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A farmers' market stall of organic vegetables grown on the city fringe of Melbourne, Australia. Photo by Matthew Carey for the Foodprint Melbourne project.

Opinion

Practitioners are pushed to evaluate their work by developing indicators and collecting quantitative data, often through complex, time-consuming approaches like logical frameworks or results-based management.

We must, of course, constantly and carefully assess whether our policies, strategies, research and interventions achieve their goals. But we believe the currently dominant approaches can undermine progress, especially when evaluating projects for improving social conditions or promoting sustainable food systems.

Why?

First, these frameworks reduce *understanding* complex change processes to measuring discrete, manageable pieces. Indicators of success are (increasingly) standardised to facilitate data aggregation necessary for global comparisons, and tend to privilege what's measurable over what might be locally important but tough to evaluate.
This model, while useful within the closed systems for which it was designed (business and engineering) and appropriate to its original purpose (improving accountability), is weak at fostering ongoing learning, engaging local communities or making sense of unpredictable and changing social contexts. And while the cause-effect logic underpinning the approaches is useful in refining practitioners' thinking about the relationships between their inputs and activities and their outcomes (or impact), it also narrows our focus to what's in the frame. We miss the unexpected.

Yet food system change occurs in complex social, economic, cultural, health and biophysical environments. Findings date rapidly; the factors that influence change are innumerable and oftentimes unknown or unknowable. Using standardised indicators and quantitative data to understand our efforts must necessarily be tentative and is limited. Yet that is not how this data is read.

Practitioners require a design and evaluation approach that opens up understanding of the web of *relationships* – human processes – that drive change, not ditching indicators and quantitative data but rather placing them in perspective.

Second, these approaches are time-consuming and resource intensive. Where neither time nor expertise is available, the frameworks are used suboptimally. Indicators are weak, linkages and assumptions associated with different levels of change are under-researched or overly optimistic, measures are weighted to those easily measured. Most problematically,

perhaps, this leads to reporting success using these mundane measures, and reluctance to report – or even investigate – failure.

We spend so much time developing and feeding data into performance management frameworks that attention and resources are diverted from action on the ground. Rather than engage stakeholders in meaningful conversations we survey them and crunch the numbers. We account to funders rather than learn from practice.

Finally, these approaches undermine our trust in human judgement and agency.
Conceptually, these approaches promote a view that "truth" is found only by collecting and analysing "the numbers". Qualitative research – human stories understood by analysing human discourse – is, consequently, reduced to collecting "success stories" for marketing purposes.
Practically, feeding data into these complex frameworks leaves less time for practitioner action and reflection on that action.

So critical evaluation, like interrogating lived experience or probing motivation, is devalued. This undervalues the food system expertise of academics, practitioners, activists and community members and overvalues the role of technicians. Though measurement, appropriate indicators, and quantitative data are important, they must not displace meaningful action on the ground, divert resources from that action, or replace thoughtful reflection with data collection. Moving towards a healthy and sustainable food system is a hugely complex undertaking, and involves engagement with multiple stakeholders and sectors. We are up against power-holding industry – whether large-scale agribusiness or food manufacturers with big advertising and marketing budgets to convince us what to consume.

Data collection must continually feed into policy development and enhance understanding, not simply be a vehicle to collect numbers related to discrete indicators. Its focus must be understanding and facilitating better change processes – by understanding the human relationships that drive change – rather than simply measuring outcomes.

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Editorial

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Assessment of the urban or city region food system is an important basis for improved and evidence-based policy making and planning for more sustainable and resilient food systems. As the article by Carey et al. states (page 19): *"Little evidence was available on the significance of the city's periurban food production to its current food supply or the risks to future production. The Foodprint Melbourne project aimed to fill this evidence gap".*

Assessment methodologies and toolkits are becoming more widely available; examples include the RUAF-FAO city region food system assessment toolkit (page 6) and the rapid urban food system appraisal used by FAO (page 10). The focus of such assessments may be regional food production potential, urban nutrition (see the article by GAIN on page 15) or other food system sustainability dimensions.

City resilience to climate change and disasters is increasingly becoming a specific area of interest for such assessments. In most cities, resilience planning includes food system resilience only to a limited extent. Using comprehensive assessment, monitoring and planning frameworks, cities like Baltimore (USA), Melbourne (Australia), Toronto (Canada) and Quito (Ecuador) are identifying key food system vulnerabilities, resilience challenges and critical areas for policy and project interventions (see the articles on page 16 to 25).

Nevertheless, Barbara Emmanuel and John Gultig (opinion column on page 3) warn us that assessment and monitoring frameworks may tend to oversimplify reality, that they take up a large amount of time and resources and do not necessarily allow us to understand the real drivers (and failures) for change. Moragues-Faus (page 34) also recognises limitations of indicator frameworks and monitoring, and that the main point is to adapt already existing frameworks to local contexts and stakeholder interests.

Lee-Smith (page 32) also acknowledges the lack of comparable data as well as problems with boundary settings, sampling and out-of-date data. Nonetheless, she points out that data is also useful for illustrating certain trends. Undeniably, hard facts and figures often act as triggers to increase awareness and mobilise action.

In this regard, both Davies et al. (page 38) and Dubbeling and

Toronto Transit Commission Subway pop-up market. Photo by Sally Miller

Carey (page 28) highlight the importance of communicating goals and (impact) data in a way that is relevant for end users, be they food communities or policy makers. The city of Ede (the Netherlands) uses a publicly accessible dashboard system to communicate progress towards healthy and sustainable food for its citizens (page 37).

End-user participation in designing monitoring frameworks is another strategy used to assess progress made by cities in achieving more sustainable food systems and in the implementation of subsequent plans and policies. The Milan Urban Food Policy Pact, for example, is building its own monitoring framework with the direct and active participation of 13 cities. The article on Basel (Switzerland) also calls for citizen engagement in food policy assessment and implementation (page 13).

Because food system transition is a serious, urgent and very complex challenge, it requires a serious and longer-term assessment and planning process, supported by policy that is monitored in relation to outcomes. Assessment and measuring of impact must serve to support on-the-ground policy and practice transformation. Questions like, "What minimum key data is needed to achieve food system change?" and, "How do food metrics actually make a difference for a city?" still require further and critical reflection. We hope that this issue of UA Magazine contributes to such further exploration.

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Measuring Food Policy Impact: Some examples from cities and policy makers

Based on a short survey with responses from representatives from Curitiba (Brazil), Malmö (Sweden), Austin (USA) and Cagayan de Oro (the Philippines)

What food indicators do cities use?

- Curitiba (Brazil) is measuring the number of gardens and the number of people participating in UA programmes.
- Malmö (Sweden), in order to quantify progress on their "Policy for development and food", is measuring the percentage of organic food purchased (as share of both value and weight) and climate impact by measuring kg CO2 equivalents per kg food bought.
- Austin (USA) uses indicators that were readily available, like UA production, food environment, food system infrastructure, emergency food, hunger, economy, health, and food waste.
- Cagayan de Oro (the Philippines) will start an urban household container gardening program and measure household waste recycling, composting and vegetable consumption.

Why are they using indicators?

They have helped:
- to quantify the efficiency of food and nutrition security

programmes and to inform the public of their results (Curitiba, Brazil).
- to find answers to questions such as whether practices have resulted in the reduction of malnutrition and obesity, and consequently in reduction of the health effects of these conditions (Curitiba, Brazil).
- to communicate results as encouragement for staff to redouble efforts towards reaching goals (Malmö, Sweden).
- to identify where they fall behind (Malmö, Sweden).
- to get a general idea of how things are changing over time in each of the food system categories (Austin, USA).
- to compare across cities by tracking shared indicators with the Milan Urban Food Policy Pact and the US Conference of Mayors Food System members (Austin, USA).

What are cities struggling with?

- an easy way to measure food waste without too much extra work for cooking staff, yet still get reliable statistics (Malmö, Sweden).
- the correct interpretation of data. For example, food insecurity rates are decreasing, but the data does not tell us if that is due to people moving away because they can no longer afford to live in Austin, or if conditions are actually improving for existing residents (Austin, USA).

City Region Food System Assessment and Planning

Marielle Dubbeling
Guido Santini

In 2015, FAO, RUAF Foundation and Wilfrid Laurier University, with the financial support of the German Federal Ministry of Food and Agriculture and the Daniel and Nina Carasso Foundation, embarked on a collaborative programme to assess and plan sustainable city region food systems in seven cities around the world: Colombo (Sri Lanka), Lusaka and Kitwe (Zambia), Medellín (Colombia), Quito (Ecuador), Toronto (Canada) and Utrecht (the Netherlands).

The City Region Food System (CRFS) assessment aims to help strengthen understanding of the current functioning and performance of a food system in the context of a city region, within which rural and urban areas and communities are directly linked. It forms the basis for further development of policies and programmes to promote the sustainability and resilience of the CRFS. The CRFS assessment and planning approach builds on a formalised process of identifying and engaging all relevant stakeholders from the start of assessment through to policy review and planning. This means that a CRFS process can result in revised or new urban food policies, strategies and projects, and also in the creation of new – or revitalised – networks for food governance and

Figure 1: Steps in a CRFS assessment and planning process

policy development, such as urban food policy councils and new institutional food programmes and policies.

Since each city region has its own context, no guideline will fit all; nevertheless, in this article we provide a short outline of the steps generally involved in a CRFS assessment and planning process, based on actual experiences in the project partner cities. These steps are:

1. Getting Prepared

The preparation phase consists of setting up a CRFS project team and multi-stakeholder task force that will identify the first steps to take in the CRFS project as well as who to involve, what goals to pursue, what sources of baseline information are available and how to get started. Setting timelines for each stage of the work is important, to balance activities with available resources and aims. From the start, the CRFS project should involve policy makers, a multidisciplinary team of researchers and other food system stakeholders.

2. Defining the CRFS

A first key activity in the defining stage will be to conduct a participatory mapping exercise with a wide range of stakeholders to define the nature and boundaries of the local city region and the city region food system. These can be defined using various criteria: main sources of food and food flows, natural boundaries, administrative and jurisdictional boundaries. These boundaries/concepts may be further refined over the course of the process, when more data becomes available and when territorial intervention strategies are designed. A second key activity involves stakeholder mapping to (further) identify and map the key stakeholders directly or indirectly involved in the CRFS.

3. Visioning

The aim of the visioning phase is to build a shared common vision for a sustainable and resilient CRFS. The visioning process

> ### Timeframe for the CRFS process
> *It is important to note that the CRFS process is cyclical, not linear. The entry points should be defined based on the local context. For example, as the CRFS process in Medellín, Colombia started during a period of political regional elections, it first focused on Policy Support and Planning to ensure that a CRFS approach was embedded in new political programmes and agendas. Once such support was ensured, the CRFS process continued with the CRFS Scan and Assessment, while work on Policy Support and Planning proceeded in a parallel process.*
>
> *In Quito, Ecuador, the CRFS process evolved from the CRFS Scan to Policy Support and Planning. As part of the design of a new territorial food strategy and the collection of baseline data and indicators, the process embarked on a more in-depth CRFS Assessment. In other cities, like Colombo, Kitwe and Lusaka, the CRFS process followed the steps outlined above. The overall timeline for the entire process was two-three years, as it is so dependent on local dynamics and political processes. Steps 1 through 4 would generally take about nine months, and steps 5 and 6 would take roughly nine to twelve months – although, as indicated, many steps are implemented in parallel.*

runs through the different steps of the entire CRFS assessment and planning process. It generally starts from building a first general project vision that will grow into a more refined, consolidated – and political – vision that is agreed upon by all stakeholders involved as the project progresses. At this stage, which marks the start of the further CRFS assessment and planning, building a general project vision will give direction to the implementation of the CRFS Scan.

4. CRFS Scan

The purpose of the CRFS Scan is to develop an overall view and description of the local context (including the socio-economic, agro-environmental, political and institutional environments) and to start characterising the city region food system. More specifically, it begins to: explore the overall structure, characteristics and functioning of the current food system, including the institutional and regulatory framework; take stock of baseline information and identify gaps; and provide, to the extent possible, an indication of general trends and critical issues relevant to increasing the sustainability and resilience of the CRFS under examination.

5. CRFS Assessment

In each of the project cities, the CRFS Scan illustrated clear food system data gaps, key constraints and challenges. On the basis of these data gaps and constraints and in line with identified policy priorities, key areas were defined for more in-depth assessment. This was followed by new and/or additional data collection and research in each city. The CRFS in-depth assessment can be guided by a CRFS indicator framework designed by RUAF and FAO. See article on page 28. Stakeholder consultation and engagement are vital to collecting further information on the key CRFS data gaps and priority issues from different stakeholders, and also for continued engagement of stakeholders in preparing further policy support and planning processes.

6. Policy Support and Planning

The final goal of the CRFS process is advancement of policy design or strategy planning, to build a more sustainable and resilient CRFS. In this phase, then, the multi-stakeholder CRFS team should develop further strategy for building the results of the CRFS assessment into policies, strategies and action plans. This policy support and planning could involve further policy analysis, policy formulation and revision, policy integration and planning of further action. Continued engagement of policy makers and other stakeholders is key to ensuring policy uptake and effective implementation.

7. Governance

Improvements to governance structures, either through the development of new networks or by facilitating new participation avenues for key food system actors, may be a priority for policy impact. The CRFS process will ultimately help improve food system governance by consistently applying a multi-stakeholder participatory approach and process throughout the various steps of CRFS assessment and planning: through the strengthening and creation of new networks and/or food governance structures, the improvement of government and stakeholder capacity in implementing a CRFS process, and the promotion of food policy design and monitoring (see Policy and planning section).

Examples of policy outcomes in the pilot cities

Policy recommendations

In all cities, results of the CRFS process have led to a set of key policy proposals and recommendations. In some cities this has already led to significant policy or project activity, including new governance structures. In other cities processes will be carried forward, by local stakeholders or under new projects. While policy proposals and recommendations differ, in all pilot cities the CRFS process

Participatory process of policy development in Quito. Photo by Alain Santandreu

has allowed the building of more awareness and information exchange on the characteristics and functioning of the CRFS and has created the basis for a common and shared vision of a sustainable CRFS.

In the example of the **Toronto Greater Golden Horseshoe** (Canada), the CRFS work cannot be considered the sole contributor to food policy activity at multiple scales. The work has, however, helped to shape other food policy initiatives either directly or indirectly. The <u>Growth Plan for the Greater Golden Horseshoe, 2017</u> that came into effect on July 1, 2017, explicitly calls for curbing sprawl and protecting farmland and green spaces: "*The finite supply of quality agricultural lands that feed the region and beyond must be protected to ensure a vibrant rural and productive agricultural economy and a secure food supply for future generations.*" As further outlined in the Growth Plan, municipalities in the city region are encouraged to implement regional agri-food strategies and provide opportunities to support access to healthy, local and affordable food; urban and near-urban agriculture; food system planning; and promoting the sustainability of agricultural, agri-food, and agri-product businesses and infrastructure.

In **Quito** (Ecuador), the CRFS process has culminated in the design of a territorial food strategy. The food strategy, a formal resolution and ordinance will be submitted to the city council for approval and adoption by the end of 2018. Also, a food policy council is being established.

In **Medellín** (Colombia), the Municipality of Medellín commissioned a study to further assess possibilities for production and commercialisation of food products from the region's rural villages. Also, a proposal has been developed to renovate the *Campo Valdes* food market into a regional food logistics centre or "food hub" within the city. This would make the urban food market more accessible for producer associations in the rural areas around Medellín, and regulating the role of intermediaries would allow these fresh products to reach consumers at much more accessible prices.

Following the CRFS assessment and policy revision, *Colombo Municipal Council (CMC)* (Sri Lanka) agreed to introduce local level by-laws to promote and regulate *Reduction, Reuse and Recycling* of food waste at the CMC level.

