pile is turned using a mini front loader (also called bobcat) and moisture is added for six weeks during the composting period. A temperature of more than 60 degrees Celsius is maintained inside the pile. After the composting period the processed material is heaped and allowed to cure. The piles are left for maturation for one to two weeks minimum. Compost is sieved when a purchase order is received. Final compost moisture level is maintained at 15%.

Compost value addition is conducted using several strategies: (a) animal wastes are buried in the middle of the pile; (b) half-burnt rice husks are incorporated; (c) rock phosphate is added to increase the phosphorous content of the fertilizer; and (d) the compost is blended with dried faecal sludge.

Production of the nutrient rich fertiliser

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As the final compost produced in Sri Lanka plants is generally of low nutrient content; overall, the products have a low market demand and price. Moreover, compost plants are highly subsidised and the long-term financial sustainability of the plants is uncertain. In order to overcome this challenge, in the Balangoda plant a nutrient-rich fertiliser is produced with the addition of 13% dried faecal sludge (FS) to composted MSW and branded as 'super compost'. It is sold at a 40% higher market price than normal MSW compost. The treatment of night soil involves a cost-effective technology. The septage is unloaded into a settling tank and allowed to thicken by gravity. The liquid portion (effluent) is treated using a wastewater treatment plant and passed through a charcoal filter to a constructed wetland for further treatment. The purified water is used in the compost plant or released to the surrounding environment. The sludge is sent to two drying beds and dried for 28 days.

Stakeholder analysis

The main actor of this project has been the Municipality, which has implemented the provisions set by the Pilisaru national project. The Balangoda compost plant is a public business entity. It receives its major inputs – MSW and night soil – free of charge from the municipal council. The council also covered initial plant operating costs.

The compost project partners with local universities and LIRNEasia for research and technology development and skills training respectively. A vocational training centre has been established at the same site to provide a diploma in waste management and recycling, which is known as a 'solid waste management assistant course' and has low course fees. The course is conducted by the Balangoda UC with the collaboration of the national vocational training authority and the LIRNEasia organisation. This diploma is equivalent to a national vocational qualification.

The council has partnerships with schools in order to support environmental awareness and attitudinal changes among children and their families. In 2010, the council also formally introduced a 'door to door' garbage collection, based on a tax payment scheme and pre-separated degradable garbage. Products, i.e. compost and non-degradable products, are sold directly to local farmers and recyclers.

Use of compost in plant production

@ IWMI/Fernando Sudarshna



Level of collaboration and coordination between local/sub-national governments at a city region level

Collaboration between the provincial and national government is mainly of a financial nature. In 2007, the National Ministry of Environment and Natural Resources developed a National Policy on Solid Waste Management and National Solid Waste Management Strategies. The then Minister Champika Ranawaka initiated a Sri Lankan Rs. 5.7 billion project named 'Pilisarū' for developing the solid waste management infrastructures of Local Authorities. In 2008 the government implemented a 'Green Levy' through a 'polluter pays' principle to earn Rs. 6 billion between 2008-2010 using half to fund the Pilisarū program. The General Treasury agreed to another Rs. 2.7 billion.

The construction costs of the Balangoda compost plant and the access roads were funded by the Central Environmental Authority and the Provincial Council under the National Pilisarū project at the cost of USD 300,000. The land was given to the project at no cost by the national Land Reform Commission.

Finally, collaboration with neighbouring municipalities in the Province has developed through Balangoda Urban Council (BUC) extending the service to neighbouring authorities.

Description of results and analysis of impacts

The quantity of organic fertiliser produced by the Balangoda Composting Plant increased from 2,620 kg in 2003 to 385,660 kg in 2009. Income generated in 2009 from fertiliser sales (Sri Lanka Rs. 1,345,660.00) was over 100 times the income generated in 2003 (Rs. 13,100.00). The income collected by selling recyclable goods in 2003 was Rs. 75,450 and increased in 2009 to Rs. 432,650 (Cofie and Jackson, 2013). Economic benefits are shared among the municipality and the seventeen workers of the plant. This provides extra income to the municipality.

Notwithstanding the increase in sales, the compost produced by the project does not compete with chemical fertilisers, which are heavily subsidised: a 50 kg bag of chemical fertiliser at the subsidised rate is cheaper than a 50 kg bag of the compost. In addition, the chemical fertiliser is needed in smaller quantities, compared to compost, considering its nutrient concentrations. The opportunity that the Balangoda compost plant exploits lies in the sandy nature of soil in the Province where it is located. Chemical fertilisers will leach out without a soil conditioner such as that provided by the compost. Environmental impacts of the initiative involve the reduction of waste generated in the municipality; reduction of open waste dumping and related environmental contamination; and the reduced use of chemical fertilisers in the region.