Policy integration
In **Kitwe and Lusaka** (Zambia) a result of the CRFS process is a proposal to integrate food in the National Zambian Urban Policy currently under development. Another example is the inclusion of local/regional food as a component of the **Utrecht** (the Netherlands) Healthy Urban Living Policy, similar to the inclusion of food in the Quito Resilience Strategy. In **Colombo**, the CRFS work informed the work of the newly formed Ministry of Megapolis and Western Development, responsible for the urban development of the Western Province, to integrate food and agriculture in its urban planning process.

Top 3 common challenges
The project cities encountered several constraints in implementing the CRFS process. Common constraints include:
1. **Limited data availability.** *The CRFS research illustrated the significant challenges arising from the dearth of data on, and empirical analysis of, food systems. Even in "data-rich" environments like Toronto, specific food system data was either not available, outdated or only available for specific jurisdictions (the city, the province), but not for the city region. A combination of secondary and primary research was used to complement missing data. Stakeholder interviews and focused case studies provided needed additional sources of information and analysis. Meeting this challenge will also require first identifying and prioritising the data, analysis and information needs, and, second, determining the multiple, innovative and efficient ways to systematically collect and analyse this data to produce the information required for decision-making.*
2. **Political buy-in and stakeholder engagement.** *Any multi-stakeholder process comes at the cost of a high level of engagement across most sectors and stakeholders. Participant fatigue can result, or it can be difficult to get key people engaged due to other reasons (lack of institutional versus individual engagement, conflicting agendas, no history of collaboration, no clear outputs from the start of the process). Important tools used in the project were individual stakeholder interviews, training, and a variety of engagement techniques and policy outreach tools.*
3. **Governance mechanisms and instruments to work at city regional level.** *Interaction and coordination are necessary between different levels of governments (larger and smaller cities in the city region, city and provincial/national government). Many provincial/national programmes still prioritise rural over urban or city regional development. Smaller cities in the city region often have less human and financial capacity for intervention than do larger cities. Urban and rural authorities, and city level versus provincial authorities, may not have much history of engaging in joint policy and planning, especially when different political orientations are at play. From the start of the process, specific training, attention and time efforts have to be put in place to facilitate such coordination, horizontal and vertical policy integration.*

Food governance structures
The CRFS assessment in the **Medellín** city region resulted in increased awareness among regional public authorities that joint and concerted actions are needed to improve the city region food system, especially in the arena of food provisioning. A new governance structure and institutional platform are planned, in which different public authorities – including the Municipality of Medellín, the Metropolitan Area of the Valley of Aburrá (a collaboration of ten municipalities with strong environmental competences and responsibilities) and the provincial government of Antioquia – collaborate. This tripartite governmental platform on territorial food policy issues, called the "Alianza por el Buen Vivir" (the "Alliance for Good Living"), is intended to serve as

LUSAKA City Region Food System
ZAMBIA
Scale 1:1,500,000

Legend • Towns —— Roads —— Rivers ▢ LUSAKA CFRS ▢ Administrative Boundaries - districts

Lusaka city region is made up of eight districts: Lusaka, Mumbwa, Chibombo, Chisamba, Shibuyunji, Chongwe, Kafue, and Chilanga. This area is defined on the basis of origin and flows of the food commodities that represent the typical food basket of the city region dwellers. It has been estimated that about 60% of the food consumed in Lusaka is produced in the city region area.

a space and mechanism for coordination and articulation of the collective development and implementation of policy and project interventions, from a territorial governance perspective, in the Medellín food system.

Multi-stakeholder discussions organised in the context of the CRFS research and the Food Smart Cities for Development Project, the **Utrecht** Municipality, the University of Utrecht (Hub Future Food), the Economic Board, the local Rabobank, the programme Food and Health and the Province of Utrecht resulted in the creation of a regional food network. This network will be a place to meet, exchange and get inspired. The goal will be to collectively develop a healthy, sustainable food environment in the Utrecht Region.

Conclusion

In order to support on-the-ground policy transformation and implementation of sustainable and resilient CRFS, it is important that city regions assess how they are fed and what their food dependencies are, identify weaknesses and potential pressure points and, where possible, develop targeted strategies to improve their food systems.

The assessment helps city stakeholders to recognise the links between food and various other sectoral policies, such as transport (as a large part of city transport is food-related), health (malnutrition, obesity, school feeding), land-use planning for agricultural and multi-functional areas, community development and revitalisation, employment generation (in food production, processing and retail) and waste management (productive use of waste and waste water, management of food waste). In addition, a CRFS approach helps cities to understand the extent to which

their urban food security is dependent on rural production areas and how the food system impacts both urban and rural populations in the city region. This understanding helps city governments to start seeing food as a driver for other sustainable urbanisation policies.

Each city region food system is unique. It has its own specific characteristics, challenges and solutions. The project developed a toolkit that documents an approach tested in seven cities worldwide to map and assess their own city region food system and to plan specific interventions that address local key issues and needs. The examples and tools documented 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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When rapidity meets complex realities

The NADHALI Approach for Assessing and Planning City-Driven Food Systems

Local governments are putting food and nutrition high on their agenda, with a sense of urgency. Rapid urbanisation is placing unprecedented pressure on natural resources, influencing what we eat, where and when. It has a profound impact on our health and wellbeing.

The New Urban Agenda (NUA) is a global reminder that sustainable food system planning is fundamental if countries are to achieve the goals of the 2030 Agenda. Innovative urban food ideas have been discussed to facilitate implementation of the NUA (see the report of the post-Habitat III Expert Group Meeting Integrating food security and nutrition into urban and territorial planning). However, for many local authorities, dealing with food systems presents numerous challenges including: (i) understanding the prevailing food system; (ii) recognising what actions may be necessary to improve the system and the prevalent interlinkages with both rural areas and non-food systems; and (iii) instituting a mechanism to facilitate change in a manner that is inclusive and effective.

In December 2016, the Food and Agricultural Organization of the United Nations (FAO) launched a pilot project to assist municipalities to meet their countries' commitments made under the NUA. The project, known as NADHALI, had three main objectives:

1. development of a tool for rapid appraisal of urban food systems[1];
2. development of a participatory food governance mechanism that facilitated effective and inclusive food system planning; and
3. a capacity-building programme that linked analysis to governance and empowered stakeholders in food system planning.

In this article we refer to the first two objectives that jointly aimed to provide an approach to assess and plan city-driven food systems. Consultation with local governments made it clear that a tool for evidence generation and analysis was needed to support their food systems decision-making process. In Nairobi, for example, the County Chief Officer for Agriculture noted that evidence was needed to understand the relationship between logistics in the food system, food cultures and preferences. This information would provide a baseline to support the county in understanding the status of the food system and improvements needed.

To fill this information gap, the FAO developed a Rapid Urban Food Systems Appraisal Tool (RUFSAT) with the goal of identifying food system "hotspots" that compromised or constrained the economic, social and environmental performance of the system. In Dhaka, for example, contrary to the widespread belief that market intermediaries are extracting inordinate profits, the analysis revealed that wholesalers were operating on a margin of just 2 percent. With such low margins, wholesalers were often compelled to find buyers for inferior-quality products, which compromised public health.

The knowledge RUFSAT generated serves to identify strategies that may contribute to reducing food waste; improving access to safe, affordable, nutritious food; reducing pressure on natural resources; addressing inequities in food distribution; preserving food culture and promoting healthy diets. In Dhaka, the major wholesale market for fresh fish and produce is located in the city centre. Despite regulations that determine when food-laden trucks may enter the city, traffic congestion is a significant impediment. Post-harvest losses are accentuated by the absence of a cold chain – and where ice is used to cool the product, the poor quality of the water, poor infrastructure and lack of sanitation accentuate the risk of contaminating the product with faecal pathogens.

The participatory food governance mechanism foreseen in each of the three pilot project cities (NAirobi, DHAka and LIma) relied heavily on the creation of a Food Liaison Advisory Group (FLAG): a multi-stakeholder platform that collectively represents the voices of the various food system actors. These include both private and public sectors, civil society organisations, and other stakeholders affected by government decisions. The latter can be actors representing other commodity systems from the commerce industry and/or from service systems such as the health system. FLAG members, when recognised as a key resource for planning and adequately empowered, are able to lobby decision makers, flagging potential problems and advising urban planners and policy makers at local and national levels on holistic approaches that permit sustainable food system planning. Great examples of institutionalised and/or modified versions of FLAGs are the food policy councils or similar mechanisms found today in cities such as Vancouver, Philadelphia and Bristol. In Lima, stimulated by the "NADHALI approach", an ordinance is under discussion to formally

Street food vending dynamics are covered in the assessment and planning process of the NADHALI approach. Photo by FAO

recognise the FLAG, and the entire FLAG will sign the "Carta Alimentaria" (Food Charter) that includes the vision and priorities for the city.

Prioritising information and engaging plurality

The RUFSAT consists of: (i) a master guide for collecting and analysing secondary data and conducting policy audits; (ii) a set of tailored surveys for key actors including consumers, food producers, processors, retailers and wholesalers; and (iii) a reporting protocol. Secondary data is collected from the national bureau of statistics, government departments (including agriculture, commerce and trade, environment, health and family welfare, transport, tourism and recreation), local municipalities, academia, research organisations and civil organisations. This data offers a greater understanding of the prevailing food system, socio-economic trends, food production and processing, food distribution and marketing, food consumption, and the policy environment. At each of the hotspots identified with RUFSAT, institutional impediments are revealed which may compromise the integrity of the food[2], leading to food safety breakdowns or accentuating food waste as a result of logistic system bottlenecks, inappropriate handling and poor governance.

At the consumer level, surveys are conducted in both modern and traditional shopping centres to gain a better understanding of the factors influencing consumers' decisions to purchase food, the type of food purchased, expenditure on food, food storage and preparation methods at household level, and the different sources from which consumers obtain their food.

With the aim of rapidly (within three-four months) collecting information and understanding the complex relationships between rural food producers and urban consumers, three to four food value chains, prioritised by the FLAG, are analysed. The food products selected for analysis have included a staple food product (rice in Dhaka, potatoes in Lima and Nairobi); fresh produce (commonly a leafy green, a root crop and a fruit crop); and either fresh fish or meat (chicken, beef, pork, mutton or goat). The value chain surveys endeavour to collect information on food sources, seasonality of supply, transport and logistics, long-term trading relationships between buyers and sellers, price margins, operational costs, food safety, food storage, food waste and key constraints impacting the business.

In addition to these structured surveys and value chain analyses, a dynamic, interactive spatial analysis through Geographic Information Systems (GIS) is conducted to integrate spatial and non-spatial data. This information is critical for urban food planning as it reveals gaps in terms of access to nutritious food and allows the FLAG to identify city neighbourhoods with high vulnerability to food insecurity or explore food environments conducive to unhealthy diets such as food deserts, food swamps and food tundras[3]. The GIS helps identify main foodsheds, transport networks and key infrastructure including water treatment plants and major food processors, with a view to boosting management of key urban resources and to establishing contingency plans for dealing with major food system disruption.

Under the leadership of local government and in a consulting role, FLAG members are identified strategically to represent the culture, geography, politics, religion, capacities and rights of all actors directly and indirectly involved in the food system. A FLAG normally consists of an active core group that expands according to specific needs, which may include technical discussions on issues such as food waste management or climate shock vulnerability. The pace and route of the FLAG dialogue process are variable. The process is influenced by many factors, including the level of empowerment and commitment of the local government, political stability, and the ease with which knowledge is managed and brought forward in a consistent way. All along the knowledge construction process within the FLAGs, the role of third-party entities may facilitate the dialogue across the institutions and actors involved. In fact, the NADHALI experience has shown that institutions with a holistic perspective, such as FAO, NGOs and academia, can play a key role in facilitating multi-scalar governance mechanisms.

The FLAG complements the RUFSAT analysis with qualitative information. After reviewing the information generated from RUFSAT, the FLAG may not only call for further analyses based on identified hotspots but also start looking into eventual formulation of holistic strategies and action plans. In a consultative process, the FLAGs also define the character (vision) of the food system they want for their city.

Analyses for action

The food system analyses have shown a persistence of food

losses in the supply chain "middle stages" (i.e., distribution) and an increasing trend towards fewer actors controlling food supply and prices. This reveals the importance of strengthening inclusive and efficient post-harvest systems. The FLAGs are informed of the various inputs and outputs (including environmental and social externalities) at different points of the supply chains and the likely reasons for biological, chemical and physical food safety risks.

Rapid assessments can provide valuable insights into local foodsheds, bringing opportunities for urban buyers (e.g., retailers, restaurants) to better engage with those producing the food. In Lima, the FLAG's improved understanding regarding foodsheds revealed how vital certain regions are for supplying nutritious food to the capital city. This has prompted interest in improving linkages within the Metropolitan Municipality of Lima and other municipalities, with jurisdictions as distant as 16 hours away (ground transportation).

The rapid assessment of the Nairobi food distribution system evidenced that close to 50 percent of food is distributed to the final consumer through informal food channels such as street vendors and informal food stalls. This percentage is much higher (67 percent) for distribution of fresh horticultural products. Of particular concern is that these informal systems operate in the absence of any functional regulatory infrastructure for food safety and quality. This evidence has led Nairobi County, with the support of the FLAG, to develop a food system strategy that will prioritise actions for creating an enabling environment for safe food commercialisation.

The assessment shows that wholesalers in key commodity value chains in Nairobi make significant margins from their food businesses. This cannot be attributed to the efficiency of the food distribution system, but rather to the ability of wholesalers to dictate price to their downstream suppliers (mostly farmers) and upstream buyers (mostly retailers). The same scenario is not reflected among the retailers: the assessment reveals that retailers operate under very small, and sometimes negative, margins. This may be attributed to high operational costs such as transport, electricity and water, as well as labour. The analysis in Nairobi has brought to the fore the importance of sectoral coordination at the subnational (county) level to ensure programmes that effectively reduce food loss and safeguard food safety.

Beyond knowledge generation on food supply, FLAGs rely on information provided by RUFSAT to support local governments in planning healthy urban food retail environments and, depending on priorities agreed upon, to establish mechanisms for improved use of natural resources, weather shock risk management and urban green environments.

Flexible locally-owned solutions as aim: some lessons learned

Entering their second year, the three NADHALI country processes have proven that the potential for effective food

system planning relies on a flexible RUFSAT that functions more as a framework than a standardised method, that – once "localised" – could be integrated in the city food systems planning process.

The role of the FLAG in complementing RUFSAT with qualitative information is crucial for ensuring rapidity in analysing the food systems in a complex reality. Rapid generation of data with RUFSAT in a few months has proven to be feasible. However, effective parallel implementation of both RUFSAT and the FLAG is not rapid by nature, given the complexity of the participatory process. To a large extent, success of the FLAG-led process rests with clear commitment and ownership by the local government as a dedicated champion, and with appropriate engagement of the diverse stakeholders. Inclusion of the most vulnerable groups in the FLAGs, then, is of paramount importance. Formally recognising the process of multi-actor involvement and enabling an environment for ownership among stakeholders are both fundamental to the sustainability of the process, regardless of changes in the political environment.

The role of spatial analysis is fundamental to understanding the geographic dimension of the food system and its potential constraints (e.g., unequal physical access to nutritious food). Moreover, it is important to highlight that food is a continuously evolving, complex system that cannot be understood without analysing the power relations among the actors involved.

In 2018, the Municipality of Douala (Cameroon) is adapting the NADHALI approach. Though the Douala context is a very different scenario, yet with the same urge for rapid assessment of city-driven food systems towards effective plans and actions, lessons learned from the experiences associated with the pilot project hold promise for the future.

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Notes
1. In this article the terms "city-driven food systems" and "urban food systems" are used interchangeably, referring to a context inclusive of the wider sustainability footprint of the food systems linked to the cities, recognising the economic, social and environmental implications of the urban food activities.
2. Food integrity is a comprehensive term which describes "the state of being whole, entire, undiminished or in perfect condition". It provides an assurance to consumers and other stakeholders about the safety, authenticity and quality of the food.
3. These concepts relate to the prevailing food offer in city neighbourhoods: food deserts are low-income communities with limited access to nutritious, affordable food; food swamps are poor urban communities with excess retail offerings of both nutritious and fast – energy dense/low nutrient – food; food tundras are urban areas where easy food access is predominantly to low-nutrient/energy-rich food.

Involving Citizen Experts in Sustainability Assessment of the City Region Food System

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The path to a sustainable city region food system (CRFS) is unique for every city. And who knows a city better than the people who live in it? We tested a new approach in the city of Basel, Switzerland, to involve citizens in the creation of a sustainability assessment tool for the city's food system.

As one of the first signatories of the Milan Urban Food Policy Pact, Basel city administration expressed interest in measuring their progress towards achieving a sustainable food system. They partnered with the <u>Research Institute of Organic Agriculture (FiBL)</u> to advertise a Master thesis position to address this challenge. Given the complex nature of a city's food system and the limited resources available for funding a Master thesis, we selected 17 experts representing society, policy and the market. We interviewed them on their needs regarding a sustainable Basel CRFS and came up with 65 evaluation criteria.

Steps taken to define the assessment criteria

The following steps were taken to use the experts' knowledge to define the criteria to assess the sustainability of the Basel CRFS. First, the experts were invited to contribute their expertise to the project. All experts are active in the arena of food and sustainability in Basel and represent various divisions of city administration, food business, or civil society, including a representative of a farmers' association, a food waste consultant, a manager of a food bank, and food activists. Second, individual face-to-face interviews collected opinions, background information and ideas. Two questions were posed to everyone: "What do you consider important when you think of a sustainable city region food system?" and "Describe your idea of a sustainable state of ... [the topic discussed]". Interviewees were able to list a number of topics but, in many cases, the perfect sustainable state could not be described. Nevertheless, many times the interviewees could qualify what they considered to be crucial points towards sustainability. Next, the interviews were analysed and the relevant topics were distilled. In a final step, these topics were each rephrased into potential evaluation criteria with a target description.

What to evaluate in Basel?

There were many interpretations of the term "sustainable food system", although topics did overlap in many cases. We identified 65 evaluation criteria in four categories: ecology, economy, social and governance.

Probably because the **ecological** dimension is most often associated with the term sustainability, the most common topics were listed in this category: increasing organic and responsible agriculture, reducing meat consumption, striving for a circular economy, shortening transport routes, consuming seasonally as well as reducing food waste and packaging.

Statements assigned to the category **economy** were more specific to Basel. With awareness of the powerful oligopoly of the two main Swiss retailers, there were different opinions on how to shape an economy with fair distribution of benefits and costs among producers, retailers and consumers. Experts proposed solutions like direct marketing, contract farming and support to food start-ups. One evaluation criteria was, for example, "equal opportunities", meaning that there should be incentives for start-ups and small and medium-sized enterprises (SME) to enter the market and create an acceptable livelihood. Another specific feature of Basel is its proximity to Germany. The food discounters right across the border pose a great challenge to Swiss stores: they offer food at prices much lower than in Switzerland because of both the advantageous exchange rate from Swiss francs to euros and a generally lower price level in Germany. The evaluation criterion target description in this case would be to find a solution which would maintain purchasing power in Switzerland and generate a livelihood for Basel's shopkeepers and local (but Swiss) producers.

The predominant issue in the category **social** was a loss of appreciation for food. According to the interviewees this is the reason for the low willingness to pay for food and the huge amount of food waste. Many linked the loss of appreciation to a lack of awareness. Since awareness may be increased by education, some of the evaluation criteria refer to issues such as education about the environmental impact of food, working conditions in the food sector or successful storage of fresh or processed food.

Many of the interviewees hold the **government** responsible for creating a supportive environment. Food should become more visible in the daily discourse and the city should commit to a path towards a sustainable CRFS – addressing the ecological, the economical and the social dimension of sustainability equally. It was suggested that the city should perform periodic impact analyses. The government should also protect citizens from any kind of fraud related to food, such as the misuse of labelling or false pretences in advertising.

Community Garden Basel, Switzerland. Photo by FiBL

A complete indicators list?

The list of evaluation criteria compiled in such a participatory way runs the risk of remaining incomplete if particular perspectives or interest groups are not, or not sufficiently, involved. Also, certain criteria that may be highly important in some cities, and are therefore often listed in sustainability assessments, might not be relevant in other cities. Additionally, any list of indicators can only be useful if data collection and monitoring is feasible and is used for reviewing progress and improving planning and policy. What, then, should be the focus: a complete list of indicators or a selected list of priorities? And who decides, and at what point, that the list of evaluation criteria is complete? This study concluded that integrating citizens' knowledge and opinions is as useful as using external experts' efforts. However, the next stage of the process, integration and adaptation, should also be participatory, and adaptation of the indicators should be an on-going process.

What is it good for?

Although it took quite an effort to involve a variety of experts in the process of finding evaluation criteria to assess the sustainability state of the Basel CRFS, the result was impressive. Involving citizens in the sustainability assessment of their city's food system generates two clear advantages.

One advantage is that, by integrating the broad and diverse knowledge, expertise and creativity of the experts, a wide range of relevant, meaningful and location-specific criteria was established. With this set of criteria, the city of Basel now has a basis for developing an assessment tool to find out about the current status and, in the next step, to define benchmarks for the path towards a sustainable CRFS.

The second advantage is that the participatory approach can also be the starting point for further collaboration between the various actors. The study showed that there is a high level of cooperation and passion among those who participated. Their involvement might have started to create more ownership for making the city's region food system more sustainable. Involving even more people might enlarge the support base, facilitate the implementation of future measures and increase the chances for success in the long run.

Acknowledgement

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Improving Urban Nutrition in Africa and Asia Through Policy Change

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Global Alliance for Improved Nutrition (GAIN).

The need to focus on urban nutrition

Poor-quality diets are now the leading contributor to the global burden of disease. Therefore cities need to place more focus on policies and practice which improve the consumption of safe and nutritious foods. Urbanisation goes hand in hand with shifts in lifestyle, consumption patterns and economic activities, many leading to adverse outcomes. For example, urbanisation plays an important role in the 'nutrition transition' - a shift from diets with high cereal and fibre intake to animal-source foods, sugars and fats, and processed foods - and subsequently is a cause for overweight, obesity and diet-related disease, for example through driving the consumption of highly processed foods. Urban areas in both Africa and Asia are increasingly characterised by the double burden of malnutrition, which is undernutrition on the one hand, and overweight / obesity on the other. While this double burden also exists in rural areas (in lower proportions on average), urban environments have characteristics, ranging from higher shares of processed foods to environments that facilitate more sedentary lifestyles, that make that they require different solutions.

> *"Tanzania is experiencing a rapid change of lifestyle as its economy improves, especially in urban areas. But the adverse nutritional outcomes associated with these changes are often costly. We must harness the rapid urbanisation in Tanzania as a chance to improve nutrition."* Vincent Assey, Acting Managing Director, Tanzania Food and Nutrition Centre

Making urban food systems more nutritious

City governments have a leading role to play in solving these urban nutrition challenges. As designers of city policies and implementers of national and regional policies they are well placed to find solutions for malfunctioning urban food systems. Their policies can address demand, availability, affordability, convenience and desirability of foods. They can have a direct impact on nutrition outcomes: through their public procurement policies, for example, which directly influence food offerings in city run institutions.

> *"A modern city has to position itself around achieving food security for its residents."* Tri Rismaharini, Mayor of Surabaya

New urban nutrition initiatives in Indonesia and Tanzania

As part of its Urban Governance for Nutrition program, GAIN is currently focusing its efforts on two cities: Surabaya City in East Java, Indonesia and a city in Tanzania (currently under

> The Global Alliance for Improved Nutrition (GAIN) was launched at the UN in 2002 to tackle the human suffering caused by malnutrition. GAIN, with its partners, aims to make healthier food choices more affordable, more available, and more desirable. We aim to support and advise governments, businesses, and development partners as they build and mobilise food and nutrition plans to advance nutrition outcomes. GAIN's purpose is to improve nutrition outcomes by improving the consumption of nutritious and safe food for all people, especially the most vulnerable. GAIN is a global, Swiss-based foundation that mobilises public-private partnerships and provides financial and technical support to deliver nutritious foods to those people most at risk of malnutrition. GAIN's programs in Africa and Asia enable better diets via nutritional products, such as fortified staple foods, including cooking oil and flour, and condiments like salt and soy sauce.

selection). Both countries have national strategies to address nutrition issues. In Tanzania, the National Multisectoral Nutrition Action Plan of Tanzania recommends double-duty nutrition actions to address chronic undernutrition problems as well emerging overnutrition challenges. In Indonesia, a National Food and Nutrition Security Action Plan is in place, and implementation is devolved to cities and districts. GAIN, along with other actors in the food system, will support municipal government to successfully operationalise these strategies.

> *"The Regional Food & Nutrition Action Plan was created as a guide for all sectors related to food safety from end to end, in order to collectively achieve food sovereignty and welfare for Surabaya residents and its surrounding areas."* Agus Imam Sonhaji, Head of Surabaya Development Planning Agency

Conclusion

The link connecting poor diet and nutrition to the strong impact of urbanisation means that nutrition should be central to any urban food policy. Key to this is multi-stakeholder alliances, especially with the private sector, to improve the governance of nutrition. This is how we can make people healthier, and their cities too.

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Building Resilient Food Systems for Urban Food Security

Examples from Baltimore City, Maryland

Erin Biehl

Urban food systems are at great risk from shocks, such as hurricanes that wipe out stores in a matter of hours, and stresses, like drought that depletes a region's crops over years. Therefore, the food system should be an important part of disaster preparedness and urban resilience planning. Expanding urban agriculture is one way to support resilience. But to ensure food security for an urban population in the face of disruptions requires looking beyond production. Resilience planning requires an understanding of how to support the whole food system from farm to plate, and a consideration of how to make sure the food available after disasters is also healthy and accessible for urban residents.

The Baltimore City (Maryland, USA) Office of Sustainability and the Johns Hopkins University Center for a Livable Future teamed up to assess the resilience of Baltimore's food system. We took a holistic approach with particular emphasis on supporting food distribution and access within the city. The collaboration resulted in the *Baltimore Food System Resilience Advisory Report,* which developed strategies for improving resilience in the food system supplying city residents, with a goal of supporting urban food security both now and after future crises.

The Advisory Report

In the *Advisory Report* we describe the current health of the food system feeding the city, assess the risk to the food system from hazards, analyse vulnerability to hazards for critical food assets and populations, and assess the level of preparedness for crises and adaptive capacity among food system stakeholders. We review environmental hazards threatening Baltimore, including winter storms, flooding, drought, extreme heat, strong winds and land subsidence. We also look at possible impacts from cyber and electrical system failures, contamination, civil unrest, terrorism, resource shortages, and economic and political shifts in the United States. *Advisory Report* work was informed by literature review, interviews with 36 stakeholders from the Baltimore food community (from farmers to food pantries), an estimation of the types and means of food transport through Baltimore using the US Department of Transportation's Freight Analysis Framework, and mapping geographic hazards (e.g. floodplains) in relation to vulnerable population groups.

Baltimore collaborators developed strategies for reducing vulnerabilities and supporting resilience by characterising

A 2010 blizzard in Baltimore temporarily blocked roads, making food transport and access to grocery stores difficult.
Photo by Seth Sawyers. Flickr, CC BY 2.0.

Keeping grocery stores well stocked despite supply chain disruptions is a key goal of urban resilience planning in Baltimore.
Photo by Mike Milli, Center for a Livable Future, 2015

report findings in relation to three questions: What can the city and its community partners do to ensure that, after a disruption,

1. *food is available to residents?*
2. *food is accessible to residents?*
3. *food is acceptable (i.e. safe, nutritious, and culturally appropriate) to residents?*

We based these questions on the Rome Declaration on World Food Security's definition of food security as, "all people, at all times, have physical, social, and economic access to sufficient, safe and nutritious foods that meet their dietary needs." To assist other jurisdictions considering similar efforts, below I share examples of how answering these questions informed our strategies to support food resilience through a food security lens in Baltimore.

Availability

Is the food supply chain flexible to disturbances, redundant enough to provide backup pathways for food flows, and able to adapt in the long term to systemic changes?

Baltimore, like many cities, is fed by a diverse network of farmers, distributors, retailers, non-profit organisations, and communities, at local to global scales. The complexity of the urban food supply chain creates both vulnerabilities and strengths for a more resilient system. For example, most of the food that residents eat is not grown in the city, which leaves urban residents more vulnerable to production failures or supply chain disruptions in other states or countries. Because the city itself is at risk of events such as blizzards, hurricanes and extreme heat, though, farmers inside city limits may also be at higher risk of those specific events than food producers in some other areas. Additionally, urban farmers are not likely to be able to operate at a scale sufficient to fully support the urban population, at any time. To address these issues, some *Advisory Report* recommendations focus on supporting agricultural product diversity in regional production (such as in the Northeast US) and an investigation into the agility of regional food supply chains.

Once food reaches the city, it must also be available for residents to acquire it in stores, markets, food banks and food pantries. In Baltimore, when interviewing for-profit and non-profit food suppliers, the smaller businesses and

non-profits we talked to tended to have fewer resources available to plan for emergencies and pay for insurance or backup equipment such as generators and refrigerated trucks, compared to larger, chain grocery stores or national disaster relief organisations. Smaller organisations tended to rely on committed and resourceful staff or volunteers doing what was needed to get food to people in a crisis. While these often heroic efforts can go far, improved resources and planning could help stores and other food sources remain flexible and reopen more quickly after events. The *Advisory Report* recommends that the city coordinate resources for small food businesses and non-profits to support their preparedness planning and backup infrastructure. For example, providing tax incentives for stores who purchase generators could support those smaller operations who otherwise would lose inventory or shut down.

Accessibility

Can consumers get to and afford the food that is available after a crisis? What existing food access barriers could make communities more vulnerable to disruptions?

Access to sufficient, nutritious food is a common challenge for urban residents in many cities, even under everyday circumstances. Baltimore residents already experience high levels of food insecurity compared with the national average, particularly among African Americans. Twenty-three per cent of residents are food insecure, and 23.5% live in areas designated as Healthy Food Priority Areas (formerly "food deserts"). Those are areas where many residents are low-income, do not have access to a car, live more than 0.25 mile/0.4 km from supermarkets, and where the food available within walking distance is not considered "healthy." Residents experiencing such challenges, as well as those who are on the cusp of food insecurity, are especially likely to lose food access after a crisis that adds an additional barrier, such as blocked roads, nearby stores running out of supply, or ineffective public transit.

Existing initiatives in Baltimore, such as tax incentives to bring supermarkets to Healthy Food Priority Areas, or non-profits' coordination of meal delivery services for homebound residents before winter, begin to address these ongoing access issues. We additionally recommended that the city consider proximity of transit stops to food access points in its public transit redesign. Although ultimately the

Corner stores with limited healthy food options are often the most convenient food source for many Baltimoreans.
Photo by Mike Milli, Center for a Livable Future

Programmes like Real Food Farm's Mobile Farmers Market make fresh food more accessible to Baltimore residents. Photo by Mike Milli, 2017

impact on food access could depend on the type of event and which food system component is disrupted, supporting more reliable transportation systems and diversifying food access methods and locations have potential to support overall diversity and redundancy in the food system, which are key components of resilience. Another recommendation included implementing and evaluating the effectiveness and feasibility of a pilot programme to set up community-based emergency food, water, and backup power storage. These "resiliency hubs" could provide temporary food assistance to residents who are unable to store emergency food supplies at home.

Acceptability

Even when available and accessible, will food be safe, nutritious and culturally appropriate for the population?