Analysis of the enabling national, regional and municipal governance structure

The national policy on solid waste management (2007) states that ‘environmentally friendly disposal of waste with maximum opportunities for application of 3R (Reduce, Recycle and Reuse) concepts with special emphasis on prevention of waste generation has to be implemented, in order to exercise due care in disposing of all waste’. Sections 5.1 and 5.2 of the policy emphasise that solid waste should be managed in accordance with the 3R principle and propose to limit landfills to receiving only non-recyclable, non-compostable, and inert material.

In 2008, following this national policy, a national solid waste management project (Pilisaruru) was initiated using public funds from the national treasury worth USD 40 million and the promotion of composting was the main objective of the project. 115 compost plants were established as of 2013 under the government-funded Pilisaruru project. The Government of Sri Lanka has already extended the Pilisaruru project for 5 more years until 2018 and many more plants are planned. The Pilisaruru project provides the capital cost as a grant to local authorities or public institutions. This capital grant includes buildings, access roads, services, equipment, and, in addition, training for workers.

The set-up of the compost plant in Balangoda Urban Council would not have been possible without the National Pilisaruru waste management project that, among other things, seeks to build waste treatment plants for local authorities. The (draft) National Sanitation policy demands resource recovery from septage (excreta or faecal sludge collected from onsite sanitation systems such as septic tanks and pit latrines) where feasible and appropriate as an alternative to disposal. This creates space for co-composting initiatives as applied in Balangoda to improve compost quality.

Lessons learned and potential for replication

One of the success factors for the functioning of waste treatment and compost plants is source segregation of waste to reduce labour-intensive sorting activities and to improve compost quality. The most common successful strategies applied are: (a) to refuse to collect mixed waste; or (b) to introduce a fee to collect unsorted waste, while extending a free service for sorted waste. Urban councils, for example, enact a waste tax for shops and institutions that fail to segregate waste. This significantly reduces the costs associated with sorting and speeds up the composting process.

Success of the Balangoda plant can also be attributed to its demand-driven approach, whereby compost is sold to farmers who have need of the product, i.e. localities where soils are sandy in nature and thus require organic fertilisers to improve soil quality and performance of chemical fertilisers that would otherwise easily leach out. Moreover, the marketing strategy involves free samples to farmers to increase subsequent demand for the product.

Lessons learned from different initiatives in Sri Lanka, however, show the importance of awareness-raising and training, both for waste generators as well as for farmers using compost. Capacity-building efforts take the form of workshops and training programmes offered to employees of the waste management centres and

to farmers, as well as educational campaigns for the community. As compost is a bulk product, transport and handling costs are a constraint to farmers. Locating the compost plants near both urban and agricultural areas has proved a favourable factor in Balangoda.

Important also are quality standards for compost manufactured from municipal solid waste (similar to those that exist for chemical fertilisers). In Balangoda a formal procedure is applied to the examination and certification of the quality of the fertiliser. Without a formal certification process, some buyers are resistant to purchase the compost. Systematic testing in laboratories is, however, expensive and contributes to the lack of regulatory standards.

The Balangoda compost plant uses a ‘near holistic approach’ to resource recovery and reuse, whereby almost all waste types, both degradable (including organic waste and faecal sludge) and non-degradable, are used. The technology applied is simple and allows for replication. However, a major limitation for replication is the high capital required for setting up such plants in terms of infrastructure and access roads. Another challenge to replicating this model is obtaining support from the municipal council to enable a company (private or public) to impose a waste tax to prevent the receipt of unsorted waste.

The increase in organic agriculture (mainly in the export sector for tea, vegetables, fruits, spices, and other products) will likely increase the demand for organic fertiliser in future and contribute to the potential viability of composting plants in the country.

The ultimate benefit of replicating the methodology developed by Balangoda Urban Council is that their success offers a solution to the problem of urban waste by improving the public health environment, offering organic fertilisers to farmers as an alternative method to protect soil quality, and improving the skill base of local workers and residents.

There is a large diversity of projects recovering nutrients and organic matter from various domestic and agro-industrial waste streams. However, larger-scale applications of such systems (at the city region level) are still difficult to find. One of the main reasons is a **lack of market analysis of demand for products**. An important challenge for the area of waste recovery and reuse is to **create further linkages between waste recycling and agricultural product reuse**.

Policy support is often a prerequisite to delivering new sanitation systems in urban areas. This can include financial support for infrastructure development, access to land, sanitary regulations or licences, waste collection, and sorting and marketing support. Other key areas for support include: logistics (transport from waste disposal to processing site) and location of and support for facilities for recycling. Government funding is certainly justified, as sanitation is a public health concern. The focus should be on centres of waste accumulation that have a higher rentability due to economics of scale.

The formulation and implementation of well-designed business models that generate value and allow cost recovery or profits could result in an important up-scaling of waste recovery and reuse efforts. **A combination of models ranging from cost recovery for sanitation services, i.e. general cost savings for public administration, to revenue generation seems to be the most sustainable.**

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City Region
Food Systems

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in collaboration with
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