In Baltimore, nearly 23% of adults are obese and 12% suffer from diabetes. The high prevalence of diet-related diseases combined with an abundance of carry-out restaurants in Healthy Food Priority Areas suggest that the food sources that could theoretically be most accessible after a disruption may not stock nutritionally adequate food. To support diverse sources of healthy food in the long term, we recommended that the city build upon its existing initiatives to support healthy food access in vulnerable neighbourhoods. In addition, we recommended investigating the capacity of food assistance organisations to provide nutritious foods that also accommodate to special dietary needs. There is little data available on how well food pantries could accommodate to a surge in service needs if populations with special needs, such as those with diabetes or allergies, turn to food pantries more after events that make food unaffordable. Recognising that some events such as power outages could spoil perishable foods, we also suggested that the city include information about safe food storage and handling in its emergency preparedness communications to residents.

Finally, assessing cultural acceptability of food is more difficult given the city's ethnic and cultural diversity, but ensuring that there are sufficient supermarkets and stores open that provide a wide range of options can offer more choices and meet diverse needs and preferences.

Next Steps

Baltimore City will incorporate the *Advisory Report* recommendations into the update of its Disaster Preparedness Plan in 2018, with further community input. These examples provide just a taste of what the *Baltimore Food System Resilience Advisory Report* covers. They present one way that urban planners and researchers can marry efforts to support urban food security with initiatives to support food system resilience and disaster preparedness. Climate change, urbanisation and population growth threaten the viability of our agricultural systems and resources available to urban populations around the world. It is urgent that governments and researchers everywhere consider food as a critical component of urban resilience, and integrate food into resilience, disaster preparedness and climate action planning.

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Assessing the Capacity and Resilience of Melbourne's Foodbowl:

The Foodprint Melbourne project

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The city of Melbourne is located in a highly productive agricultural region with the capacity to meet approximately 41% of the city population's food needs. Melbourne's "foodbowl" is an important building block in a resilient and sustainable food system for this rapidly growing city. This article presents some findings of the Foodprint Melbourne initiative led by University of Melbourne researchers who worked in partnership with local governments to investigate the significance of periurban food production to the city's long-term food security and the regional economy. They identified risks to city fringe food production from urban sprawl and the impacts of water scarcity, and generated an important evidence base to support the development of a vision and roadmap to strengthen the resilience of Melbourne's foodbowl.

Context

Melbourne, a city of about 4.5 million in south-east Australia, is experiencing rapid population growth: within two decades it is predicted to become Australia's largest city. Much of this growth is on the city fringe at relatively low urban density on former farmland. The city is in a water-scarce region predicted to experience further warming and drying as a result of climate change. Like most of Australia's capitals, Melbourne is relatively isolated geographically; food imported from other states must travel long distances. Little evidence was available on the significance of the city's periurban food production to its current food supply or the risks to future production.
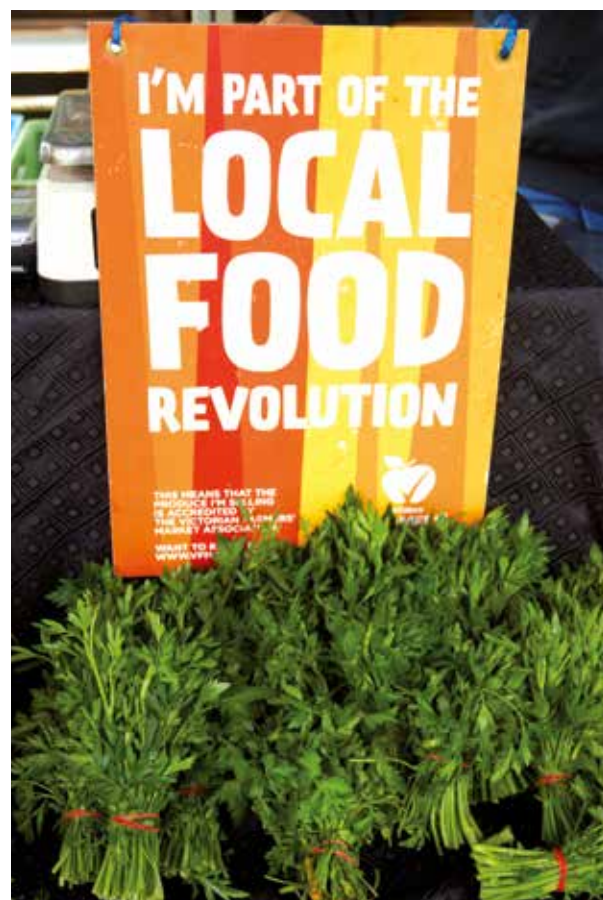
The Foodprint Melbourne assessment

The Foodprint Melbourne project aimed to fill this evidence gap by assessing (i) how much food grows on Melbourne's periurban fringe, and its economic value; (ii) the region's capacity to feed the city now and as it grows to over 7 million people by 2050; and (iii) the risks to its food production from chronic stresses, particularly urban sprawl and water scarcity. The project also aimed to assess the city's "foodprint" – how much land and water it takes to feed the city, and the resultant food waste and greenhouse gas emissions.

To ensure the project's relevance to a wide range of stakeholders, an advisory group was established that included the City of Melbourne, the associations representing local governments in its periurban region, and some individual local governments. This advisory group helped shape the project's direction, interpret the significance of findings and determine next steps, as well as providing data for the assessment undertaken in 2015.

Defining the city's foodbowl

A key question was where to draw the boundary of the city's periurban region of food production referred to here as Melbourne's "foodbowl"). Stakeholder advisory group feedback led to the foodbowl definition being expanded from the "Inner foodbowl" area shown in Figure 1 to include the "Outer foodbowl" area, which is represented by an association: "The Periurban Group of Rural Councils".

A sign welcoming shoppers to an accredited farmers' market in Melbourne, Australia.
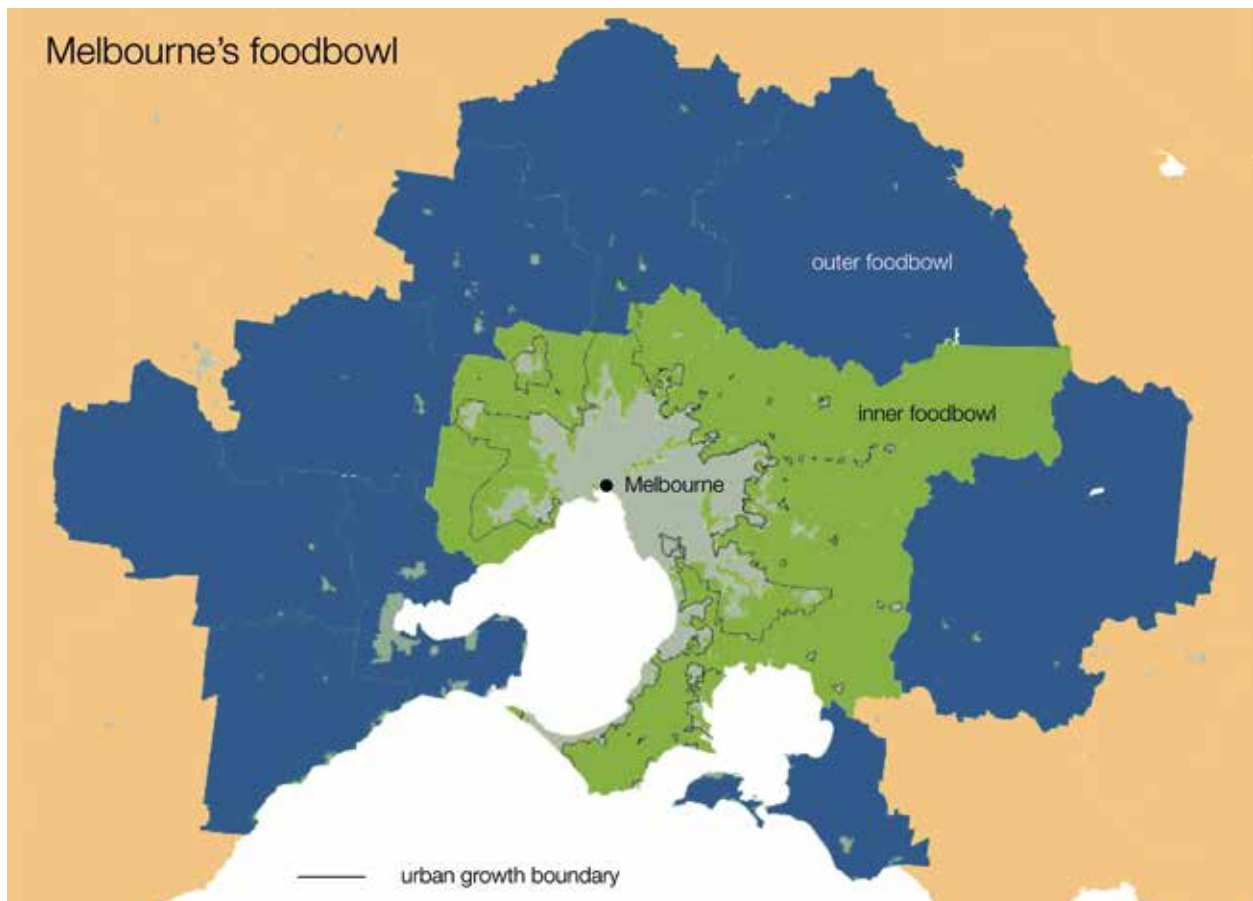Photo by Matthew Carey for the Foodprint Melbourne project.

Figure 1: Melbourne's foodbowl

Assessing the capacity of Melbourne's foodbowl

Melbourne's foodbowl can meet about 41% of Greater Melbourne's food needs and up to 82% of the city's vegetable needs.

The productive capacity of Melbourne's foodbowl was assessed using Australian Bureau of Statistics data about the volume of food produced in the region. The foodbowl's current capacity to feed the Greater Melbourne metropolitan area was assessed via a complex research process that drew on data from multiple sources, including a national assessment of Australia's food security carried out under a previous project using the "Australian Stocks and Flows Framework".

Although the assessment also aimed to establish how much of the food produced in Melbourne's foodbowl was actually consumed in the city (i.e. the city's dependence on food from the periurban region), a key data gap emerged. Australia collects robust data about food *exports,* but data about food freight movements within and between states is limited. The team was unable to establish how much of the food produced in periurban Melbourne is consumed in the city. The assessment's 41% estimate for the *capacity* of Melbourne's foodbowl to feed the city suggests that 60% or more of Melbourne's food comes from outside the city region. According to the assessment, the periurban region can meet about 82% of the city's demand for vegetables, 13% for fruit, 39% for dairy, 63% for red meat and 100% for chicken meat and eggs.

Assessing economic value

Melbourne's foodbowl contributes about AUD 2.45 billion per annum to the city's regional economy and roughly 21,000 jobs.

The project's stakeholder advisory group emphasised that data about the economic value of Melbourne's foodbowl was essential to build a case for action and investment in the region. The team commissioned Deloitte Access Economics to undertake an economic analysis of the value of Melbourne's foodbowl, which found that regional agriculture and related food manufacturing contributed about AUD 2.45 billion per annum and roughly 21,000 (full-time equivalent) jobs. The vegetable industry was the largest contributor to agricultural value (about AUD 400 million) and the second largest contributor of jobs (about 2000 employees).

Assessing the impact of chronic stresses

If Melbourne continues to grow as it has, the foodbowl's capacity to feed the city could fall to about 18% at a population of 7 million.

The project also aimed to assess the impact of chronic stresses on production in Melbourne's foodbowl, particularly of urban sprawl and water scarcity. The team used the Australian Stocks and Flows Framework to model the likely impact of land loss scenarios on food production. One scenario estimated the loss of production capacity at a predicted population of 7 million if growth continued at historical rates of urban density: the capacity of the foodbowl

RESILIENT CITY FOODBOWL
A vision for Melbourne

Figure 2: Vision for a resilient city foodbowl for Melbourne

to feed the city was likely to fall from about 41% to 18% due to farmland loss and population growth.

The team also commissioned Deloitte Access Economics to assess the likely economic impact of urban growth scenarios with higher rates of urban density and less growth on the urban fringe (i.e. greater infill of existing urban areas). Deloitte found that at a population of 7 million, with significantly higher rates of urban density and urban infill, Melbourne's foodbowl was likely to lose agricultural production capacity of AUD 32 to AUD 111 million per annum (AUD 376 million to AUD 1.33 billion over 20 years). A key finding was that all scenarios modelled (including aspirational rates of urban density and urban infill) led to loss of production capacity in the foodbowl. The issue is not whether farmland will be lost to accommodate growth, but how much and with what consequences.

The team also investigated the impact of water stress on Melbourne's foodbowl. Modelling using the Australian Stocks and Flows Framework found that over 475 L of water was required per person per day to feed the city (not including rain-fed production, which is not tracked in Australia's national water accounts). The economic impact of water stress on food production in the region was evident during Australia's Millennium Drought (1997-2009), during which 35,000 jobs were lost (1998-2002) in Victoria's agricultural industries and food prices spiked. The price of fresh vegetables in Australia rose 33% (2005-2007), and the price of fresh fruit rose 43% over a similar period. The team also drew on Intergovernmental Panel on Climate Change

estimates of likely impacts of climate change in southern Australia showing further regional warming and drying are likely.

The team assessed the potential of recycled water from Melbourne's water treatment plants to increase the resilience of the foodbowl to water stress. Recycled water from Melbourne's two main water treatment plants is currently used by farmers in the foodbowl to produce food (particularly vegetables), but relatively little of the available water is used due to lack of infrastructure to store the water and make it available to farmers. City water corporation data showed that just 6% of the available recycled water was used to produce food in the region; 84% was unused and disposed of at sea. Using the Australian Stocks and Flows Framework, the team estimated the potential of the unused recycled water to support food production in the foodbowl: just 10% of the available recycled water would be enough to grow roughly half of the vegetables eaten in the city.

Co-designing a vision and roadmap
A resilient food system is one with the capacity over time to provide sufficient healthy, sustainable and fair food to all, in the face of chronic stresses and sudden shocks, including unforeseen circumstances.

The assessment findings supported the development of a vision for a resilient foodbowl for Melbourne, and a roadmap of strategies to achieve it. The team developed a visual representation (see Figure 2) to communicate key features,

such as drought-proof areas of food production near the city's water treatment plants. The team is adopting a "co-design" approach to working with stakeholders in developing a vision and roadmap. They continue to work closely with local government stakeholders and have broadened involvement to include farmers, urban planners, water policy specialists, and other food system stakeholders from across the city in a series of interviews and co-design workshops. A key aim is to involve stakeholders representing groups most affected by policies influencing the resilience of Melbourne's foodbowl.

Influencing policy

The team and local government partners continue to advocate for state government policy to support a resilient city foodbowl, such as stronger measures to protect agricultural land and increased investment in infrastructure to deliver recycled water to farmers. The latest version of Melbourne's metropolitan planning strategy, *Plan Melbourne 2017-2050*, includes objectives to protect agricultural land and recognises, for the first time, that the city's food security is linked to food production on the periurban fringe. However, it includes no new measures to protect agricultural land, and existing legislation, such as the city's Urban Growth Boundary and Green Wedges, has failed to stop the sprawl. The "permanent" Urban Growth Boundary introduced in 2002 has been expanded several times since, justified on the basis of ever higher predictions for increases in population and housing affordability needs. Local governments will likely play an important role in taking action to increase the resilience of the foodbowl and in advocating for stronger state government policy. Local governments on Melbourne's fringe are using evidence from the Foodprint Melbourne project to inform their Green Wedge plans and food policies and to make the case for state and federal government investment in recycled water infrastructure.

Building social and political licence to act

One lesson from the Foodprint Melbourne project is the need to increase public awareness of the importance of periurban food production in order to build the social and political licence for governments to act to strengthen periurban resilience. A communications strategy was developed, and findings were released as summary briefings, infographics and reports, with a focus on disseminating key messages through online and social media. Findings were released in stages throughout the project to build a public conversation about the issue and to simplify complex messages. The project findings have been covered in over 50 media articles to date, with over 95,000 points of online engagement (including social media shares, comments, reads and downloads). The team recently launched a set of resources for secondary schools, based on the project findings, that enable students to investigate food production in Melbourne's foodbowl and its significance to the city's food security.

Conclusions

The pressures affecting Melbourne's foodbowl are repeated across the major state capitals in Australia and across cities in many regions of the world. This Melbourne case study highlights the need to understand the potential impacts of urban development and growing water scarcity on the capacity of periurban food production regions. It also points to the potential of periurban food production to increase the resilience of city region food systems, by harnessing valuable city waste streams, such as waste water, for food production. Assessments like the Foodprint Melbourne initiative form an important evidence base as a springboard for action.

Acknowledgements

More information

Foodprint Melbourne project website - http://research.unimelb.edu.au/foodprint-melbourne

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Assessing the Impact of Climate Change and Extreme Weather Events on the Food System in the City of Toronto

Ronald Macfarlane, Taryn Ridsdale and Barbara Emanuel, Kim Zeuli and Austin Nijhuis and David Macleod

Climate change is expected to increase the frequency and severity of extreme weather events in Toronto, which in turn can pose a significant risk to food processing, distribution and access. The City of Toronto has committed to building the city's resiliency to climate change and, as part of its Climate Change and Health Strategy, in 2017 Toronto Public Health began engaging stakeholders from across the food system to assess the impact of climate change on the food system in Toronto, including potential impacts on vulnerable populations. The findings of this high-level analysis will help increase the resiliency of Toronto's food system to ensure adequate and equitable access to food.

Why assess the impact of climate change on the food system?

Extreme weather events, such as heavy rainfall and ice storms, have already caused extensive damage across Toronto and are expected to become more frequent and severe due to climate change. As cities prepare for climate change and extreme weather, food systems can be overlooked. However, disruptions to critical infrastructure due to extreme weather events have the potential to significantly impact access to food, especially for people with limited resources or those living in neighbourhoods where it is difficult to access food retail stores. A resilient food system would, in a relatively short period of time, have the capacity to provide all residents with adequate and equitable access to food within walking distance after an extreme weather event.

Scoping the assessment

A city's food system – growing, transforming, and moving food from farm to table – is incredibly complex. Food distribution in particular involves numerous businesses and different pathways to transport food products from processing facilities to food retail outlets, community agencies and restaurants. Analysing all the production points and flow of all food products consumed and wasted in Toronto would require a very comprehensive analysis, particularly since the majority of food consumed in Toronto is produced outside of Toronto.

To get started, Toronto Public Health commissioned an eight-month study and engaged the Initiative for a Competitive Inner City (ICIC) to complete a high-level assessment focused on identifying the most significant, urgent climate change risks for Toronto's food system.

Approach to the food system assessment

Based on historical information and future projections, three extreme weather events – significant rain and flooding, an extended heat wave, and a major winter ice storm – were selected for this analysis because they are likely to occur more intensely and frequently in the near term in Toronto. These three types of extreme weather events have already caused significant damage in the city and could realistically cause widespread damage in the future.

Focusing on these most likely events, the study utilised three complementing tools that analysed a diverse set of data and engaged 49 stakeholders from across the food system to identify the most urgent risks to Toronto's food system:

1. Ontario Climate Change and Health Vulnerability and Adaptation (V&A) Assessment Guidelines

The Ontario Ministry of Health and Long-Term Care developed the V&A Assessment Guidelines in 2016 to provide public health units across Ontario with a practical toolkit to understand the current and projected future public health risks of climate change, and to identify and develop policies and programmes to increase resilience to these risks. For this study, the analysis focused on potential public health effects related to the food system, including food safety implications and public health impacts due to food or water shortages.

2. City of Toronto's High-Level Risk Assessment (HLRA) tool

The City of Toronto developed the HLRA tool to help implement its Climate Change Risk Management Policy,

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"Hurricane Hazel was Toronto's perfect storm" (Toronto Star, October 15, 2016). On October 15, 1954, Hurricane Hazel hit Toronto, with 121.4 mm of rain falling in one day and more than 200 mm of rain falling over 48 hours as well as heavy winds reaching 124 km per hour. Hurricane Hazel left over 4,000 people homeless in Ontario (1,868 people in Toronto) and 81 dead. Significant damage occurred to roads and bridges.

"Toronto's July flood listed as Ontario's most costly natural disaster" (Toronto Star, August 14, 2013). On July 8, 2013, Toronto received 126 mm of rain in a one-day period during a severe thunderstorm, resulting in widespread flooding. This was the most rain Toronto has ever received in a day. More than 90 mm of rainfall occurred in just two hours.

Flooding in Dufferin Street, Toronto. Photo by Eastmain [CC BY-SA 3.0

which was designed to evaluate the resilience of the city's infrastructure to extreme weather events. For this study, the HLRA tool was used in a facilitated workshop with stakeholders representing different parts of Toronto's food system. The group included municipal and provincial government agencies, private food distributors and retailers, and non-profit food service organisations and associations. Based on their extensive knowledge, the stakeholders were asked to systematically identify climate change vulnerabilities by determining the impacts of the three extreme weather scenarios on seven components of Toronto's food system (e.g., food distribution), as well as the potential impacts on five supporting systems (e.g., electricity). For each component of the food system, the stakeholders were asked to use the HLRA rating system to assess the consequences of the extreme weather event (from insignificant to catastrophic) and the likelihood of those consequences occurring.

Food System Components Analysed for Toronto High-Level Risk Assessment
Regional and local food production
Food processing
Food distribution
Food retail
Restaurants
Food assistance network (e.g., food banks and food pantries)
Home food storage and meal preparation
Food System Supporting Infrastructure
Public transportation
Road network
Electrical power system
Telecommunications
Fuel supply transportation, storage and distribution

3. *Initiative for a Competitive Inner City's* Framework for Analyzing Urban Food System Resilience

ICIC's framework allows cities to analyse the resilience of their food systems to different types of disasters and identify critical areas of weakness. The framework is focused on food processing, distribution and access, and analyses food vulnerabilities at the neighbourhood level to identify areas within the city where food access would be disproportionately

impacted. This is advantageous in urban centres like Toronto where food system disruptions could vary by neighbourhood.

Applying the findings

Based on the comprehensive information gathered, a review of actions taken in eight other cities across the world (Barcelona, Calgary, London, Montreal, New York City, Oslo, Ottawa, and Vancouver), and ongoing discussions, a report is being developed with the findings and potential recommendations for public (government), private and not-for-profit food system stakeholders. The emerging findings confirm findings from other cities and suggest that the critical vulnerabilities for Toronto include infrastructure interdependencies for food supply and access (e.g., electricity), and that certain populations (e.g., those with low incomes) could be disproportionately impacted by disruptions to this infrastructure. The report will identify actions that can be taken at federal, provincial and municipal levels to address these risks.

When available, Toronto Public Health will share the findings and next steps in a report that will be made available to the public and in a follow-up article for this publication.

Conclusion

Strengthening food system resilience requires leadership from both the public and private sectors. Our high-level assessment of the food system in Toronto shows that understanding where critical vulnerabilities exist is a manageable and beneficial first step for cities. However, to be meaningful, the assessment needs to engage a broad set of stakeholders from the public, private and non-profit sectors.

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The Inclusion of Food in Quito's Resilience Strategy

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In October 2017, the Metropolitan District of Quito (MDQ), together with the Rockefeller Foundation's 100 Resilient Cities initiative, published the city's Resilience Strategy. The MDQ proposes to confront a range of vulnerability challenges and natural hazards – including seismic events, volcano disruptions, flooding and hail storms, forest fires, environmental degradation, and economic disruptions – with 5 key aspects:

1. Inclusive and empowered citizens to strengthen participatory capacities and ownership of non-governmental organisations and communities;
2. A robust and sustainable environment that protects the natural resource base and promotes better environmental management;
3. An integrated and compact city to control urban sprawl and promote efficient mobility systems;
4. A resourceful and solid economy that enhances youth employment and a food economy as a strategy for development; and
5. A reflective and safe territory that mitigates existing and future risks and vulnerabilities and prepares the city for possible future threats.

As part of the fourth aspect, and under coordination of the Secretariat of Production Development and Competitiveness, the MDQ proposes to develop a plan to strengthen Quito's food system.

Quito's food system is characterised by specific vulnerabilities, including a high (over 85%) dependence on food imports, weak food distribution systems and isolated vulnerable communities. Based on a vulnerability analysis, an action plan will be developed to enhance the availability and accessibility of diversified, safe and nutritious food for the entire population. The action plan will also seek to increase consumer capacity, education and awareness regarding healthy diet and nutrition.

Additional actions in the strategy include:
• Strengthening Quito's urban agriculture programme in terms of enhancing the quality and quantity of local food production and by facilitating more diversified market mechanisms.
• Developing a programme on sustainable agricultural development in the periurban and rural areas. Sustainable and lower-emission production practices will be promoted, as well as more decent labour conditions.

In 2017, a disaster resilience assessment of Quito's food system was implemented with a focus on emergency food storage and the continuity of food distribution in emergency situations. The risk of disruptions – due to volcanic eruptions, seismic events or other natural events amplified by climate change – is high, given Quito's high dependence on food imports from other areas of the country or other countries, a limited food-supply road infrastructure, and a single, central Quito distribution market. As a large number of Quito's low income households live in vulnerable housing and areas, in the event of a disaster many of these settlements and substandard constructions would become uninhabitable, disrupting the dwellers' ability to access any home-stored foods, home gardens and cooking facilities. This would be aggravated in many isolated communities that lack proximity access to rural or urban food markets.

In 2018 the MDQ has set out to further improve its understanding of the emergency preparedness of households, businesses and the government. Based on such further assessment, the MDQ will define what steps to take to encourage or implement emergency food storage practices at the household, neighbourhood, food system business and municipal levels. In addition, MDQ will likely need to devise transportation strategies to ensure that, in the event of an emergency, food can be moved from local storage locations to households, especially those that may have limited ability to store emergency food of their own.

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Vulnerability and Resilience of the Colombo Urban Food System to Extreme Weather

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Colombo, the commercial capital of Sri Lanka, is the most urbanised area of the country. It is home to half a million people and has an equally large daily floating population. Most of its land area is utilised for commercial and residential purposes; agricultural activity in the Colombo Municipal Council area is negligible. Colombo's minimal food production is dependent on food cultivated in other areas of the country, which is passed along a complex supply chain of many actors. Furthermore, the fact that the two most popular wholesale markets in Sri Lanka, the Manning market for commodities such as vegetables and fruits and the Peliyagoda market for fish, are located in and close to Colombo makes the city a food supply hub for different parts of the country. Therefore, when the supply chain to Colombo is negatively affected, the food system of the country can also be disrupted.

When Sri Lanka was hit in 2016 by a severe cyclone, and several parts of Colombo suburbs and external food supply areas were flooded, the International Water Management Institute (IWMI) commissioned still during the period of crisis a study to investigate the vulnerability and resilience of the urban food system to such increasingly periodic events.

Impacts on and recovery of marketing channels and supplies were analysed through visits to major markets with significant influence on Colombo's food system, and through interviews with lorry drivers, commission agents, buyers, sellers, wholesalers and importers. In addition, floor managers and distribution centre managers of leading supermarket chains were interviewed to analyse how much their food supply was affected as well as their coping strategies. The interviews were carried out a week, a month and two months after the floods that displaced half a million people across the country. In addition to the impact, the reasons for low supply were also analysed (production failure, transport failure, etc.).

While the paddy rice supply – the most important local staple food – remained constant during this time of crisis due to sufficient storage capacity in Colombo, the heavy rains led to a shortage of vegetables. The upcountry vegetable (carrots, leeks, beans and cabbages) supply was greatly affected by rains and flooded transport roads, and prices were at least four times higher than in the same period of previous years. Leafy vegetables were particularly affected because the alternative main supply to Colombo comes from periurban areas that were flooded. Fish supply was heavily affected: a 75% drop in supply was experienced immediately after the floods because fishermen were advised not to go out fishing

during the extreme weather. The supply and prices of onions, garlic, dhal and potatoes, however, remained unchanged, as a major portion of these is imported and the harbour and wholesale market for imports is located in Colombo.

Though the big supermarket chains (Keells, Cargills and Arpico) also experienced low supply and higher vegetable and fish prices, they had more flexible supply chains and alternative suppliers, and recovered within two to three weeks. In contrast, the mainstream supply chain (which serves the middle- and low-income community) took up to two months to recover for most affected commodities. Some local food processing factories (e.g. alcoholic and non-alcoholic beverages) which were flooded had production shortages even 3 months after the events.

This study shows that the supply of some popular commodities (e.g. fish, vegetables) proved to be very vulnerable to extreme weather disasters because no infrastructure or mechanisms are in place to cope with possible supply failure. Pulses, dry fish and other imported commodities can fill this gap to some degree, and within limits of cultural acceptance. Mainstream supply chain actors, small retail shops and the poor are most vulnerable to these extreme weather events because of their low adaptive capacity.

Lack of economic incentives and a low lobbying capacity of those affected, coupled with the fact that floods have been periodic but hard to predict, have thus far limited investment of public resources and efforts to mitigate the related challenges. However, as climate-change related extreme weather events are likely to become more frequent in the future, investments into short food chains (urban and periurban agriculture), storage, and diversified supply chains is needed to increase the resilience of Colombo's food system to disasters and future possible impacts from climate change, and thus move towards achieving the second sustainable development goal of zero hunger.

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Resilience of Urban Food Supply in West Africa

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Within the larger assessment of urban food supply and commodity-specific <u>foodsheds</u> in West Africa, the question was posed how City Region Food Systems (CRFS) respond to natural disasters like droughts or flooding which might severely affect urban food supply and resilience.

The study, which was co-funded by the German Government through the <u>GlobE – UrbanFoodPlus</u> project, and the <u>Water, Land and Ecosystem Research Program of the CGIAR</u>, focused on four cities, Accra, Kumasi, Tamale (all Ghana) and Ouagadougou (Burkina Faso), cutting from south to north across different agro-ecological zones from humid to semi-arid. The project consisted of two parts: (1) a detailed and multi-seasonal quantitative analysis of commodity-specific rural-urban food flows to determine urban foodsheds supporting Ouagadougou and Tamale, respectively, and (2) a commodity-specific, semi-quantitative study on the experience and coping measures of market traders in reaction to supply shortfalls affecting any of the four cities.

The food flow study was conducted over two years, covering the seasons of good and short supply and more than 30 food commodities. Food flows were assessed via vehicle surveys on all major urban access roads to the cities, as well as market surveys and visualisation via GIS. Some results were presented earlier in the <u>UA Magazine 29</u> and in <u>Karg et al. (2016)</u>.

For the study of the resilience of urban food supply, 90 traders on 25 retail and wholesale markets in the four study cities were interviewed about shortfalls between 2007 and 2014, addressing the key commodities yam, cassava, plantain, millet, maize, local rice, okra, onions and eggplant, and their coping mechanisms.

Results indicated that foodsheds were highly crop specific, sourcing, for example, specific crops predominantly from one or more areas, with strong variations between seasons. The most common supply challenges were extreme climatic events such as large-scale flooding as well as lack of rain and drought. Traders recorded for every year, supply problems for one crop or another, mostly related to particular weather conditions but also across commodities due to fuel price increases. In particular, 2011 posed severe challenges due to low rain, as mentioned by every third trader who could recall the exact year across the cities. Supply losses due to changes in rainfall ranged between 40 and 100%. However, in 2 out of every 3 cases alternative sourcing allowed the wholesalers to buffer the likely loss; with related extra costs (transport distance) being transferred to the customer. In fact, several

The number of chicken on a motorbike is recorded on an access road to Ouagadougou. Photo by IWMI

traders reported extra profits if they were able to benefit with elevated prices from the general demand/supply gap. Supply shortfalls which some traders could not buffer concerned products such as local rice, millet, maize and onions.

A tendency to an increase of city vulnerability from south to north was observed. Compared with Accra and Kumasi, twice as many cases of unsuccessful coping were reported in Tamale, and the number of cases doubled again in Ouagadougou. Larger geographical diversity of the foodsheds (i.e. more sourcing areas) appeared to enhance the resilience of urban food systems. However, while the urban traders appeared generally prepared to cope with extreme climate events, especially low-income consumers suffer from related food price increases of 5 to 35%. It has to be explored how far such trade-offs could be addressed by the Government though storage facilities for key commodities.

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A City Region Food System Indicator Framework
A new resource for cities

Marielle Dubbeling
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Photo by Spelenderwijs, Utrecht

Background

RUAF and FAO have developed a City Region Food System (CRFS) indicator framework in the context of their joint programme on CRFS assessment and planning. This framework is a practical tool designed to help cities to:

- assess, following a whole-system approach, the current status and performance of a city region food system;
- identify priority areas for action with clear desired outcomes and ways of measuring change;
- plan strategy and action to achieving desired outcomes; and
- establish baselines and monitor changes resulting from (future) policy and programme implementation.

Development process

The indicator framework has been developed around 21 key "desired direction of travel" areas that characterise a more sustainable and resilient CRFS ("A Vision for City Region Food Systems", FAO & RUAF). Following initial work at two expert meetings organised in Rome (March 2015 and April 2016), a set of 210 indicators/measures was compiled to help measure both baseline data and ongoing progress towards these desired food system sustainability and resilience changes. The framework further builds on experiences from its application by local teams in seven cities on different continents.

Taking a "whole food system" approach, the indicators are based on a matrix of food system dimensions:

- those sustainability areas that reflect the multifunctional nature of the food system; and
- food system outcomes for the different components of the whole food system (from production through to waste, and also food system policy and planning).

The indicator framework connects policy priorities to outcomes that cities may want to see in the future (i.e., changes that characterise a more resilient and sustainable CRFS) and defines possible indicators for each outcome. For each of the six food system sustainability areas, overarching objectives, outcomes and impact areas have been defined (see Table 1 for one example of the first area: social sustainability and equity).

The 210 possible indicators included in the full CRFS indicator framework correspond to the different impact areas. The purpose of the indicators is to help measure the extent to

Synergies between food policies and sustainability goals

In the last decades, many local food systems strategies have been developed by city and regional administrations concerned with food policies. With these strategies, administrators try to organise the food system in a sustainable way and at the same time pursue objectives related to public health, landscape preservation, urban resilience and economic vitality. They also try to link to goals included in urban agendas and international programmes of sustainable development.

To understand the real contribution of food systems and food chains to global challenges, synergies between food policy objectives and those related to international sustainability programmes were identified. The University of Molise, Italy analysed several experiences with assessment of the sustainability of food systems, internationally and at different scales, drawing up a list of ten urban food policy goals and 54 objectives. The list has been compared with the SDGs and the United Nations New Urban Agenda. The results show, on the one hand, that the positive effects of a well-constructed food strategy are manifold and are synergic with other important sustainability programmes and, on the other hand, that an evaluation framework is needed to verify their effectiveness in achieving the objectives.

For further information about the complete list of connections between food policy objectives and SDGs and the New Urban Agenda goals, please write to gia.mazzocchi@gmail.com.

which the desired changes are actually happening. Each city will need to identify the most appropriate indicators for their own priority impact areas. Indicators can also be used to establish a baseline from which to measure on-going progress/change over time. The full framework can be accessed here.

There are two important points to note:
1. Most of the indicators relate to the whole city region; they therefore include both rural and urban situations rather than specify them separately.
2. Many of the indicators are in fact multiple indicators and will need to be disaggregated. The more the data can be disaggregated – e.g., by geographic location, income group, age category, gender – the better.

A number of indicators will require very specific data and may need breaking down into sections to calculate final figures; one example is, "(Decrease in) number and type of people requiring emergency food aid". This process should be informative, even if a final figure proves too difficult to establish. Identifying where data is missing is in itself an important finding.

The indicator framework also includes a column with corresponding Sustainable Development Goals (SDGs) indicators that could be adapted to suit the local situation.

This might be useful if a city is making use of SDGs in its own strategic plans. It also sets out suggested data sources, either secondary or primary, from which indicator information could be extracted or collected. This list is not comprehensive.

How to use the framework

1. **Getting started:** As every city is different, the first step will be to identify food system change *priorities* that are informed by a deeper understanding of the local city and city-region context. The indicator framework sets out ideas for "desired direction of travel" and each city will have to decide on (more) specific objectives for attaining sustainable and resilient city region food systems, which may need to align with already set policy objectives.

2. **Using the indicators:** Indicators need to be selected according to priorities and modified to suit the local situation. They can be used to help guide and build initial baseline data. The indicators are only numbers and ultimately need to be connected to their relevant "impact area" and "desired direction of travel" through (early stage) analytical narrative. It should also be noted that the extent to which local organisations/researchers in cities can collect/analyse corresponding data is largely dependent on data availability (secondary and primary data) and on the complexity of the indicators. Challenges will include agreeing on what to measure; finding inexpensive ways to collect data and gaining insights into what it means;

City Region Food System Objectives, Outcomes and Impact Areas

	Objectives	Outcomes: desired direction of travel *This will not be achieved quickly but is the kind of change that the city wants to achieve in the longer term*	Impact Areas: key issues to be measured *It is important to clarify the focus of the assessment; the city may need to select from these suggestions as appropriate*
Social sustainability and equity	1. Improve health and well-being and increase access to food and nutrition	All rural and urban residents have access to affordable, sufficient, nutritious, safe, adequate and diversified food that contributes to healthy diets and meets dietary needs	**Accessibility:** Degree of ease with which vulnerable/low-income groups in the city region can buy and prepare fresh, nutritionally balanced food
			Affordability: Trends in food consumption and expenditure for different types of consumers in the city region (including vulnerable groups)
			Health, well-being & nutrition utilisation: Incidence of diet-related diseases and status of diet-related physical and mental health in specific communities
			Nutritional standards & legislation: Extent to which good-quality nutritious food is provided by the processing, retail and catering sectors (including public food procurement) and consumed by customers
			Education and awareness: Extent to which residents of the city region are equipped with knowledge and skills on safe, diversified and nutritious food and healthy diet
			Food safety: Extent to which processing, retail and catering sectors comply with sanitation and food safety regulations
	2. Improve social conditions for workers	All workers in the food system work under healthy and safe conditions	**Workforce conditions:** Extent to which all city region food system businesses provide good-quality health and safety working conditions and risk assessment/reduction for their workforce
	3. Build local food culture & heritage	The city region is known for its food culture, food heritage and sense of identity	**Food culture and identity:** Extent to which food businesses located in the city region are actually connected to food produced/processed in the city region and make the provenance of food visible to customers
	4. Ensure acceptability of food provision for all city residents	The city is known for a readily available diversity of food provision to meet the wide range of preferred dietary habits of its citizens	**Food choices:** Extent to which food provision meets the needs of a diversity of customers

engaging decision/policy makers or budget holders in prioritising this work; and aligning this work with available resources: money, time, expertise, commitment.

3. **Data collection:** Collection and analysis of data on selected CRFS indicators can be accomplished using a variety of methods, including:
   - qualitative and quantitative data collection by means of household, government and business surveys;
   - further stakeholder and expert consultations (focus group discussions, interviews, etc.);
   - quantitative food flow mapping; and
   - use of representative case studies to illustrate specific issues, highlight (potential) innovations and provide more specific inputs /ideas for policy and action planning.

Where data is too costly or difficult to collect but an issue is important to include, there may be other approaches. For example, greenhouse gas emission assessments will be too costly and time-consuming to fall within the scope of this project. However there may be existing studies that could be used, e.g., transport emission data. Or there may be no data on food waste, but instead successful initiatives could be described as case studies and further analysis done to explore opportunities for improvements and changes. In this case it will be important to view this exercise as a "rapid appraisal" rather than a robust scientific study and therefore to make use of interviews and focus groups to gather data.

4. **Spatial location of data:** It will be important to be able to geographically link specific indicator data collection and analysis to specific areas in the city as a basis for further territorial planning.

5. **Gender dimension:** The further development of CRFS indicators should take into account different sustainability dimensions including gender, urban resilience and youth employment. With support of the CGIAR Water, Land and Ecosystems Research Program (WLE), RUAF, IWMI and CIAT will apply a specific gender lens to further development of the framework and the development of methodological guidelines on data collection and analysis.

Conclusion

The final goal of a CRFS analysis and indicator/data collection is to advance CRFS policy design or strategy planning. Collection of baseline indicators may act as a useful trigger for improved action and policy; the "neutral" appearance of data and research presented provides an entry point for food to be considered on the policy agenda. As well, indicators can play a useful role in order to allow for monitoring and improving performance and progress in terms of programme and policy implementation.

For example, from the Utrecht region (the Netherlands) perspective, there is a gap in the production of regional vegetables, meat and eggs. Fruit and dairy production is more locally present and provides opportunities for a regional market. One of the policy recommendations is to better match local supply and demand. This requires enhancing demand for local food, support to regional production, processing and marketing, and improved coordination between urban food demand and supply of regional food products from farm businesses located in surrounding municipalities. Relevant indicators include:
- number of farm businesses in the Utrecht region, by type, that produce explicitly for the Utrecht region;
- number of farmers' markets in the Utrecht region;
- percentage of the population in Utrecht that always/often buys regional food products; and
- proportion of food procurement expenditure by public institutions on food from shorter (local/regional) supply chains.

In Quito (Ecuador), targets were set for the different envisaged outcomes of the territorial food strategy. (Baseline) indicators were defined for each of the targets, including:
- types of food products and volumes imported (from outside the city region) compared with similar types of product volumes produced in the city region;
- total surface area of current and potentially available currently vacant land within the Metropolitan District of Quito used for urban and periurban and rural agriculture land;
- number and percentage of children suffering from chronic malnutrition (per income group);
- presence of an active multi-stakeholder food policy and planning structure;
- existence of a food supply emergency/food resilience management plan for the municipality (in response to disasters; vulnerabilities in food production, transport, access; socio-economic shocks, etc.) based on vulnerability assessment;
- costs of a nutritious food basket at city/community level; and
- number of jobs in the food sector.

For policy outreach and planning purposes, it is important to consider the presentation and visualisation of data collected and how these findings are communicated with policymakers. In Colombo (Sri Lanka), Kitwe and Lusaka (Zambia), data collected in the assessments were georeferenced and mapped to better visualise and understand the CRFS and its spatial distribution and dynamics. In Utrecht and in Toronto (Canada), key data and figures were summarised and visualised for different parts of the food system, for example to bring to the forefront key food system contributions to job creation, GHG emissions or health impacts.

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New York City Food Indicators:

Sharing lessons for the next decade

Joy Carey

In a recent report published February 2018, the City University of New York Urban Food Policy Institute takes stock of what has changed in food policy in New York City (NYC) since 2008 and identifies a number of challenges that any city will face in developing a food metrics process. This is a must-read report for anyone concerned with implementing and monitoring city-level food system change.

Key findings suggest that, although accomplishments to date do show that city and state governments can take action on food policy and implement policies that could lead to improvements in health, if NYC is to achieve meaningful improvements in food-related outcomes in the next decade, it will need to consider more than simply maintaining current efforts.

Questions that shape the report

Lessons for the Next Decade seeks to answer several questions:

- What are the strengths and weaknesses of the cumulative food policy recommendations that NYC and State officials have made over the last decade?
- To what extent have the policies monitored through the NYC Food Metrics report since 2012 been implemented? What are the strengths and weaknesses of this monitoring system?
- What is the evidence on the implementation and impact of a broad array of public food policies that have been approved by NYC or New York State in the last decade?
- How have key nutrition and health indicators for the NYC population changed over the last decade? What do these changes tell us about the success and limitations of current food policies?

How has NYC made use of food indicators?

Across a range of different agencies in and around NYC there is a broad attempt to create policy that relates to the following food-related goals, and under which the NYC Mayor's Office of Food Policy monitors 37 indicators:

- Improve nutritional well-being – reduce diet-related diseases (21 Mayor's Office indicators)
- Promote food security (4 Mayor's Office indicators)
- Create food systems that support economic and community development (3 Mayor's Office indicators)
- Ensure sustainable food systems – waste, carbon, protecting farmland (8 Mayor's Office indicators)
- Support food workers (1 Mayor's Office indicator)
- Strengthen food governance and food democracy (0 Mayor's Office indicators)

How has the use of indicators helped and what are the limitations?

- The six annual Food Metrics Reports from 2012-2017 show measurable progress on about 50% of the 37 indicators and provide valuable data for understanding the implementation of city food initiatives.
- 50% of the indicators relate to policy goals that promote health and reduce diet-related diseases. The other policy goals have far fewer indicators.
- Most of the current indicators focus on outputs, making it difficult to determine whether food-related policies are having any impact or not.

What reflections does NYC have to share on the use of indicators and the reporting process?

- Indicators need to be presented in a way that shows progress or set-backs.
- Indicators need to be disaggregated by geographical area, to help identify local problems and enable local solutions.
- Indicators need to be made more publicly available to enable further analysis and data visualisation.
- Heavy reliance on quantitative data limits policy makers and advocates in understanding why changes have or have not occurred.
- Because collecting the data requires such a big effort, more resources are needed and many more city organisations need to be involved in contributing data to strengthen the Food Metrics Reports.

Ultimately, the authors of the *Lessons for the Next Decade* report recommend 1) a NYC Food Plan that charts five- to ten-year food policy goals for the city, state, and region; and 2) a process to identify key outcomes and metrics for key food policy goals that can be used to monitor the food plan.

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Good Scholarship on Urban Agriculture and Food Systems

Diana Lee-Smith

Scholarly food system research has been criticised for haphazard disciplinary overlap, sometimes not even addressing the same problems or questions, and for being "advocacy driven". Data on urban agriculture (UA) and food systems has also been criticised as missing, weak or out of date. In response, this paper looks at how interdisciplinary overlaps should be handled. It also presents an overview of quantitative data on households practising UA in Africa over several decades, yielding important empirical results. These can be used to advance debate on the effectiveness of food systems and UA in different settings. Questions are also raised for further research on the relationship of UA to food systems.

This short article does not permit evaluation of the studies compared, but suffice it to say each uses a household survey of a particular town or city and counts the incidence of various types of UA. Data is analysed by comparing key intervening variables that are available (household size and income, access to land, size of town and, where available, nutrition and food security levels), to observe differences and trends.

Results

As shown in Table 1, households practising UA form a significant but highly variable proportion of urban African households. This proportion varies with the interacting variables of town size, household income and accessibility of land. Generally, the larger the town or city, the fewer households practise UA. The majority of households farm for their own consumption but also make savings and sell produce; some are even predominantly commercial. An unexplained relationship is that UA households are consistently larger than the norm. Although the positive effect of UA on food security and nutrition seems established, more studies would help confirm this.

Surprisingly, low-income groups are less likely to practise UA than higher-income earners. While the poor predominate over middle- and high-income groups in urban Africa, they are proportionally under-represented among urban farmers. This is probably because they live mainly in dense urban slums and tend to farm opportunistically in open spaces. Higher-income groups are better able to farm, including the more profitable livestock keeping, because they have space: these are mostly backyard farmers.

Food insecurity and malnutrition are at alarmingly high levels in African urban slums. UA households are better off than the norm, with consistently higher-than-average urban incomes. Urban small-scale farmers earn at least twice as much as rural farmers on only about 20 percent of the area, while both commercialisation and higher incomes are

Table 1: Proportion of households engaged in UA in some African towns and cities

City / town	Country	Farming households	Survey date	City population at that date
11 in southern Africa	9 SADC* members	22% - crops and livestock (only poor households measured)	2008	varied
21 in West Africa		20-50% - crops and livestock	2006	varied
Kampala	Uganda	49% - crops and livestock	2003	1,200,000
Mbeya	Tanzania	93% - crops and livestock	2002	266,000
Morogoro	Tanzania	90% - crops and livestock	2002	228,000
Ibadan	Nigeria	45% - crops, 40% - livestock	2000	2,550,593
Nakuru	Kenya	35% - crops and livestock	1998	239,000
Dar-es-Salaam	Tanzania	36% - crops only	1995	2,500,000
Kampala	Uganda	30% - crops and livestock	1991	774,000
Nairobi	Kenya	20% - crops only	1985	1,000,000
Addis Ababa	Ethiopia	17% - vegetables only	1983	1,400,000

Table from Lee-Smith et al., forthcoming
*Southern Africa Development Community

A woman farms vegetables on a plot next to municipal offices in Cape Town, South Africa (2012). The plot was donated by the city Urban Agriculture Unit, and the farmers are also provided with water and manure to assist in production. Photo by Diana Lee-Smith

associated with livestock production, with its opportunities for the sale of products such as milk and eggs in addition to meat. Irrigated open-space urban vegetable farming can achieve an annual income two to three times that earned in rural farming.

Discussion

The relationship between UA and income is not yet understood. Is there a causal link between UA and poverty alleviation? Longitudinal cohort studies are needed to understand the direction of the relationship: does UA alleviate urban poverty or does being better off help a household engage in UA? Also, why are UA households bigger and what, if anything, can be learned from this? More and better studies are also needed on health impacts of UA, both positive and negative, following the seminal work of Cole et al. (2008).

Meanwhile the widespread nature of UA in African cities, and its association with better food security, child nutrition and incomes, suggests that supporting it as part of city planning is desirable. However, planners would need to distinguish between residents of low-income informal settlements (most of whom do not farm but whose food insecurity and malnutrition have been measured) and backyard urban farmers who are clearly doing well. This is being done in Nairobi through its UA Act of 2015 for allocating land and water for UA to households in slums - but different planning solutions may be needed in more developed cities with less malnutrition.

UA can never be proved a "right" or "wrong" policy, even though, as claimed in this article, it is a well-established empirical fact in African cities. Policy makers have to decide whether the facts demonstrate a need for UA planning, and in what way. Policy goals are the key when it comes to deciding on a course of action and assessing effectiveness. Alleviating hunger and malnutrition may be a higher-

priority goal than increased GDP – not so until recently, although the case for promoting UA may be argued citing human rights, as a way of alleviating hunger and malnutrition (including lack of dietary diversity causing obesity as well as stunting). Supportive policies can thus be advocated for UA production of animal source foods and fresh vegetables.

Conclusions

There are not many comparative analyses of empirical data on UA that look at different studies as I have tried to do. Even if data is uneven and most of the studies are out of date, they are still useful in building a general picture: together, their findings reveal certain patterns.

Planning and designing for UA in food systems must rely on sound empirical evidence as well as the calculus of policy and urban land-use priorities. They must also rely on artful solutions to complex dilemmas without single solutions, aptly characterised as "wicked" problems. They require those involved to make choices. Unlike social science problems that can be rigorously tested, such planning problems require participatory argumentation and balancing of various interests. Thus the planning of food systems, and even their day-to-day operation, are inherently political; solutions will also vary from place to place.

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Measuring Progress in Sustainable Food Cities:

A Toolbox for Action

Ana Moragues-Faus

What do we mean by success? How can we convince others that what we do has a positive impact on the urban foodscape? And... are we actually having an impact? What are the most effective activities we can implement in the context of austerity? These questions prompted a fruitful collaboration with the Sustainable Food Cities Network: a network of 50 cities in the UK that are developing food strategies and associated local food partnerships to deliver them. We initiated a participatory-action research process to develop an indicators toolbox that will help food partnerships start addressing these big questions.

The Sustainable Food Cities Network (SFCN) is a partnership project coordinated by three UK NGOs – the Soil Association, Sustain and Food Matters – that, since 2011, brings together public, private and civil society organisations to share challenges, explore practical solutions and develop good practice in all aspects of sustainable food. For that purpose, the SFCN has developed a platform for peer-to-peer support and exchange of good practices; offers tailored support, hands-on advice, training material and resources; runs national and local campaigns to drive change; organises events and webinars; provides funds to support local activities and has designed an awardWWs framework.

The SFCN now joins 50 cities across the UK, and constitutes a step forward in scaling urban food strategies in the UK up and out, representing a unique experience in the world of urban food policy (Moragues-Faus, 2017). In this context, the SFCN wanted to help cities measure their progress in developing sustainable food systems and providing a holistic account of the food system, at the same time acknowledging place-based specificities and differences. The remainder of this article presents the motivation for this project, the process of co-producing indicators and the lessons learned.

Why do we need indicators?

The evaluation of programmes and development of indicators is complex and time-consuming. A myriad of sustainability assessment exercises exist at the local, national and international level, using different frameworks and implementing diverse methodologies (Prosperi et al., 2015). Why was the SFCN interested in indicators? For three main reasons:

First, the SFCN promotes working through food partnerships and across sectors. To be a member of the SFCN a city needs to have in place a multi-stakeholder partnership and collectively develop a food action plan to work across

Sustainable Food Cities Network Conference 2017. Photo by Sustainable Food Cities Network

Workshop on identifying indicators at City University, September 2015. Photo by the Food Research Collaboration

sustainability dimensions, including health and wellbeing, social justice, economic aspects and environmental challenges. While this approach is increasingly being adopted by a range of initiatives, it is still relatively new in the urban food policy world. And, by and large, it remains a shared challenge to assess – as well as communicate – **the collective impact of working together**. Consequently, an assessment framework that shows the connections and synergies between sectors and actors can contribute to supporting more holistic and participatory interventions in the food system. This can result in more commitment to support backbone organisations and cross-sectoral programmes by various stakeholders and funders.

Second, the development of a framework that includes health and social wellbeing, economic and environmental outcomes can help **make the case** for different sectors to work together and meet their goals through food-related activities. For example, some of the health and social wellbeing indicators identified in this framework match key performance indicators of the UK Public Health Service, which allows food partnerships to bring on board key institutions. In this regard, it is particularly important to include the evidence that shows how specific food initiatives contribute to improving particular indicators related to specific food system outcomes, e.g. providing studies that show the impact on obesity rates of reducing exposure to unhealthy food environments.

Finally, in the context of austerity food partnerships and policy, councils struggle to **define priorities**. A framework that maps current food activity in the city can help identify areas that need further work, and key gaps in terms of types of activities – policies, training or market-based tools – and also what sustainability dimensions are addressed: health and wellbeing, environment and economic prosperity. Furthermore, if this framework contains evidence of how specific food initiatives contribute to progress-specific indicators, it becomes a toolbox to inform decision-making.

Co-producing an indicators toolbox for action

We designed a participatory-action research process in order to co-produce a place-based, holistic and action-oriented assessment framework. The process was led by academics and SFCN practitioners, and involved diverse stakeholders in order to assure a collective identification of goals and criteria for selecting indicators. The project was articulated around the following steps.

First, a review of both academic and "grey" literature led to identifying the different types of assessment frameworks mobilised in the food realm, as well as the range of indicators used to measure the environmental, social and economic sustainability of urban food systems (see Prosperi et al., 2015).

Second, the results of this literature review guided the design of four participative workshops enrolling more than 100 practitioners to define a vision for a sustainable food city and to identify the most relevant indicators to guide action towards that goal. The workshops were organised geographically (Cardiff, London, Edinburgh and Liverpool) in order to grasp differences across places that might shape the type of partnerships and activities being developed, and therefore assessment priorities, as well as maximise participation of city governments and civil society organisations in the project.

A third step consisted of synthesising the results of the workshops and verifying the feasibility and coherence of the selected indicators on the basis of the available literature and insights from practitioners. A draft toolbox was widely disseminated for that purpose. This included conducting a webinar with 42 attendees. A meeting with 17 academics and practitioners was also organised in London to gather extra feedback. In total more than 70 participants provided comments on the draft toolbox.

Finally, we applied the framework to two cities, Bristol and Cardiff, actively involved in the SFCN. This step included gathering information from different institutions and databases produced in the last five years to feed the indicators toolbox and gain additional insights, e.g. providing a reflection around each indicator and complementary sources of information.

These activities have resulted in the development of a conceptual framework and toolbox to measure progress towards sustainable food cities, and can be accessed below.

Lessons learned

- While it is important **not to reinvent the wheel**, it is equally relevant to **broaden participation** of stakeholders in the definition of the framework. This is essential for making sure to develop a tool that responds to people's needs and is therefore useful and actually implemented in specific local contexts.
- At the moment, our experience in the UK shows that it is virtually impossible to develop or select food-related indicators at the city level that are accessible, reliable, comprehensive and inexpensive to collect. It is important to acknowledge these **trade-offs** and use criteria for the selection of indicators that is most important for potential users. Rather than developing a perfect assessment framework, we sought to develop a useful, flexible toolbox that recognises its limitations. In our case, some of the meta-indicators are more accessible than others; for example, it is easy to monitor the decrease in the number of overweight or obese people, and more difficult to measure changes in the number of jobs in the local food economy. It is also beneficial to break down indicators in terms of neighbourhoods, gender, age, income and ethnic background.
- The combination of a **systemic approach to food sustainability and a place-based perspective** is a key characteristic of this framework. We were committed to developing a non-prescriptive framework that accommodates the diversity of UK cities and takes into account that there are various pathways towards sustainability. Furthermore, the framework not only assesses progress, but helps map current activities, connect to different sectors and stakeholders in the city, and inspire action.

Next steps

The toolkit is a living project that will be progressively refined. The next steps to continue improving the tool have been defined:

- We will align the meta-indicators with other international processes taking place, such as those developed by the Milan Urban Food Policy Pact. These meta-indicators will also be weighted in order to provide a visual result of the assessment, that allows cities to visualise their progress and key challenges, as well as a comparison between cities to foster good practice exchanges.
- Though, at the moment, the framework can be accessed as a document, the SFCN is in the process of developing an interactive toolkit where the top-down and bottom-up entries could be more intuitive and user-friendly. This interactive platform will be ready before the end of 2018.

Acknowledgements

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More information
Download the toolbox: Making the case and measuring progress: towards a systems approach to healthy and sustainable food.
Webinar: We held a webinar in December 2016 during which we discussed this toolbox. It can take you through its various elements, how it could be used and how we came to develop it. Listen to a recording and view presentations here.

How Ede Municipality Developed a Tool to Monitor Improvement of the Local Food System

Lydia Hubregtse
Lara Sibbing

Screenshot of part of the general municipal dashboard (top right corner gives access to the section on Food).

Ede, a municipality (120,000 inhabitants) in the Netherlands, has an ambition: healthy and sustainable food for all its citizens. One of the first municipalities in the country to do so, Ede developed an integrated food policy to realise this ambition. Goals were developed within six themes:
- Healthy people
- A healthy food environment
- Sustainable consumption
- Short food chains
- A robust agri-food sector
- An integrated governance approach

The Ede food policy has been implemented for several years now and its first effects can be seen. Whereas only one in every ten primary schools in Ede had a school garden three years ago, now a full third of these schools has one! This is only one result. How can the entire food policy, which aims to improve the entire food system through its six themes, be monitored? And how can these results be made visible to inhabitants, policy makers and partners?

As a solution, the municipality created a tailor-made 'food' dashboard in which it combines information on all selected indicators to monitor progress within the six food policy themes. This dashboard is publicly available on the municipal website (see link below). Some of the information comes directly from existing monitors or surveys, such as the Ede census that assesses variables such as the number of overweight inhabitants. For other indicators new tools were developed, including the food education survey in which schools where asked if they have a school garden. The added

value of the Ede food dashboard is that, by combining both existing and new information on the six themes, it creates a complete overview of the state of the food system and thus the progress of the Ede food policy.

By embedding the food dashboard into the newly developed general municipal dashboard, Ede demonstrates that improving the food system is as important as other municipal issues such as the local economy, infrastructure and housing. Moreover, in putting the new issue of the state of the food system on the municipal agenda, Ede increases support for its food policy by making the impacts measurable.

Collecting the data and updating the general municipal dashboard – in which the food dashboard is embedded – takes about 20 days each year. The costs amount to 13,000 euros per year (this includes the software that the research department needs, regardless of the dashboard, to produce statistics in general). The initial investment for creating the general dashboard was approximately 15,000 euros.

Now that the food dashboard exists, there is room for improvement. Selecting the best indicators, those that are both sound and applicable, and updating them remains a challenge. The number of schoolchildren who work in a school garden might be a good indicator to measure the state of food education in the municipality. But is it a practical indicator? The number of schools with a school garden that children use might be a more useful one after all. To keep improving the quality of the dashboard, Ede is now using the Milan Urban Food Policy Pact indicators, which were developed together with the FAO. Combining this broad, global framework with local practice seems a fruitful way forward!

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Communicating Goals and Impacts of Urban Food Sharing

Anna Davies
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Stephen Mackenzie

Urban food sharing – which includes collective or shared practices around growing, preparing, eating and redistributing food – is experiencing a technology-fuelled renaissance, but are these activities contributing to more sustainable food systems? Delving into the project's research findings, this article analyses the goals of ICT-mediated urban food sharing initiatives from nine global cities and examines the ways that these organisations are communicating their activities and impacts through their online profiles. Five categories – social, environmental, economic, health and political – are used to classify goals and impacts. The article concludes by distilling the key challenges of establishing sustainability impacts.

In an era of planetary urbanisation there is growing clarity regarding the unsustainability of cities. Sharing, particularly ICT-mediated forms such as social media platforms, websites and apps, is increasingly identified by advocates as a potentially transformative mechanism for reorienting urban environments on to more sustainable pathways by reducing consumption, conserving resources, preventing waste and providing additional opportunities to interact with others. In the arena of food, sharing includes the physical exchange of food products and meals, connecting people who may also wish to share land and tools for food growing, and the sharing of kitchen spaces, food preparation and storage devices. Importantly, it also enables the exchange of knowledge, skills and information about the availability of food and the means to grow, process and cook it.

Although sharing food is certainly not a recent development, the new world of ICT-mediated food sharing stretches the territories over which people can share, increases the numbers of people who can be brought into sharing initiatives and brings into focus new forms of sharing among strangers. However, despite the claims of sustainability being made about urban food sharing, little is known about the collective scale, scope and impact of these systems. In response, SHARECITY – a project funded by the European Research Council – has begun to map out these reinvigorated international landscapes of urban food sharing.

Urban food sharing

Focusing on 100 urban areas drawn from all corners of the globe, more than 4000 food sharing initiatives, ranging from informal and community groups to charities, social enterprises and for-profit businesses, have been identified, categorised and mapped through the open access and interactive SHARECITY100 Database. This study demonstrated that there was little consistency across initiatives regarding how goals and impacts were being communicated in the online profiles of these initiatives. This is important, as all initiatives utilise their online profiles to communicate what they do with existing sharers and to recruit new ones, to

Examples of shared urban spaces: Skip Garden (London) and Himmel Beet (Berlin). Photos by SHARECITY

build and maintain relationships and to facilitate the exchange of new ideas, cooperation and innovation. Such communication also provides an element of transparency, which can help build trust within an initiative as well as with other initiatives, organisations and communities. In response we conducted a textual and visual analysis of the goals and impacts of 37 diverse initiatives from nine global cities – Athens, Barcelona, Berlin, Dublin, London, Melbourne, New York, San Francisco and Singapore – that focus on shared practices around growing, eating and redistributing food. This article reports on the goals and impacts that were uncovered. These cities were selected because they provide contrasting geographical, political and cultural contexts. The initiatives were selected in order to provide insights from different types of food sharing.

Communicating goals

The goals of the food sharing initiatives were identified through an examination of their mission statements or descriptions that explain the purpose of the initiative. Among the 37 initiatives, **social goals** were identified in almost every case (95%), showing food sharing remains an important means of prosocial behaviour among friends and family in the 21st century. **Environmental goals** were also articulated by the vast majority of initiatives (89%), with recurrent themes emerging of food waste reduction, local produce and small scale agriculture, and improved human connections with nature. **Economic goals** were identified for 59% of the initiatives assessed. While the economic goals identified were diverse, recurring themes included the promotion of alternatives to the traditional market economy and reducing inequalities. Just under half (49%) of the initiatives stated **health goals**, centring on the idea of increasing access to fresh, healthy or nutritious food. Explicit **political goals** – goals which seek to change the ways in which power and resources are distributed – were given by only 27% of the initiatives.

Communicating impacts

In this analysis, impacts were considered to be what the initiatives claimed to have achieved through their activities. Whereas goals were directly stated in every instance, communication of impacts tended to be more uneven across initiatives, with some communicating impacts explicitly and quantitatively and others implying impacts qualitatively through images or statements from those who share, sometimes using stories, testimonials or endorsements about achievements that resulted from the activities or services provided. Visual cues, such as graphics and photos, were also examined, as they feature prominently on initiatives' online profiles as a means of communicating both what they do (e.g., images of people growing food) and the results (e.g., images of harvests). With regard to social media, recent studies have found that posts with images produce 650% higher engagement than regular text posts. The images were scrutinised in terms of their setting (e.g., indoor, outdoor), any representations of nature (bright, pristine, rugged, urban, pastoral, rural etc.) and foodstuff (e.g., raw, "ugly", cooked), and the presence or absence of

Melbourne Food Justice Truck. Photo by SHARECITY

people and collaborative activities (growing, eating, moving, cooking, playing, learning, creating etc.). These visual cues were then also categorised along the five impact categories.

Nearly all (95%) initiatives provided some kind of statement about impacts, with an almost even split between cases where impact statements were purely qualitative and those that were quantitative. **Social impacts** were most commonly reported (89%), and these were expressed quantitatively by 52% of those initiatives. The most commonly reported quantitative social impacts were numbers of participants in events or partners of the initiative. For example, food-redistribution initiative foodsharing.de (Berlin) reports 200,000 registered users in Germany, Austria and Switzerland, with 32,461 volunteer "Food Savers" internationally. Qualitative social impact reports examined were often descriptions of activities that an initiative facilitates. For example, the urban harvest mapping initiative Ripe Near Me (Melbourne) simply says that their activities give "users a tool to connect with their local community". It was less common to find details of the scale or scope of impact in these cases.

Environmental impacts, meanwhile, were reported by just over two-thirds of the initiatives examined. This was the category in which initiatives were most likely to provide a quantitative impact statement. Claims of food waste reduction by weight, such as the "1,460,223 lbs of food rescued since 2013" noted by Rescuing Leftover Cuisine (New York), were a recurrent theme for this category. Qualitative reports of environmental impact tended to focus on food being produced locally or organically.

While social and environmental impacts were the main areas of concern for initiatives, at least in terms of their public communication efforts, it was also possible to identify **economic** (41% of initiatives), **health** (30%) and **political** (11%) impacts. Whereas just over half of the initiatives identifying economic impacts provided some quantified measures, only about a quarter of those reporting political impact did so, with even fewer of those reporting health impacts. This is unsurprising given the greater challenges associated with distilling direct cause and effect impacts in relation to health or political change. Further details of this goals and impacts analysis are detailed in the third SHARECITY Briefing Note (Davies et al., 2018), which can be accessed through the SHARECITY website.

The sustainability of food sharing

While examining the self-proclaimed goals and impacts of food sharing initiatives does not itself provide a means to establish the entire range of sustainability impacts of ICT-mediated food sharing – what we might call a sustainability "sharescore" – it is an important starting point. It does the essential job of documenting exactly how the initiatives present their goals and allows these goals to be compared with the impacts that they choose to represent through their ICT profiles. This is valuable even though initiatives also communicate in other ways, for example through face-to-face interactions and through reports to funders and other stakeholders.

The analysis shows clearly that while all initiatives include a goal of some kind, even if loosely articulated, the practices of reporting on actions and making claims about impacts are highly differentiated. Very few of the initiatives develop novel measures or metrics specifically for their activities and even fewer utilise the burgeoning number of generic sustainability assessment tools on offer. There are many and varied potential reasons for this that are currently being explored through in-depth ethnographies with these initiatives, such as financial cost implications or a limited range of available skills and capabilities to conduct such assessments, as well as the time it takes to collect and analyse the required data.

With regard to the online communications, in many cases goals are identified but no qualitative or quantitative data on impacts are provided. Unsurprisingly, where data are provided it is readily determined outputs that predominate, such as numbers of people engaged or the weight of food diverted from waste streams, rather than longer-term outcomes, which are hard to isolate and track over time. Although there is nothing inherently wrong with using qualitative or output-focused approaches to assessment and reporting, there are limitations. For example, communicating activity only along these lines may limit the initiatives' ability to convince external actors that their actions are making a significant difference to urban sustainability and miss important ways that initiatives affect the lives of urban citizens and urban environments more broadly. Although convincing decision makers or potential funders might not be a priority or even a necessity for some initiatives, establishing outcomes provides information for the initiatives themselves, and their participants, in terms of whether they are making progress towards stated goals.

Our research found that in many cases a key goal for food sharing initiatives revolves around social justice and community inclusion or cohesion, yet few statements or measures of such impacts are provided. This discrepancy is understandable, as measuring collective, relational and affective dimensions of sharing, such as generosity, community, or self-esteem, is far from easy. This begs the question of whether it is possible – and perhaps more importantly, appropriate – to apply measures or metrics in these cases. If it is, how should appropriate metrics be identified? And if it is not, then how are such qualities to be recognised in decisions around supporting more sustainable food systems? These questions form the basis for the next phase of the SHARECITY research project.

Next steps

Analysing the narratives provided by the initiatives themselves through their online profiles tells only one side of the communication story around goals and impacts. How these communication strategies are received is being further explored with food sharing initiatives, their participants and those who regulate or fund their activities, through in-depth ethnographic research. Building on the findings of this research, a period of collaborative work with initiatives will take place during which the SHARECITY team will design with them a flexible, online tool to assist in establishing trajectories towards their goals and communicating the worth of their activities more holistically.

We will be reflecting on the results of our co-design activities later this year and would like to hear from any food sharing initiatives who are interested in testing a beta version of the online sustainability impact supports we will produce. Our resources and outputs are freely available from the SHARECITY website detailed below. We would be delighted to hear from anyone interested in discussing our work further. Do get in touch!

Acknowledgement

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Web resources

SHARECITY website: http://sharecity.ie/
SHARECITY100 Database: http://sharecity.ie/research/sharecity100-database/
SHARECITY Briefing Notes: http://sharecity.ie/outputs/publications/

Measuring Urban Agriculture for Sound Policy in a North American City

Andrew Kilduff
Tim Tensen

Recent policy amendments permit residents to raise small livestock and grow food in backyards, however residents of multi-family rental units face continued challenges securing land access rights.

To date, many closely followed urban agricultural efforts in the United States have focused on its largest cities – but because of their scale, these efforts are not necessarily applicable to midsize cities (population: 50,000-250,000), which characteristically operate with fewer resources and exert far less global influence. Midsize cities account for the majority of America's urban landscape, and it is in these cities that urban agriculture (UA) may be most impactful by building on unique and individual stories of place and promoting an inclusive and participatory process. This story follows the case of one midsize city: Brockton, Massachusetts.

Industrial legacy

Brockton, a post-industrial city in the north-eastern US, is challenged by a declining tax base, environmental degradation and systemic issues of corruption and inefficient governance. Over the past 100 years it witnessed the rise and fall of a major shoe manufacturing industry and subsequent residential and commercial development, and consequently possesses many vacant parcels and commercial and industrial buildings. Brockton is also home to a large immigrant population, including among the largest Cape Verdean and Haitian communities in the nation. Especially since city government lacks equal representation from its 95,000 residents, Brockton's limited resources have negatively impacted social and economic equality and community wellbeing, including food access.

Chicken frustration

Brockton's exploration of UA began when frustrated residents were vying for the right to raise chickens in their backyards. Previous efforts to bring these frustrations to the City Council, Board of Health and Planning Department were unsuccessful since Brockton had no policy sufficient to address agricultural production. Beginning the winter of
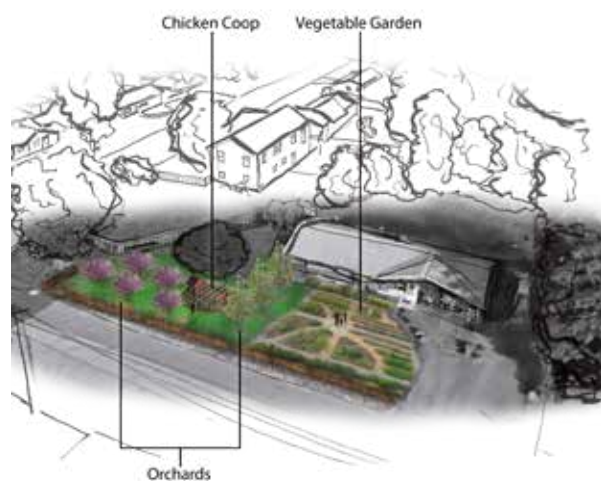
A majority of residences in Brockton resemble single-family residences. Policy allowing food growing on privately-owned properties may contribute a change to a majority of urban landscapes in the U.S.

Vendor Hall   Restaurants   Incubator Kitchen

INSIDE

OUTSIDE

Greenhouses   Rooftop Farm   Solar Panels   Rain Garden Park

Reusing vacant commercial sites in Brockton for food production, processing and distribution was explored as part of solutions to stimulate UA enterprises and economic development.

2017, the Brockton Department of Planning and Economic Development engaged a student team from the Conway School of Landscape Design to devise a long-term policy solution in an Urban Agriculture Master Plan.

The Urban Agriculture Master Plan outlined a working definition of UA, existing conditions in Brockton and five core recommendations for supporting UA in the city. These recommendations underscored that if any UA project is to be successful, it must emerge from an inclusive planning process that reflects community needs and desires. Bridging the existing divisions between city government and the public would be a necessary part of this process. The plan also recognised that, as UA research is in the early stages of development, there is much to be learned about how urban planning and policy, public and private infrastructure and community decision-making can increase access to local and nutritious food.

One step forward

The master planning process led Brockton to adopt policy supporting UA – including allowing residents to raise backyard chickens. Efforts to incentivise urban agricultural enterprises, including zoning amendments allowing UA as an accessory on vacant commercial and industrial parcels, are also taking shape. Concurrently, Massachusetts is developing statewide policy supporting UA. These steps are coupled with community-driven action; in Brockton, the interfaith community and healthcare sector have led support for UA.

Since Brockton's UA efforts are in the early stages, it will be possible to study them from their inception. This is critical, since many midsize US cities are similarly developing UA. Brockton is thus an ideal candidate for the study of urban agricultural development and effective and replicable planning and policy efforts.

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Hungry for more?

ASSESSING CITY REGION FOOD SYSTEMS

Validating the City Region Food System Approach: Enacting Inclusive, Transformational City Region Food Systems

This article offers a critical assessment of the evolving City Region Food Systems (CRFS) approach (see also page 6 and 28).
http://www.mdpi.com/2071-1050/10/5/1680

ASSESSING FOOD SYSTEM RESILIENCE

Measuring Local Food Systems' Resilience: Lessons learned from Honduras and Nicaragua

This briefing note presents a series of resilience indicators as examples for measuring the resilience of local food systems based on community consultations in Honduras and Nicaragua. It is primarily addressed to food security and resilience practitioners in Central America and for those working on climate and food security metrics more generally.
http://www.iisd.org/library/measuring-local-food-systems-resilience-lessons-learned-honduras-and-nicaragua

San Francisco Disaster Food System Report

This analysis includes recommendations to advance food resiliency for low-income and vulnerable populations in the event of disaster. The report highlights the fragility of the disaster food pipeline in San Francisco and focuses on lessons learned from other disasters (like Hurricane Katrina and Superstorm Sandy).
www.issuelab.org/resource/san-francisco-disaster-food-system-report.html

The resilience of long and short food chains: a case study of flooding in Queensland, Australia

This paper provides insights into the food security performance of long and short food chains, through an analysis of the resilience of such chains during the severe weather events that occurred in the Australian State of Queensland in early 2011.
link.springer.com/article/10.1007/s10460-015-9603-1

Local economic resilience: the role of community food enterprises.

This guide uses case studies, and draws on interviews with local authority officers and elected members, to set out the benefits that community food growers can deliver to local economic resilience and how local authorities can best support them. This report is part of a series of easy-to-read guides developed for community enterprises and local authorities.
www.sharedassets.org.uk/innovation/local-land-economies

FOOD SYSTEM DATA AND INDICATORS

Urban Agriculture: Between Urban Phenomenon and Urban Legend

Pay Drechsel (IWMI) at the Rural Transformation and Urbanisation - Agriculture for Development Conference (2017). Watch it on YouTube
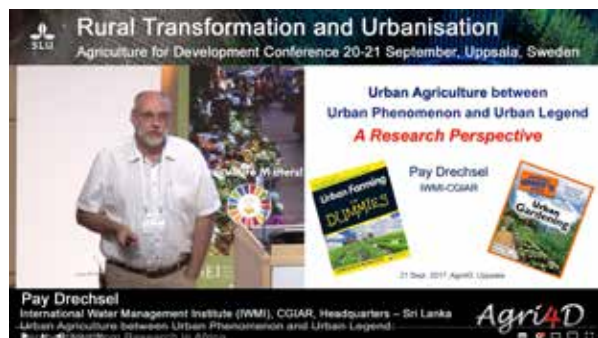
Vancouver Urban Farming Census 2014 to 2016

The Census provides data on the characteristics and impact of urban farms in Vancouver. It contains detailed information on the number and types of farms operating in city of Vancouver, the amount of land under production, farm job creation and volunteer labour, food sales, community engagement, challenges to operating an urban farm business, and the contribution of urban farms to the Vancouver Food Strategy goals.
http://www.urbanfarmers.ca/vancouver-urban-farming-census-2014-to-2016

The Food Counts: A Pan-Canadian Sustainable Food Systems Report Card

This report brings together existing measures of social, environmental, and economic well-being to help researchers, policy makers, and practitioners examine food systems at the national level. https://fledgeresearch.ca/foodcounts

The CityVeg project supported direct selling by young farmers in Accra. Photo by IWMI

Upcoming issue: Youth Employment and Migration October 2018

This issue of the Urban Agriculture Magazine is a joint effort of the RUAF Foundation and its partner The Laurier Centre for Sustainable Food Systems, Wilfrid Laurier University (Canada).

In this upcoming magazine we would like to explore the issues of youth employment and migration in relation to urban agriculture and city region food systems.

We look forward to your contribution on one of the following issues:

- The role of urban and periurban agriculture in providing livelihood opportunities and decent jobs along the local food supply chain (not only in food production but also in food processing, distribution, marketing, catering, waste management and ICT), that are especially relevant to young people.
- The role of urban and periurban agriculture in migration and job creation, building economic opportunities, self-esteem and social protection (including topics such as informal and formal jobs, temporary jobs, rural-urban migration, remittances and gender related issues) both in countries of origin and of destiny.
- Urban food and agriculture programmes and projects that facilitate access to finance, land, markets, training and education focusing on young and beginning farmers and vulnerable groups.
- Urban food projects that link youth and elders especially those that foster knowledge sharing.
- Policies that support job creation for youth in urban food and farming or that help raise minorities and recent immigrants out of poverty through urban agriculture or urban food (like social procurement policies).

Read the full call for contributions. Deadline for articles: *1 July (abstract or first draft), 1 August (full article).*

Total article length should be *600 (1 page), 1400 (2 page) or 2100 words (3 page).* We also welcome other type of contributions such as interviews, book reviews, visual stories, videos or infographics.

The Magazine will be published by *October 2018.* For more information or to receive the detailed author guidelines, contact Femke Hoekstra at f.hoekstra@ruaf.org.